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Assessment of the Lemery MDRRMC's Disaster Risk Reduction Preparedness Relative to Typhoon Kristine Onslaught

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ABSTRACT: *The study aimed to assess the Lemery MDRRMC's Disaster Risk Reduction Preparedness relative to Typhoon Kristine's onslaught in terms of the early warning system, resource mobilization, and evacuation center, which served as the basis for the proposed inputs for enhancing the Lemery MDRRMC's Disaster Preparedness Plan. Additionally, it sought to determine the significant differences in the perceived level of assessment of Lemery MDRRMC's Disaster Risk Reduction Preparedness relative to Typhoon Kristine's onslaught when grouped according to demographic profile. The researchers employed a descriptive-comparative research design to assess the collected data and better understand issues related to Lemery MDRRMC's preparedness. A survey questionnaire was the data-gathering instrument distributed to 377 respondents using cluster sampling. The data gathered were tallied, tabulated, and analyzed to provide conclusions and recommendations. The study's findings revealed that the level of assessment of Lemery MDRRMC's Disaster Risk Reduction Preparedness relative to Typhoon Kristine's onslaught, in terms of the early warning system and resource mobilization, had a composite mean of 3.00, indicating that respondents generally agreed and acknowledged the MDRRMO's preparedness and response efforts in handling disaster and response operations, with minor areas for improvement in disaster preparedness seminars conducted by the BDRRMO, allocated funds of the MDRRMO, and practical usage of megaphones for mass information. Meanwhile, in terms of the evacuation center, which had a composite mean of 2.94, the results also suggest that the respondents agreed and acknowledged the MDRRMO's preparedness and response efforts in handling disasters and response operations, with minor areas for improvement in restroom sufficiency at the evacuation center.*

KEYWORDS: *Typhoon Kristine, disaster preparedness, early warning systems, evacuation center, resource mobilization*

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I. INTRODUCTION

Because of its location in the Pacific Ring of Fire, the Philippines is especially vulnerable to natural disasters and is considered one of the most disaster-prone countries in the world. Each year, it experiences around twenty typhoons, which bring heavy rain, strong winds, storm surges, and landslides that can cause severe damage and loss of life. [1] The Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121) outline comprehensive disaster preparedness and response guidelines, emphasizing the key role of Local Government Units (LGUs). Under this law, the Local Disaster Risk Reduction and Management Offices (LDRRMOs) are established to implement proactive measures, conduct training programs, and mobilize resources concerning potential disasters. In connection with this, RA 10121 also seeks to strengthen organized disaster response efforts and foster safer communities by institutionalizing preparedness and encouraging greater community involvement. It also promotes integrating disaster risk reduction into local development planning and decision-making processes. Thus, it ensures that disaster risk reduction becomes a responsibility to build a resilient nation. [2]

II. METHODOLOGY

The study used a quantitative research design to determine the level of assessment of the Lemery MDRRMC's disaster risk reduction preparedness as a basis for the proposed inputs of enhancement. Thus, a survey questionnaire was used in the research to collect data and provide answers to questions. The study utilized survey questionnaires divided into two (2) parts and validated by three (3) experts, such as a Psychometrician, MDRRMC personnel, and a Criminology practitioner from academe. Before disseminating information, the researchers engage in a discussion regarding data collection process with the Head of Lemery MDRRMC. Thus, the researchers used a clustered sampling technique to select respondents. It is employed in

research studies to identify the data that can be collected from large population by dividing it into smaller groups. The total of 377 evacuees are the respondents who are divided into three (3) barangays, such as 256 evacuees from Barangay Ayao Iyao, 73 evacuees from Barangay Nonong Casto, and 48 evacuees from Barangay Malinis, which experienced the on-the-ground realities of Typhoon Kristine. This study followed several procedures. First, the researchers sought approval to conduct research after presenting a research proposal. Second, a self-made questionnaire was administered to the respondents. Third, the completed questionnaires were retrieved, and the gathered data were analyzed. Fourth, the significant findings were consolidated to answer the research questions. Fifth, the Statistician will examine and interpret the collected data. Lastly, the results served as the basis for inputs to enhance Lemery MDRRMC's disaster preparedness plan. However, in order to interpret the data collected, the following tools were used to answer the research questions: Percentage which was used to determine the magnitude of the frequency in relation to the whole response, Kruskal-Wallis that was used to determine the difference between the variables, descriptive Statistics that was used to summarize and describe the essential features of a dataset, Shapiro Wilk that was used to determine whether the data are typically distributed, weighted mean that was used to evaluate the level of preparedness of MDRRMC relative to Typhoon Kristine Onslaught, mean that was used to summarize the entire data set with a single number representing the center point of the data or the typical value, and ranking that was used to analyze data, ranging from the least to the most excellent points, and to give each data point an ordinal number.

