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Disaster risk reduction and management policies and programs of the municipalities in the fifth district of Camarines Sur: A comprehensive analysis

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ABSTRACT

This study assessed the disaster risk reduction and management policies and programs implemented in the Fifth District of Camarines Sur municipalities based on the Sendai framework criteria for local government resilience to disasters. It sought to identify the key vulnerabilities and risk factors and assess the current disaster risk reduction and management policies and programs implemented. The quantitative study utilized descriptive correlational design to gather the necessary data with documentary analysis and questionnaire as the main data gathering instruments. The questionnaire is composed of an adapted and self-made questionnaire which was distributed to 60 respondents. The data were analyzed with the use of the assessment checklist, weighted mean, and Friedman's analysis of Variance. The municipalities of Baao, Balatan, Bato, Buhi, Bula, and Nabua are highly vulnerable to heavy rain, typhoons, and flooding, however, they are fully compliant with the criterion for disaster risk reduction and management policies and programs which implies good practices along with governance, risk identification, financial capacity, urban development, natural ecosystem, institutional capacity, societal capacity, infrastructure resilience, disaster response, and recovery. On the other hand, the municipality of Balatan complied with the criterion for disaster risk reduction and management policies and programs. The disaster risk reduction and management policies and programs implemented in the municipalities of Fifth District of Camarines Sur are significantly influenced by several barriers such as top-down planning and poor understanding of disaster risk. There is a significant difference between the current disaster risk reduction and management policies and programs implemented in the Fifth District of Camarines Sur indicating notable disparities across municipalities.

KEYWORDS

disaster risk reduction and management, policies and programs, municipality

INTRODUCTION

Efforts to manage disaster risks involve putting into action policies and strategies. These aim to lessen the impact of potential disasters by preventing new hazards, reducing existing ones, and effectively handling any remaining risks. This approach strengthens a community's ability to bounce back (resilience) and minimizes losses from catastrophes. Issues like climate change, growing cities, and a lack of preparedness for disasters are making natural hazards like earthquakes, volcanic eruptions, and tsunamis even more severe. This results in significant losses in human life and economic well-being. As the range of natural disaster threats widens, Disaster Risk Reduction (DRR) is becoming increasingly crucial for organizations within the United Nations system. Disaster Risk Reduction is not just outlined in a key document (Sendai Framework) but is also essential for achieving goals laid out in other international agreements, such as the Sustainable Development Goals and the Paris Climate Agreement.

The Philippines is a country that experiences yearly natural disasters and climate-related risks. The World Risk Report 2020 states that it ranked tenth among 181 nations in terms of disaster risk, with prior years placing as ranked as high as third in 2018 or second in 2014 (Behlert et al., 2020; UNDRR, 2019). This is because of the country's geological features, location within the Pacific Ring of Fire, and its political and socioeconomic environment, all of which increase its susceptibility to catastrophes. In the context of the Philippines, one of the most catastrophic climate disasters would be yearly hurricanes. The country is not only made up of a coastline but also more than 7,000 islands. Spanning more than 36,000 km, it also experiences 20 typhoons on average that make landfall in the Philippine Area of Responsibility (PAR) every year, resulting in consequences such as storm surges, flooding, and damaging wind patterns (United Nations Office for Disaster Risk Reduction (UNDRR), 2019). The Philippines is considered to be the most disaster-prone nation in the world, placing it in the top three in terms of population exposure to dangers. Because its islands are situated in the center of a typhoon belt and close to the edge of two major tectonic plates, they are frequently impacted by landslides, floods, typhoons, earthquakes, volcanoes, and droughts. Most of these measures have been concentrated on post-disaster (reaction and recovery), even though complete disaster management ideas support preventive (reduction), mitigation, preparedness (readiness), response, and recovery concerns (Bolletino et al. 2018).

Annual tropical cyclones and a worldwide pandemic have combined in recent years to bring increased pressure on the management systems in place, compelling players to examine their frameworks with a sharper perspective. The nation was struck by typhoons in 2020, which is one particular collection of events. During the COVID-19 pandemic's peak. Among these typhoons are Ulysses (globally referred to as Vamco), Vicky (Krovanh), Quinta (Molave), Ambo (Vongfong), and Rolly (Goni). The local names of Pepito (Saudel), Ofel, and Marce (Dolphin) are used here (Santos, 2021). Three of these were particularly strong and influential: Ulysses, Rolly, and Quinta. Super Typhoon Rolly falls into one of two categories: the "most powerful tropical storm to ever impact Earth". Typhoon Ulysses is the cause of the 2020 "worst flooding" that occurred in years in Manila (Buan, 2020). With many years of disasters under its belt, the Philippine government has established strong resilience. However, there are still significant skills gaps in disaster management throughout the Philippines, and surprisingly little information is available on local levels of preparedness and resilience to disasters. People are put in danger when preventive or preparedness measures are neglected, which also raises unnecessary demands on response and recovery resources. The latter has led to a shift in the global approach to emergency and catastrophe management in recent years toward a more organized and thorough risk management process. The objective of this strategy is to establish a more unified approach encompassing pre-disaster endeavors, comprising prevention, mitigation, and preparedness actions referred to as Disaster Risk Reduction (DRR) activities, and post-disaster initiatives. Acknowledging the significance of the latter has spurred a global shift in emergency and disaster management towards a more systematic and comprehensive risk management framework in recent times. This strategy emphasizes the development of an integrated approach that encompasses both pre-disaster DRR activities and post-disaster interventions.

The greater emphasis on improving community resilience to mitigate the effects of catastrophes has been central to this new strategy. In industrialized nations, community disaster resilience (CDR) has become the cornerstone of hazard preparation and catastrophe risk reduction. Despite the resilience construct's expanding prominence and multidisciplinary use, no precise definition has emerged. To assess how well-prepared communities are for disasters (disaster resilience), the National Disaster Risk Reduction and Management Council (NDRRMC) uses a recognition program called Gawad KALASAG. Established in 1998, this program acknowledges outstanding achievements in disaster risk management (DRM) and humanitarian aid. By highlighting the successes of various DRM professionals in boosting a country's ability to withstand disasters (resilience), Gawad KALASAG encourages long-term support and commitment from high-ranking government officials. At the same time, Gawad KALASAG continues to encourage volunteering among agencies and people to provide much-needed assistance throughout the DRM response phase. Kalasag is the Filipino word for "shield," which was used by early Filipinos to protect themselves from attackers or dangerous animals. Gawad KALASAG was established to encourage the participation of various stakeholders in the development and implementation of Disaster Risk Management (DRM) programs aimed at safeguarding high-risk areas from disasters. As a former head of the Iriga City CDRRMO, which has been recognized as a Hall of Famer in the Gawad Kalasag Award, the researcher acknowledges the crucial importance of designing disaster risk reduction and management strategies to safeguard the lives and property of every resident of Iriga City towards disaster resilience. Iriga City, serving as a model, can assist nearby municipalities in achieving the desired objective of disaster resilience.

The Fifth District of Camarines Sur comprises municipalities that are exposed to multiple hazards, making it imperative to evaluate the effectiveness of their DRRM policies and programs. This study sought to address a knowledge gap in disaster risk reduction and management by providing a comprehensive review of resilience strategies based on the Sendai Framework for disaster risk reduction. It represents the first comprehensive examination of resilience measures, particularly at the municipal level. This research is particularly timely in the realm of disaster management, given ongoing efforts to ensure evidence-based disaster management, particularly at the local level, and national discussions regarding the centralization of disaster resilience measures under a unified national entity. The study aimed to provide a comprehensive overview of the current state of DRRM in the Fifth District of Camarines Sur. The findings will serve as a basis for recommending enhancements to existing policies and programs, ultimately contributing to the safety and resilience of communities in the different municipalities of Camarines Sur.

Objectives

This study assessed the disaster risk reduction and management policies and programs implemented in the Fifth District of Camarines Sur municipalities based on the Sendai framework criteria for local government resilience to disasters.

It specifically sought answers to the following specific objectives.

1. Identify the key vulnerabilities and risk factors specific to municipalities in the Fifth District of Camarines Sur.
2. Assess the current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur along with:
    a. Governance
    b. Risk Identification
    c. Financial Capacity
    d. Urban Development
    e. Natural Ecosystem
    f. Institutional Capacity
    g. Societal Capacity
    h. Infrastructure Resilience
    i. Disaster Response

j. Recovery

3. Identify the barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur.
4. Test the significant difference between current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur.
5. Formulate a plan to enhance the disaster risk reduction and management policies and programs capabilities and community involvement in the municipalities of the fifth district of Camarines Sur.

METHODS

The researcher utilized a descriptive-correlational study, assisted each municipality, and compared disaster risk reduction and management policy and programs of each Municipality in the fifth district of Camarines Sur. A correlational study determined each municipality's similar views on fundamental disaster risk management competence. However, the tools for statistical analysis of data inherent in quantitative research are still beneficial in identifying correlations. The study tested and analyzed the differences between current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur were

Respondents

To acquire the most valid and credible source of data, the researcher evaluated data originating from the primary source, which were the three (3) primary stakeholders, two (2) Municipal officials, MDRRMO Head, three (3) MDRRMO staff, barangay captains as the main respondents. The researcher considered 10 respondents for each municipality which accounts for a total of 60 respondents. The researcher used the purposive-criterion sample strategy based on the chosen respondents. The sample was picked by the researcher depending on who the researcher believed would be fit for the study. This is commonly used when there are a restricted number of people with expertise in the topic under investigation.

Research Instrument

The researcher used the survey checklist in gathering the primary data, supplemented by unstructured interviews, observation, and documentary analysis. *Questionnaire*. This research utilized the assessment checklist to evaluate the disaster risk reduction and management policies and programs of the Local Government Unit (LGU) following the Sendai framework for disaster risk reduction and management. The questionnaire comprises items accompanied by scoring and rating systems. *Documentary Analysis*. The researcher conducted a documentary investigation of pertinent documents, particularly in identifying the key vulnerabilities and risk factors specific to municipalities in the Fifth District of Camarines Sur. The researcher considered analyzing documents for verification and substantiating the primary data gathered.

Data Collection

In evaluating the current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur, the researcher adopted the assessment checklist following the principles of the Sendai Framework. Moreover, a self-made questionnaire was made for the barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur.

Preparation of the Questionnaire. The structure of the questionnaire was shaped by integrating principles from the Sendai Framework, specifically focusing on disaster risk reduction and management. Part I of the questionnaire determined the current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of

Camarines Sur along with governance, risk identification, financial capacity, urban development, natural ecosystem, institutional capacity, societal capacity, infrastructure resilience, disaster response, and recovery, and the Part II evaluated the barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur. *Validation of the Questionnaire*. The draft of the questionnaire was shown to the research professor, research adviser, and statistician for correction and approval of the questions and items to be sought from the respondents. To test the clarity and understanding, the comments and suggestions made by the experts are acknowledged for the improvement and revisions of the questionnaire prepared. *Administration and Retrieval of the Questionnaire*. During the administration of the survey, the researcher asked for a permit to conduct the study and obtained it from the head of the Local Government Unit which was the subject of this study. The researcher personally conducted the distribution of the questionnaire to countercheck the responses through an unstructured interview and ease the retrieval of the survey instrument.

Data Analysis

The data gathered were organized, tabulated, and analyzed in the light of the purposes of this study. To interpret the data, statistical tools were employed such as the percentage technique, weighted mean, and Friedman's Analysis of Variance. The percentage technique displays the proportion of observations for each data point or collection of points. It is a popular approach for representing the relative frequency of survey replies and other data (Jove, 2022). This was used in determining the disaster and risk profile of each municipality in the fifth District of Camarines Sur. To assess the current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur, the researcher used the assessment checklist following the Sendai framework for disaster risk reduction and management using the scoring scheme shown below.

Level	Range	Verbal Interpretation
5	4.50-5.00	Excellent (E): Full conformity with the requirement. A significant number of excellent practices serve as an example for others.
4	3.50-4.49	Very Good (VG): Full compliance to the criterion which implies good practices
3	2.50-3.49	Good (G): Compliance with the criterion
2	1.50-2.49	Fair (F): Minimal compliance to the criterion
1	1.00-1.49	Poor (P): Non-compliance to the criterion set
0	0.00-0.00	No Provision: Missing but must be included

Weighted Mean was used to quantify the data on the barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur. Friedman's Analysis of Variance was utilized to test the significant difference between current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur.

RESULTS AND DISCUSSIONS

This part highlighted the data collection results and interpretations derived from the evaluation of the disaster risk reduction and management policies and programs implemented in the municipalities of the Fifth District of Camarines Sur. The data were arranged and presented in graph and tabular form, with a written explanation to give more detailed and significant insights into the issue under investigation.

1. *Key Vulnerabilities and Risk Factors Specific to Municipalities in the Fifth District of Camarines Sur*

The initial segment outlines the prevailing primary vulnerabilities and risk factors inherent in the municipalities within the fifth district of Camarines Sur. Table 1 displays comprehensive data illustrating the risk profile of the municipalities comprising this district. Notably, the data highlights the principal hazards and threats each municipality faces, indicating susceptibility to flooding, flash floods, rain-induced landslides, typhoons, and in some cases, strong winds as precipitating factors. Additionally, municipalities like Bato, Bula, and Balatan acknowledged the risk of storm surges due to their coastal locations, while Bula also identified potential risks from tsunamis and sea level rise. Ground shaking and earthquakes are recognized threats in Baao, Bula, and Nabua, with Bato being the sole municipality mentioning lineaments/fault lines based on PhiVolcs reports, along with ground settlement, subsidence, and liquefaction.