III. DISCUSSION

The Philippines is one of the most disaster-prone countries in the world which experiencing around twenty typhoons annually that often cause flooding, landslides, and loss of life. These risks are worsening with climate change, as typhoon intensity has increased fivefold over the past 50 years (Liu et al., 2020). In addition to this, typhoons also impact agriculture, food security, and biodiversity (Lei, 2022). Thus, Asian countries, including Hong Kong, remain highly vulnerable which emphasize the need for continuous disaster preparedness and education (Hong Kong Observatory, 2020).

Lemery, Batangas, Philippines was among the most affected areas during Typhoon Kristine in 2024which caused severe flooding, damaged infrastructure, and affected over two million people nationwide (Argosino, 2024). Due to this, it underscores the importance of strengthening the National and Municipal Disaster Risk Reduction and Management Councils (NDRRMC & MDRRMC). In connection to this, the National Disaster Risk Reduction and Management Plan for year 2020–2030 integrates Climate Change Adaptation and Disaster Risk Reduction through multi-sectoral collaboration (Office of Civil Defense, 2021). Similarly, the Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121) institutionalize local preparedness and community participation, which aligns in providing detailed guidelines for disaster preparedness and response. The mentioned law also serves as the cornerstone of the country's efforts to create safer and more resilient communities in the face of natural and human-induced disasters (Lawphil Website, 2010). However, the study is guided by the Disaster Risk Reduction Theorythat was created under the United Nations Disaster Risk Reduction which helps to promote preparedness, awareness, and shared responsibility. Nevertheless, the study evaluates the performance of the MDRRMC during Typhoon Kristine which focuses on early warning systems, resource mobilization, and evacuation centers and proposes recommendations for the MDRRMC-Lemery Manual to strengthen disaster response and community resilience.

IV. FINDINGS

Demographic Profile of the Respondents

Residence: Table 1 presents the demographic profile of respondents according to residence. It identifies possible patterns or differences influenced by their living environments. Most respondents have been residing in Lemery, Batangas, for more than six (6) years, with a frequency of 331 and a percentage of 87.80 of the sample population. Lastly, the lowest frequency of five (5) is less than one (1) year and a percentage of 1.30.

Years of Residence	Frequency	Percentage	Ranking
More than 6 years	331	87.80%	1st
1-3 years	21	5.60%	2nd
More than 3 years but less than 6 years	20	5.30%	3rd
Less than 1 year	5	1.30%	4th
Total	**377**	**100**	

Table 1: Demographic Profile of Respondents According to Residence

Estimated Monthly Income: Table 2presents the demographic profile of respondents according to their estimated monthly income. The poor category, with an estimated monthly income of below Php 12,030, got the highest frequency of 304 and 80.60 percent of the total sample population. Thus, the middle-income group with an estimated monthly income of Php 48,120 to Php 84,210got the lowest frequency of four (4), with a 1.10 percent.

Estimated Monthly Income	Frequency	Percentage	Ranking
Poor (below Php 12,030 per month)	304	80.60%	1st
Low Income (Php 12,030 to Php 24,060 per month)	57	15.10%	2nd
Lower Middle Income (Php 24,060 to Php 48,120 per month)	12	3.20%	3rd
Middle Income (Php 48,120 to Php 84,210 per month)	4	1.10%	4th
Upper Middle Income (Php 84,210 to Php 144,360 per month)	0	0	-
Upper Income (Php 144,360 to 240,600 per month)	0	0	-
Rich (above 240,600 per month)	0	0	-
Total	**377**	**100**	

Table 2: Demographic Profile of Respondents According to Socio-economic Status in terms of Estimated Monthly Income

Primary Source of Income: Table 3 presents the demographic profile of respondents according to their primary source of income. Most respondents, with 76.40 percent, identified salary as their primary source of income, with a total frequency of 288. However, only 1.10 percent of the respondents, with a frequency of four (4), rely on a pension. Thus, no respondents reported inheritance or other sources as their primary income.