Table 1. Key vulnerabilities and risk factors specific to municipalities in the fifth district of Camarines Sur

HAZARDS	BATO	BAAO	BUHI	NABUA	BULA	BALATAN
a. Flood	/	/	/	/	/	/
b. Rain	/	/	/	/	/	/
c. Storm Surge	/				/	/
d. Faultline	/					
e. Drought	/				/	
f. Typhoon	/	/	/	/	/	/
g. Earthquake		/	/	/	/	
h. Volcanic Eruption		/	/	/	/	
i. Pandemic		/				
j. Endemic						
k. Liquefaction	/					
l. Ground Settlement	/					
m. Ground Subsidence	/					
n. Accidents/		/				/
o. Fire/Crime					/	
p. Tsunami					/	
q. Extreme Weather					/	

Among the natural hazards listed, Baao, Buhi, and Balatan also highlighted a heightened risk of human-induced hazards, particularly vehicular accidents, and fire incidents as indicated in the provided risk profile data. Furthermore, infrastructure, particularly road networks, facilitates easy access to areas along the national highway, with Bato, Bula, Nabua, and Baao serving as minor business hubs for the district, while Buhi and Balatan are accessible by sea. Most municipalities, except Buhi, have full access to facilities such as power and water, with private providers offering potable water, although water access is at 92%, and a portion of households still rely on kerosene. Communication services, including postal, telephone, and cable television, are widely available, with access to various networks like Smart and Globe, enhancing commerce, trade, and industry. Each municipality celebrates its own local festivities and religious activities, providing opportunities for locals and "balikbayans" to reunite with family after working overseas. These events attract tourists, allowing them to experience the tourism and cultural offerings of each area, alongside developed beach resorts, pools, and waterfalls. Protective services in each municipality are bolstered with appropriate resources, ensuring safety and security measures for all constituents, including police, fire personnel, and village workforces trained in basic life-saving techniques. This underscores that the fifth District of Camarines Sur faces significant risks from hydro-meteorological hazards such as flooding, rain-induced landslides, and typhoons, as well as geologic hazards like liquefaction,

ground shaking, and tsunamis. Climate change-related hazards such as drought, stronger typhoons, extreme weather events, and sea-level rise further exacerbate these risks. Moreover, areas along national highways are more susceptible to human-induced hazards, notably accidents, fire incidents, and crime. It emphasizes the urgent need for comprehensive preparedness, prevention, and mitigation programs, projects, and activities to reduce the likelihood and impact of these hazards on the community. Extreme rainfall events cause heavy damage in the country. The excessive rainfall in 2004, 2006, 2008, and 2009 caused massive landslides and floods, such as those in Aurora and Quezon in 2004 and Iloilo in 2008. Excessive rainfall also caused the remobilization of lahar deposits, resulting in the avulsion of rivers and flashfloods such as in 2006 in Legazpi City and its vicinity due to Typhoon Reming. Heavy rains also trigger excessive flooding that destroys communities along riverbanks, fishponds, agricultural lands, roads and bridges, and other infrastructure such as caused by perennial flooding in the Cagayan River Basin, Pampanga-Agno River Basin, Bicol River Basin, and the Jalaur River Basin in Iloilo (Cruz, 2017).

2. Current Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur

The following section delves into the current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur, based on the Sendai Framework for Disaster Risk Reduction 2015-2023.

a. Governance. Competent and effective disaster governance is a key step in realizing the objective of a resilient municipality. Clear and thorough guidance for decision-making and catastrophe risk mitigation actions are provided by policies and institutional structures. Table 2 illustrates current disaster risk reduction and management policies and programs implemented in the municipalities of the fifth district of Camarines Sur along with governance.

Table 2. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with governance

INDICATORS	BAA	BAL	BAT	BUH	BUL	NAB
1. Plan making	4.70	4.00	3.90	4.10	3.80	4.80
2. Organization, Coordination & Participation	4.60	3.70	4.40	4.10	3.80	4.90
4. Integration	4.40	3.80	3.90	4.30	3.70	4.60
AWM	4.57	3.83	4.07	4.17	3.77	4.77
EVALUATION	E	VG	VG	VG	VG	E

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good E- Excellent

The municipalities of Baao, Balatan, Bato, Buhi, Bula, and Nabua have a master plan that includes and implements disaster risk reduction approaches having a weighted means of 4.70, 4.00, 3.90, 4.10, 3.80, and 4.80, respectively. There is also a multi-agency/sectoral mechanism with appropriate authority and resources to address disaster risk reduction through organization, coordination, and participation. Lastly, resilience is properly integrated with other key municipal functions/portfolios. Overall, the municipalities in the 5th district of Camarines Sur such as Baao, Balatan, Bato, Buhi, Bula, and Nabua are organized for resilience having an average weighted means of 4.57, 3.83, 4.07, 4.17, 3.77, and 4.77, interpreted as excellent, very good, very good, very good, very good, and excellent, respectively. This suggests that the full execution of the DRRM Plan required persistent attention, institutional commitment, careful planning, considerable investments, multi-sectoral and multi-stakeholder collaborations, and necessary competencies. Resilience is

ingrained in governance. Competent and effective disaster management is an important first step in achieving the objective of a resilient town. Policies and institutional frameworks provide extensive and clear guidance for decision-making and actions targeted at reducing catastrophic risk. Each municipality has a master plan that incorporates and implements disaster risk reduction strategies. Furthermore, there is a multi-agency/sectoral system with the power and resources to address catastrophe risk reduction through organization, coordination, and involvement. The municipalities in Camarines Sur's fifth district are generally structured for resilience. As a result, the municipalities of Nabua and Baao have the highest average weighted mean of 4.57 and 4.77, respectively. Which are interpreted as excellent. It implies that these municipalities are in full conformity with the requirement with a significant number of excellent practices that serve as an example for others. Whereas the other municipalities are not far behind with very good results which suggests that they are in full compliance with the criterion which implies good practices. This suggests further that consistent focus, institutional commitment, thorough planning, sizeable investments, collaborations amongst multiple sectors and stakeholders, and sufficient competencies were required for the complete implementation of the DRRM Plan. These findings align with those of Pellini et al. (2018) who studied LGU efforts to lessen the consequences of catastrophes as well as how knowledge and research evidence are used to build urban resilience policies in urban regions. It examined how scientific knowledge and research findings are applied to the design and implementation of urban resilience strategies in natural catastrophe policy and decision-making.

b. Risk Identification. Identify, comprehend, and apply present and future risk scenarios. Municipalities can effectively devise disaster risk reduction strategies when they possess a comprehensive understanding of potential hazards. Risk assessments and analyses facilitate planning for risk reduction measures, prioritizing projects, and making informed decisions. Table 3 displays current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with risk identification. The municipalities are cognizant of the primary threats faced by the LGU and their likelihood of occurrence indicating a very good assessment. They exhibit a shared understanding of risks among the municipality, utility providers, and other regional and national agencies overseeing infrastructure such as power, water, roads, and railways, as well as stress points on the system and municipal-scale risks, and agreed-upon scenarios outlining municipal-wide exposure and susceptibility to each hazard, or sets of hazards, have been prepared by the municipalities.

Table 3. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with risk identification

INDICATORS	BAA	BAL	BAT	BUH	BUL	NAB
1. Hazard assessment	4.70	4.00	4.10	4.50	4.30	4.80
2. Shared understanding of infrastructure risk	4.20	3.60	3.90	4.40	3.80	4.80
3. Knowledge of exposure and vulnerability	4.10	3.70	3.90	3.80	3.90	2.80
4. Cascading impacts	3.70	3.40	3.60	4.10	3.70	2.50
5. Presentation and update process for risk information	4.10	3.50	3.60	3.50	3.80	4.70
AWM	4.16	3.64	3.82	4.06	3.90	3.92
Evaluation	VG	VG	VG	VG	VG	VG

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good E- Excellent

Furthermore, there exists a mutual understanding of potential cascade failures between municipalities in the 5th district of Camarines Sur and infrastructure systems under various scenarios. Additionally, there are regularly updated danger maps and risk statistics. Overall, the

municipalities in the 5th district of Camarines Sur such as Baao, Balatan, Bato, Buhi, Bula, and Nabua demonstrate a high level of preparedness and capability in identifying, understanding, and implementing existing and future risk scenarios, with an average weighted mean of 4.16, 3.64, 3.82, 4.06, 3.90, and 3.92, interpreted as very good, respectively. This implies that these municipalities are in full compliance with the criterion which implies good practices. This indicates that these municipalities have amassed a substantial amount of consolidated data on hazards, vulnerability, risk, and capacity, along with a comprehensive understanding of disaster management arrangements, plans, and experiences within the municipality.

c. Financial Capacity. Strengthens financial capacity for resilience. Local governments may implement their strategies when they have adequate financing and resources set aside for disaster risk reduction. The data presented in Table 4 shows the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with financial capacity. The municipal agencies understand all financing sources, are well linked, are aware of all potential channels to obtain external money, and are actively pursuing funds for important resilience initiatives; exhibit a dedicated allocation of budget, provision of suitable resources, and establishment of contingency funds for local disaster risk reduction efforts; ensure insurance coverage across all sectors - business, and community, while also offering incentives to various sectors and segments of society to aid in resilience development.

Table 4. Current Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur along with Financial Capacity

INDICATORS	BAA	BAL	BAT	BUH	BUL	NAB
1. Knowledge of approaches for attracting new investment to the municipality	4.40	3.60	3.80	3.90	3.80	4.50
2. Financial plan and budget for resilience, including contingency funds	4.30	3.10	3.70	4.10	4.20	4.70
3. Insurance	3.80	2.90	3.10	3.50	3.50	4.50
4. Incentives	3.40	3.00	3.30	3.20	3.60	4.50
AWM	3.98	3.15	3.48	3.68	3.78	4.55
Evaluation	VG	G	G	VG	VG	E

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good E- Excellent

Overall, the municipalities in the Fifth district of Camarines Sur specifically Nabua, demonstrate a robust financial capacity for resilience, with an average weighted mean of 4.55, indicating an excellent preparedness. It implies that Nabua is in full conformity with the requirement with a significant number of excellent practices that serve as an example for other municipalities. On the other hand, the municipalities of Baao, Buhi, and Bula demonstrate a very good preparedness in financial capacity with weighted means of 3.98, 3.68, and 3.78, respectively. Indicating that they are in full compliance with the criterion which implies good practices. Conversely, the municipalities of Balatan and Bato show a good assessment of their financial capacity having a weighted mean of 3.15 and 3.48. It means that they are compliant with the criterion. This underscores the effective utilization of the Municipal DRRM Fund, alongside other DRRM resources, regular funding sources, and budgetary support for the Municipal Disaster Risk Reduction and Management Office (MDRRMO), all guided by planned programming. As per the 2010 Disaster Risk Reduction (DRR) Act, each Local Government Unit (LGU) is mandated to

maintain both a DRRM fund and a "Quick Response Fund" for emergency purposes. Consequently, LGUs generally perform well in terms of the allocated budget and contingency fund criteria. Sim et al. (2018) conducted a study on the disaster resilience of megacities, focusing specifically on Hong Kong. Their findings revealed that Hong Kong exhibits resilience to catastrophes due to its incorporation of disaster risk considerations into its development plans and the allocation of sufficient financial resources.

d. Urban Development. Pursue resilient urban development. Preventative measures can avert serious infrastructure disruption and incapacitation, which have detrimental effects on society, the environment, and the economy. Urban development is a theme that emphasizes sustainable urban growth, land use zoning, and building code requirements. Table 5 depicts the municipalities' capacity in the 5th district of Camarines Sur to advance resilient urban development. Table 5 illustrates the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with urban development. The municipalities of Baao, Buhi, Bula, and Nabua have a very good assessment of urban development, particularly the land use zoning, new urban development, building codes, and standards, application of zoning, and building codes and standards, with a weighted mean of 3.90, 3.78, 3.63, and 4.45, respectively. On the other hand, the municipalities of Balatan and Buhi demonstrate good assessment for urban development. It implies that the municipalities of Baao, Buhi, Bula, and Nabua are in full compliance with the criterion which indicates good practices, while Balatan and Buhi are compliant with the criterion. The very good ratings for land use zoning in Baao, Buhi, Bula, and Nabua reflect effective spatial planning that considers hazard-prone areas and restricts development in high-risk zones. Effective land use zoning contributes to minimizing exposure to hazards and is critical for sustainable urban growth. Other municipalities can benefit from reviewing these zoning practices to improve their own urban planning and risk reduction strategies. Furthermore, the municipalities of Balatan and Buhi, which have good assessments, comply with urban development criteria but have room for improvement compared to other municipalities.

Table 5. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with urban development

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Land use zoning	4.10	3.50	3.60	3.90	3.60	4.60
2. New urban development	4.00	3.40	3.20	3.80	3.60	4.40
3. Building codes and standards	3.80	3.60	3.10	3.80	3.80	4.40
4. Application of zoning, building codes and standards	3.70	3.40	3.50	3.60	3.50	4.40
AWM	3.90	3.48	3.35	3.78	3.63	4.45
Evaluation	VG	G	G	VG	VG	VG

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good G- Good

While these municipalities meet basic standards, there is potential to elevate their urban development practices to very good or excellent levels. Targeted initiatives to enhance zoning regulations, update building codes, and ensure stricter compliance can further reduce disaster risks. This indicates that municipalities in the 5th district of Camarines Sur diligently comply with the National Building Code and the Green Building Code when applying for construction permits for new homes and structures, ensuring adherence to standards for sewage treatment plants, sanitation, fire safety, flood mitigation, and earthquake safety measures. Israel and Briones (2018) explored the correlation between household poverty and natural disasters in the Philippines. Their research revealed that previous studies on adaptation and coping mechanisms suggest natural disasters

significantly impact household income, leading to increased poverty levels. Both urban and rural poor households are disproportionately affected as disasters diminish their asset base, earning capacity, and income, exacerbating poverty and diminishing household welfare.

e. Natural Ecosystem. Preservation of natural ecosystems involves safeguarding natural buffers to enhance the protective functions provided by these ecosystems. Table 6 presents data illustrating the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with the natural ecosystem. Awareness and understanding of ecosystem services functions; integration of green and blue infrastructure into municipality policy and projects; and transboundary environmental issues were rated as very good with Nabua ranking highest among the six municipalities with a weighted mean of 4.30. This is followed closely by Baao and Balatan signifying a very good performance with a weighted mean of 3.73 and 3.66. Conversely, the municipalities of Bato, Buhi, and Bula exhibit a good performance along with natural ecosystems with a weighted mean of 3.43, 3.33, and 3.13. The municipalities of Nabua, Baao, and Balatan exhibit a very good understanding and integration of ecosystem services functions, green and blue infrastructure, and transboundary environmental issues, with Nabua ranking the highest.

Table 6. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with natural ecosystems

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Awareness and understanding of ecosystem services functions	3.90	3.67	3.60	3.60	3.50	4.50
2. Integration of green and blue infrastructure into municipality policy and projects	3.50	3.50	3.40	3.40	2.90	4.20
3. Transboundary Environmental issues	3.80	3.80	3.30	3.00	3.00	4.20
AWM	3.73	3.66	3.43	3.33	3.13	4.30
Evaluation	VG	VG	G	G	G	VG

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good G-Good

These municipalities are effectively incorporating ecological considerations into their DRRM policies, recognizing the importance of natural ecosystems in mitigating disaster risks. On the other hand, Bato, Buhi, and Bula, while performing well, show room for improvement in their awareness and integration of natural ecosystem functions into DRRM policies. These municipalities have established a foundation for integrating ecosystem services into their DRRM strategies but need to enhance their practices to reach very good performance levels. The assessment of DRRM policies and programs in relation to the natural ecosystem across the municipalities in the fifth district of Camarines Sur reveals a varying degree of integration and awareness. Municipalities that demonstrate very good performance serve as exemplars of best practices in ecosystem-based DRRM. To achieve uniform excellence, there is a need for targeted improvements, capacity building, and enhanced community engagement in municipalities with lower scores. By embracing and expanding these practices, all municipalities can strengthen their resilience to natural disasters while promoting sustainable development and environmental conservation. Pellini et al. (2018) researched LGU efforts to lessen the consequences of catastrophes as well as how knowledge and research evidence are used to build urban resilience policies in urban regions. The survey discovered that people are more cognizant of the risks linked with natural disasters when they have a history of

living in a disaster-prone area.

f. Institutional Capacity. Strengthen institutional capacity for resilience. The local government's DRR activities are strongly steered by a knowledgeable and capable institutional component. The data revealed in Table 7 outlines the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with institutional capacity. The municipality of Nabua possessed an excellent assessment of its institutional capacity along with skills and experience, public education and awareness, data sharing, training delivery, languages, and learning from others with a weighted mean of 4.58. Moreover, the municipalities of Baao, Balatan, Bato, Buhi, and Bula show a good assessment with a weighted mean of 4.37, 3.50, 3.78, 3.42, and 3.53, respectively. It implies that Nabua is in full conformity with the requirement with a significant number of excellent practices that serve as an example for others. While Baao, Balatan, Bato, Buhi, and Bula are fully compliant with the criterion which implies good practices. Nabua's excellent assessment with a weighted mean of 4.58 indicates its practices can serve as benchmarks for other municipalities. Nabua's success in institutional capacity can be used as a model, offering insights and strategies that other municipalities can adopt to enhance their own DRRM capabilities. The good assessments in Baao, Balatan, Bato, Buhi, and Bula suggest these municipalities have solid foundations but can benefit from targeted capacity-building programs. Initiatives to improve institutional skills and experience, particularly through training and professional development, can help elevate their performance to an excellent level.

Table 7. Current Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur along with Institutional Capacity

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Skills and experience	4.60	3.50	3.70	3.30	3.50	4.60
2. Public education and awareness	4.40	3.60	3.90	3.40	3.50	4.40
3. Data sharing	4.20	3.80	3.80	3.20	3.50	4.40
4. Training delivery	4.50	3.60	3.70	3.60	3.60	4.70
5. Languages	4.30	3.20	3.70	3.40	3.60	4.60
6. Learning from others	4.20	3.30	3.90	3.60	3.50	4.80
AWM	4.37	3.50	3.78	3.42	3.53	4.58
Evaluation	VG	VG	VG	VG	VG	E

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good E - Excellent

The assessment of institutional capacities across the municipalities in the fifth district of Camarines Sur highlights Nabua as an exemplary model in DRRM practices. The implications of these findings suggest that other municipalities can significantly improve their DRRM effectiveness by adopting similar strategies in capacity building, public education, data sharing, and continuous learning. By leveraging the strengths identified in Nabua and addressing the gaps in other municipalities, the district can enhance its overall resilience and preparedness against disasters.

g. Societal Capacity. Enhancing societal capacity for resilience is a crucial aspect of disaster risk reduction strategy. Citizen participation plays a vital role in this regard, with programs aimed at raising awareness, educating individuals, and building capacity contributing to the development of stronger and better-prepared communities. Table 8 presents data illustrating the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with societal capacity.

Table 8. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with societal capacity

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Community or "grassroots" organizations, networks, and training	3.30	3.90	3.60	3.50	4.80	3.95
2. Social networks "Leave no one behind"	3.50	3.60	3.30	3.10	4.30	3.70
3. Private sector/employers	3.50	3.50	3.20	2.90	4.60	3.68
4. Citizen engagement techniques	3.40	3.70	3.20	3.40	3.70	3.68
AWM	3.43	3.68	3.33	3.23	4.35	3.75
Evaluation	G	VG	G	G	VG	VG

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good G – Good

The table indicates that in terms of societal capacity, the municipalities of Balatan, Bula, and Nabua show a very good assessment of the community or "grassroots" organizations, networks, and training; social networks "Leave no one behind"; private sector/employers; and citizen engagement techniques, with a weighted mean of 3.68, 4.35, and 3.75, respectively. On the other hand, the municipalities of Baao, Bato, and Buhi, displayed a good assessment with a weighted mean of 3.43, 3.33, and 3.23, respectively. It implies that the municipalities of Balatan, Bula, and Nabua are in full conformity with the requirement with a significant number of excellent practices that serve as an example for others when it comes to societal capacity. While the municipalities of Baao, Bato, and Buhi are fully compliant with the criterion which implies good practices. Societal capacity is a critical component of community resilience, ensuring that communities can withstand and recover from disasters. Balatan, Bula, and Nabua, with their very good assessments, can serve as models for other municipalities. Their successful strategies in leveraging grassroots organizations and citizen engagement can be studied and emulated by Baao, Bato, and Buhi to enhance their societal capacities. Establish peer learning programs and exchanges where representatives from lower-scoring municipalities can observe and learn from the best practices in Balatan, Bula, and Nabua. The assessment of societal capacity across the municipalities in the fifth district of Camarines Sur indicates varying levels of effectiveness in leveraging community organizations, social networks, private sector involvement, and citizen engagement. By learning from the best practices of high-performing municipalities like Balatan, Bula, and Nabua, and by implementing targeted strategies to enhance societal capacity in lower-scoring municipalities, the district can strengthen its overall resilience and preparedness for disasters. Overall, municipalities in the fifth district of Camarines Sur demonstrate a comprehensive understanding of and commitment to strengthening societal capacity for resilience. It suggests that for residents to contribute to the endeavor to build resilient cities, education, training, and public awareness campaigns are essential. To be able to plan and take action to deal with future disasters, the entire community must be aware of the dangers and risks to which they are exposed. Programs for education and capacity building are also essential for encouraging community engagement in municipal disaster management efforts. Community catastrophe resilience holds great promise as a guiding paradigm for promoting disaster risk reduction and facilitating disaster recovery by focusing on and investing in local capacity for adaptation to a changing and unpredictable environment. However, there is still work to be done in terms of clarifying the concept and operationalizing the mechanisms that lead to increased community resilience and disaster recovery through attention to, and investment in, local adaptation capacities to a changing and uncertain environment. However, there is still work to be done in clarifying the notion and operationalizing the mechanisms that contribute to strengthening community resilience. According to Mayer (2019), community disaster resilience has great potential as a guiding paradigm for promoting disaster risk reduction and facilitating disaster recovery by

focusing on and investing in local capacity for adaptation to a changing and unpredictable environment. However, more effort has to be made to clarify the notion and operationalize the procedures that will lead to increased community resilience.

h. Infrastructure Resilience. During disasters, it is critical to consider vital infrastructure such as hospitals, schools, and road networks, which facilitate mobility, provide safety nets, and deliver essential social services. Therefore, safeguarding these infrastructures is of utmost importance. Table 9 presents data on the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with infrastructure resilience. Respondents indicate that municipalities prioritize the resilience of critical infrastructure by implementing strategic plans, with Bato scoring a weighted mean of 3.80, interpreted as very good. Additionally, there exist well-designed and well-built protective infrastructures based on risk information, notably in Baao with a weighted mean of 4.20, also interpreted as very good. Municipalities in the area adequately address major service disruptions in potable water, sanitation, energy, transportation, and communication lines, with Nabua scoring high with weighted means of 4.10 and 4.30, respectively, interpreted as very good. Moreover, sufficient first responder equipment, with military or civilian backup as required, is available, particularly commendable in Baao with a weighted mean of 4.60. Overall, the municipalities of Baao, Bato, Bula, and Nabua have enhanced infrastructure resilience along with critical infrastructure overview; protective infrastructure; water-potable and sanitation; energy; transport; communications; health care; education facilities; and first responder assets with a weighted mean of 3.81, 3.56, 3.24, 4.08, all interpreted s very good.

Table 9. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with infrastructure resilience

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Critical infrastructure overview	3.70	3.20	3.80	3.00	3.20	3.50
2. Protective infrastructure	4.20	3.30	3.60	3.10	3.60	3.80
3. Water-potable and sanitation	3.80	3.10	3.60	4.10	3.20	4.10
4. Energy	3.60	3.30	3.40	3.20	3.10	4.30
5. Transport	3.60	3.40	3.20	3.00	2.90	4.30
6. Communications	3.70	3.40	3.50	3.60	3.00	4.30
7. Health care	3.90	3.00	3.60	3.30	3.20	4.00
8. Education facilities	3.20	3.40	3.50	3.10	3.20	4.30
9. First Responder assets	4.60	3.00	3.80	2.90	3.80	4.10
AWM	3.81	3.23	3.56	3.26	3.24	4.08
Evaluation	VG	G	VG	G	VG	VG

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good G - Good

Moreover, the municipalities of Balatan and Buhi displayed good assessment with a weighted mean of 3.23 and 3.26. The municipalities of Baao, Bato, Bula, and Nabua have demonstrated a high level of infrastructure resilience, achieving very good assessments across various critical infrastructure domains such as protective infrastructure, potable water and sanitation, energy, transport, communications, healthcare, education facilities, and first responder assets. With weighted means of 3.81, 3.56, 3.24, and 4.08 respectively, these municipalities exemplify robust infrastructure systems that are well-prepared to withstand and recover from disasters. This indicates a comprehensive approach to disaster preparedness that incorporates resilient infrastructure planning and investment. The very good performance in these areas not only enhances the municipalities' capacity to manage emergencies but also ensures the continuity of

essential services, contributing to the overall safety and well-being of the community. In contrast, the municipalities of Balatan and Buhi, while showing good assessments with weighted means of 3.23 and 3.26, respectively, have room for improvement in their infrastructure resilience. These scores suggest that while Balatan and Buhi have adequate infrastructure to handle disaster risks, they may benefit from targeted enhancements to achieve the very good performance level seen in Baao, Bato, Bula, and Nabua. Focusing on strengthening protective infrastructure, improving water and sanitation systems, upgrading energy and transport networks, and enhancing healthcare and education facilities can significantly enhance their resilience. It underscores the importance of integrating this theme by identifying and mapping critical infrastructure and describing initiatives involving protective infrastructure and the restoration of vital services thoroughly. In the study of Brash (2021), she examined peer-reviewed literature on community resilience initiatives in the Northeastern United States, identifying evidence-based interventions and evaluation metrics. This research addresses gaps in the literature regarding strategies implemented to enhance community resilience against climate change-related disasters and the metrics used to assess resilience resulting from these strategies. The Climate and Disaster Resilience Initiative (2010) utilized the CDRI to assess disaster resilience in Metro Manila, encompassing 16 cities and one municipality. Survey respondents, serving as Planning Officers, highlighted poor ratings for urban morphology, population density, and the frequency of floods and typhoons, indicating vulnerabilities in these cities. Based on the Hyogo Framework, the study made policy recommendations in five critical areas for improving resilience. Specific recommendations were made for each municipality. However, the report concluded that Metro Manila localities must take an active role in defending themselves rather than relying solely on the national government.

i. Disaster Response. Ensure effective disaster response. Early warning systems and preparedness initiatives guarantee that people in communities at risk from natural hazards can react effectively and quickly to minimize casualties and lessen property damage. The data presented in Table 10 shows the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with disaster response.

Table 10. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with disaster response

INDICATORS	BAA	BAL	BAT	BUH	BUL	NAB
1. Early warning	4.50	3.20	4.00	3.60	3.60	4.90
2. Event management plans	4.50	3.50	3.90	3.40	3.50	4.80
3. Staffing /responder needs	4.10	3.00	4.00	2.90	3.40	4.30
4. Equipment and relief supply needs	4.10	2.90	3.80	3.00	3.40	4.80
5. Food, shelter, staple goods, and fuel supply	4.10	3.00	3.70	3.30	3.50	4.30
6. Interoperability and interagency working	4.60	3.10	4.00	3.40	3.50	4.70
7. Drills	4.30	3.20	4.30	3.70	3.50	4.70
AWM	4.31	3.13	3.96	3.33	3.49	4.64
Evaluation	VG	G	VG	G	G	E

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan VG- Very Good G – Good

The municipality of Nabua exhibits full conformity with the requirement of disaster response with a significant number of excellent practices that serve as an example for other communities

specifically in providing early warning; event management plans; staffing /responder needs; equipment and relief supply needs; food, shelter, staple goods, and fuel supply; interoperability and interagency working; and drills with weighted mean of 4.90; 4.80; 4.30; 4.80; 4.30; 4.70; and 4.70 respectively. Consequently, the municipality of Balatan has the lowest assessment of disaster response to the different indicators yielding a weighted mean of 3.20;3.50; 3.00; 2.90; 3.00 3.10; and 3.20 respectively interpreted as good or compliant with the criterion. Overall, Nabua is in full conformity with the requirement with a significant number of excellent practices that serve as an example for others with an average weighted mean of 4.64; Baao and Bato are fully compliant with the criterion which implies good practices with an average weighted mean of 4.31 and 3.96, interpreted as very good; and lastly, Balatan, Buhi, and Bula are compliance to the criterion of disaster response with an average weighted mean of 3.13, 3.33, and 3.49, interpreted as good. It implies that Nabua stands out with a full conformity rating, showcasing a comprehensive and exemplary approach to disaster response. With weighted means ranging from 4.30 to 4.90 across various indicators such as early warning systems, event management plans, responder staffing, equipment and relief supplies, and interagency coordination, Nabua's practices set a high standard for other municipalities. This high level of preparedness not only ensures a swift and efficient response to disasters but also minimizes potential impacts on the community by providing essential resources and well-coordinated emergency services. In contrast, Balatan, with the lowest assessment scores in disaster response, demonstrates significant gaps in its preparedness and capability. The weighted mean for Balatan, ranging from 2.90 to 3.50, highlights areas needing substantial improvement, particularly in staffing, equipment readiness, and interagency coordination. Despite being compliant with the basic criteria, the scores suggest that Balatan's disaster response mechanisms may not be as robust or effective as those in higher-performing municipalities like Nabua. This disparity underscores the urgent need for targeted interventions to bolster Balatan's disaster response infrastructure, ensuring it can better protect its residents during emergencies. The overall evaluation of disaster response across the district indicates that while Nabua sets a benchmark with an average weighted mean of 4.64, other municipalities like Baao and Bato also perform well with very good ratings of 4.31 and 3.96, respectively. Meanwhile, Balatan, Buhi, and Bula, with average weighted means between 3.13 and 3.49, meet the basic requirements but exhibit room for growth. The implications are clear: there is a need for a district-wide strategy that encourages knowledge transfer and resource sharing from high-performing municipalities to those with lower assessments. By adopting best practices from Nabua and investing in the critical areas identified, all municipalities in the fifth district can enhance their disaster response capabilities, leading to a more resilient and well-prepared community overall.

j. Recovery. Facilitate swift recovery and implement resilient reconstruction. The capacity of municipalities in the fifth district of Camarines Sur to revitalize and rebound from the aftermath of a disaster is enhanced by implementing a well-structured and inclusive recovery and reconstruction process. The data presented in Table 11 illustrates the current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with recovery.

Table 11. Current disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur along with recovery

Indicators	Baa	Bal	Bat	Buh	Bul	Nab
1. Post-event recovery planning – pre-event	4.00	3.10	3.50	3.30	3.50	4.20
2. Lessons learnt / learning loops	2.90	2.00	3.30	3.00	2.60	2.40
AWM	3.45	2.55	3.40	3.15	3.05	3.30
Evaluation	G	G	G	G	G	G

Legend: Bul- Bula Baa- Baao Bat- Bato AWM- Average Weighted Mean
Nab- Nabua Buh- Buhi Bal- Balatan G – Good

These municipalities employ strategies or processes for post-event recovery and reconstruction, encompassing economic revitalization and societal aspects, with a weighted mean of 4.00 for Baao; 3.10 for Balatan; 3.50 for Bato; 3.30 for Buhi; 3.50 for Bula; and 4.20 for Nabua. Along with the analyses of lessons learned the following were the results; Baao (2.90); Balatan (2.00); Bato (3.30); Buhi (3.00); Bula (3.05); and Nabua (2.40). Overall, the current disaster risk reduction and management policies and programs implemented in Baao, Balatan, Bato, Buhi, Bula, and Nabua along with recovery displayed compliance with the criterion with a weighted mean of 3.45, 2.55, 3.40, 3.15, 3.05, and 3.30 respectively interpreted as good. The evaluation of recovery strategies in the fifth district of Camarines Sur highlights varying degrees of effectiveness in post-event recovery and reconstruction among the municipalities. With weighted means indicating overall compliance but differences in performance, municipalities like Baao and Nabua stand out with higher scores of 4.00 and 4.20 respectively, suggesting strong recovery frameworks. These municipalities have effectively incorporated economic revitalization and societal recovery into their disaster risk reduction and management (DRRM) programs, which enhances their ability to rebound quickly after disasters. Their higher scores indicate strong policies and practices that can serve as models for other municipalities aiming to improve their recovery efforts. Conversely, the lower scores in the post-event analysis of lessons learned, particularly in Baao, Balatan, and Nabua indicate a critical area for improvement across all municipalities. These lower scores suggest that while there may be effective recovery processes in place, the systematic evaluation and integration of lessons learned from past events are insufficient. This gap can hinder the continual improvement of DRRM strategies and resilience building. To address this, municipalities need to establish more rigorous post-disaster review mechanisms, ensuring that experiences and insights from past events are thoroughly analyzed and used to inform future DRRM plans. Enhancing this aspect can lead to more adaptive and resilient communities capable of better withstanding future disasters. Overall, the data suggests that while the municipalities in the fifth district of Camarines Sur demonstrate good compliance with recovery criteria, there is a clear need for improvement in learning from past disasters. The municipalities can ensure that recovery efforts not only restore communities but also build greater resilience against future disasters. Sharing best practices and resources among municipalities, particularly learning from the higher-performing municipalities can foster a more cohesive and effective regional recovery framework. Francisco (2018) conducted a study on the coping mechanisms of households in Marikina, a city prone to heavy flooding. The study aimed to understand the various coping mechanisms utilized by households in response to flooding. It recommended promoting proactive adaptation measures by enhancing access to information, disaster management, adaptation training, and livelihood support for economic resilience, opportunities for higher education and financial assistance to construct stronger and more resilient housing units.

3. Barriers Influencing Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur

This section of the chapter addresses the barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur as illustrated in Table 12. The respondents identified top-down planning as the most significant barrier, with a weighted mean of 2.91, followed by poor understanding of disaster risk, with a weighted mean of 2.70, both interpreted as agreement. Furthermore, respondents agreed that facilitating disaster capitalism and overlooking the multiple dimensions of risk are barriers influencing the implementation of disaster risk reduction management policies and programs, with weighted means of 2.62 and 2.58 respectively, also interpreted as agree. However, along with exacerbating social exclusion, poor investing in DRR for resilience, poor enhancement of preparedness and building back better, and poor disaster risk governance are not barriers or as seen as challenges encountered having a weighted mean of 2.46, 2.42, 2.37, and 2.36 respectively, all interpreted as somewhat disagree. This implies that DRRM efforts are often hindered by centralized decision-making processes that may not adequately consider local contexts and needs. Additionally, the lack of a comprehensive understanding of disaster risks among stakeholders further complicates

the implementation of effective DRRM strategies. These barriers suggest a critical need for more inclusive, bottom-up planning approaches and enhanced education and awareness programs that can empower local communities and stakeholders with the knowledge necessary to effectively manage and mitigate disaster risks. Furthermore, the respondents agreed that facilitating disaster capitalism and overlooking the multiple dimensions of risk are also significant barriers. This implies that there are concerns about the exploitation of disasters for economic gain, which can undermine genuine recovery efforts and resilience building. Additionally, failing to consider the multifaceted nature of risks including social, economic, and environmental dimensions can lead to incomplete and ineffective DRRM strategies. Addressing these issues requires a holistic approach to disaster management that integrates various risk dimensions and prioritizes equitable and sustainable recovery efforts. By fostering a more comprehensive understanding of risk and promoting transparent and fair economic practices, municipalities can enhance the efficacy of their DRRM policies and programs.

Table 12. Barriers influencing disaster risk reduction and management policies and programs implemented in the municipalities in the fifth district of Camarines Sur

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Poor Understanding of Disaster Risk	2.70	Agree	2
2. Denying Multiple Dimensions of Risk	2.58	Agree	4
3. Poor Disaster Risk Governance	2.36	Somewhat Disagree	8
4. Exacerbating Social Exclusion	2.46	Somewhat Disagree	5
5. Poor Investing in DRR for Resilience	2.42	Somewhat Disagree	6
6. Facilitating Disaster Capitalism	2.62	Agree	3
7. Poor Enhancement of Preparedness and Build Back Better	2.37	Somewhat Disagree	7
8. Top-Down Planning	2.91	Agree	1
Average Weighted Mean	2.55	Agree	

Conversely, the data indicates that barriers such as exacerbating social exclusion, poor investment in DRR for resilience, poor enhancement of preparedness and building back better, and poor disaster risk governance are perceived as less significant, with respondents somewhat disagreeing that these are major challenges. This suggests that while they are acknowledged, they are not seen as primary impediments to effective DRRM. This perception may indicate that some foundational elements of DRRM, such as governance and investment, are relatively stronger in these municipalities. Ensuring that these elements are regularly reviewed and strengthened can help sustain and enhance the overall disaster resilience of the municipalities in the Fifth District of Camarines Sur.

4. Difference Between Current Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur

The following describes the difference between current disaster risk reduction and management policies and programs implemented in the municipalities in the Fifth District of Camarines Sur as reflected in Table 13. The variation in the implementation of disaster risk reduction and management policies and programs across each municipality was grounded on the Sendai Framework for Disaster Risk Reduction 2015-2030. A statistical analysis conducted to assess significant differences in disaster risk reduction and management policies and programs undertaken by each municipality yielded an Analysis of Variance (F-ratio) value of 6.2569 at a significance level of 5%, with a calculated p-value of 0.00062. Consequently, the null hypothesis was rejected, indicating notable disparities in the disaster risk reduction and management policies and programs across municipalities.

Table 13. Difference Between Current Disaster Risk Reduction and Management Policies and Programs Implemented in the Municipalities in the Fifth District of Camarines Sur

Indicator	Computed F ratio	p-value @ 0.05	Decision on Ho	Interpretation
Difference in disaster risk reduction and management by each municipality	6.2569	0.00062	Rejected	Significant

This implies that each municipality in the fifth district of Camarines Sur implements different strategies for managing Disaster Risk Reduction and Management Policy and Programs. The rejection of the null hypothesis underscores the presence of notable disparities in how each municipality approaches and implements DRRM strategies. This finding implies that there is no uniformity in the effectiveness or comprehensiveness of DRRM initiatives across the district, which could lead to varying levels of resilience and preparedness against disasters. In contrast, municipalities with less effective DRRM measures may face greater challenges in disaster preparedness, response, and recovery, potentially leading to higher vulnerability and longer recovery times following disasters. This uneven landscape necessitates targeted interventions to address the gaps in less-prepared municipalities, promoting knowledge transfer and resource allocation from better-performing municipalities to those in need. To enhance the overall disaster resilience of the district, it is crucial to identify and address the specific weaknesses in the DRRM policies and programs of lower-performing municipalities. This may involve providing additional training, resources, and support to these areas, fostering a collaborative approach where successful practices from higher-performing municipalities are shared and adapted. Moreover, policymakers should consider developing district-wide DRRM standards and guidelines to ensure a more uniform and effective approach to disaster risk management. By reducing these disparities, the Fifth District of Camarines Sur can build a more cohesive and resilient response framework, ultimately protecting its communities more effectively from the adverse impacts of disasters.

CONCLUSION AND RECOMMENDATION

This presents the critical findings from the assessment of disaster risk reduction and management (DRRM) policies and programs implemented in municipalities across the Fifth District of Camarines Sur. It not only summarizes the key results but also draws conclusions and offers recommendations to improve the effectiveness of DRRM efforts in the different municipalities.

The municipalities of Baao, Balatan, Bato, Buhi, Bula, and Nabua are highly vulnerable to heavy rain, typhoons, and flooding. The municipalities of Baao, Bato, Buhi, Bula, and Nabua are fully compliant with the criterion for disaster risk reduction and management policies and programs which implies good practices along with governance, risk identification, financial capacity, urban development, natural ecosystem, institutional capacity, societal capacity, infrastructure resilience, disaster response, and recovery. On the other hand, the municipality of Balatan complied with the criterion for disaster risk reduction and management policies and programs. The disaster risk reduction and management policies and programs implemented in the municipalities of Fifth District of Camarines Sur are significantly influenced by several barriers such as top-down planning and poor understanding of disaster risk. There is a significant difference between the current disaster risk reduction and management policies and programs implemented in the Fifth District of Camarines Sur indicating notable disparities across municipalities. The formulated plan can enhance the disaster risk reduction and management policies and programs capabilities and community involvement in the municipalities of the fifth district of Camarines Sur.

Based on the gathered results, the following recommendations were suggested:

1. The Municipal Government may develop a contingency plan for each identified risk or hazard in the Municipalities. For improved planning and strategy, continue to update the disaster risk profile of the Municipality. To address the high vulnerability to heavy rain, typhoons, and flooding in the municipalities of Baao, Balatan, Bato, Buhi, Bula, and Nabua, it is crucial to invest in advanced weather monitoring and early warning systems. These systems will enable timely alerts and improve preparedness among residents. Additionally, upgrading and maintaining critical infrastructure, such as drainage systems, flood barriers, and resilient roadways, will help mitigate the impact of severe weather conditions. Community training programs should be conducted regularly to educate residents on disaster preparedness and response. Developing and updating comprehensive emergency preparedness plans tailored to the specific risks of each municipality is essential. Furthermore, implementing environmental management projects like reforestation and riverbank stabilization can significantly reduce flood risk and soil erosion.

2. To maintain and enhance compliance with disaster risk reduction and management policies and programs, municipalities should facilitate knowledge exchange and sharing of best practices. Regularly reviewing and updating disaster management plans to incorporate new technologies, data, and methods is also necessary. Targeted support should be provided to some municipalities to help them fully align with the best practices observed in other municipalities. Encouraging collaborative projects that involve multiple municipalities can address common challenges and optimize resource use. Establishing strong monitoring and evaluation frameworks will track the effectiveness of disaster risk reduction initiatives and allow for data-driven adjustments to improve outcomes.

3. Addressing the barriers of top-down planning and poor understanding of disaster risk requires a shift towards bottom-up planning. Encouraging community participation in planning processes ensures local needs and knowledge are integrated into disaster risk reduction strategies. Capacity-building initiatives for local officials and community leaders will enhance their understanding of disaster risks and management practices. Decentralizing disaster management authority empowers local governments to make swift decisions and take action during emergencies. Extensive awareness campaigns should be conducted to educate both the public and local officials about the importance and benefits of proactive disaster risk management. Additionally, establishing feedback mechanisms to gather input from community members and stakeholders can continuously improve disaster risk reduction policies.

4. To address the disparities in disaster risk reduction and management policies and programs across municipalities, standardized guidelines should be developed to ensure consistency. Equitable allocation of resources is essential to meet the specific needs and vulnerabilities of each municipality. Implementing tailored interventions that consider the unique risks and capacities of each municipality will further enhance effectiveness. Regular capacity-building programs should be conducted to elevate the disaster management capabilities of less developed municipalities. Fostering a culture of peer learning, where municipalities with advanced disaster management practices mentor those lagging, can promote uniformity in preparedness and response efforts.

5. Effective implementation of the formulated plan is critical for enhancing disaster risk reduction and management capabilities. Clear timelines and responsibilities should be established to ensure accountability. Actively involving the community in the implementation process through regular consultations and participatory activities will foster a sense of ownership and engagement. Conducting regular disaster drills and simulation exercises can test and refine the plan, ensuring readiness. Securing adequate funding and resources is essential to support the plan and its various components. Finally, establishing a continuous monitoring and evaluation system will track progress and allow for necessary adjustments to improve the plan's effectiveness.

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