Primary Source of Income	Frequency	Percentage	Ranking
Salary	288	76.40%	1st
Business	85	22.50%	2nd
Pension	4	1.10%	3rd
Inheritance	0	0	-
Self-employed	0	0	-
Other	0	0	-
Total	**377**	**100**	

Table 3: Demographic Profile of Respondents According to Socioeconomic Status in terms of Primary Source of Income

Family Type: Table 4 presents the demographic profile of respondents according to their family type. The data reveal that most respondents belong to nuclear families, with a frequency of 204, accounting for 54.10 percent of the total sample population. Meanwhile, 11.70 percent come from single-parent households with a frequency of 44.

Family Type	Frequency	Percentage	Ranking
Nuclear	204	54.10%	1st
Extended	129	34.20%	2nd
Single-parent Household	44	11.70%	3rd
Total	**377**	**100**	

Table 4: Demographic Profile of Respondents According to Family Structure in terms of Type of Family

Members of the Household: Table 5 presents the respondents' demographic profile according to the household members. The data shows that most respondents, with 52.80 percent and a frequency of 199, consist of 3-6 members. However, only 10.60 percent with a frequency of 40, with 1 to 3 members.

Members of the Household	Frequency	Percentage	Ranking
3-6 members	199	52.80%	1st
More than six members	138	36.60%	2nd
1-3 Members	40	10.60%	3rd
Total	**377**	**100**	

Table 5: Demographic Profile of Respondents According to Family Structure in terms of Members of the Household

Level of Assessment of the Lemery MDRRMC's Disaster Preparedness

Early Warning Systems: Table 6 presents the level of assessment of Lemery MDRRMC's disaster preparedness in terms of early warning system, with a composite mean of 3 and interpreted as Agree, which means that the respondents generally agreed and acknowledged the MDRRMO's preparedness and response efforts in handling disaster and response operations with minor areas of improvements regarding the disaster preparedness seminars conducted by the MDRRMO and BDRRMO. These findings align with Municipality of Quezon, Isabela (2018), highlighting the importance of an early warning system in providing timely warnings and mobilizing community response. [3]

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
MDRRMO's Facebook page provided real time updates.	3.23	0.444	Agree	1st
Facebook warnings helped us take appropriate safety actions.	3.12	0.403	Agree	2nd
MDRRMO sends text messages to warn residents of approaching storms.	3.04	0.464	Agree	3rd
MDRRMO provided timely and effective typhoon warnings via phone calls.	3.03	0.542	Agree	4th
MDRRMO's personnel personally walked around residential areas, sounding sirens to disseminate typhoon warnings.	2.92	0.564	Agree	5th
House-to-house visits for typhoons were effective.	2.91	0.502	Agree	6th
Disaster preparedness seminars by the MDRRMO and BDRRMO were informative.	2.79	0.501	Agree	7th
Composite Mean	**3**		**Agree**	

Table 6: Level of Assessment of Lemery MDRRMC's disaster preparedness in terms of early warning systems

Resource Mobilization: Table 7 presents the level of assessment of Lemery MDRRMC's disaster preparedness in terms of resource mobilization, with a composite mean of 3 and interpreted as Agree, which means that the respondents generally agreed and acknowledged the MDRRMC preparedness and response efforts in handling disaster and response operations with minor areas of improvements in allocated funds of the MDRRMO and usage of megaphones for mass information. These findings align with Jurilla (2016), which highlights that well-prepared DRRM systems characterized by adequate resources, trained personnel, and effective communication are crucial in managing disaster impacts.[4]

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
Relief goods were provided.	3.2	0.443	Agree	1st
First aid assistance was readily available.	3.05	0.53	Agree	2nd
MDRRMO's search and rescue operations equipment is sufficient during evacuation.	3.01	0.465	Agree	3rd
MDRRMO had sufficient vehicles for evacuation.	3	0.487	Agree	4th
The personnel of the MDRRMO were adequately trained, well-coordinated, and sufficiently staffed to effectively respond to the disaster during the onslaught of Typhoon Kristine.	2.99	0.487	Agree	5th
The MDRRMO effectively mobilized and deployed essential resources promptly during Typhoon Kristine.	2.96	0.435	Agree	6th
MDRRMO personnel were responsive and available during the typhoon.	2.93	0.505	Agree	7th
The MDRRMO had adequate and properly allocated funds to support disaster preparedness, response, and recovery efforts.	2.92	0.414	Agree	8.5th
Megaphones were used effectively for mass information.	2.92	0.504	Agree	8.5th
Composite Mean	**3**		**Agree**	

Table 7: Level of Assessment of the Lemery MDRRMC's Disaster Preparedness in terms of Resource Mobilization

Evacuation Centers: Table 8 presents the level of assessment of Lemery MDRRMC's disaster preparedness in terms of evacuation center, with a composite mean of 2.94 and interpreted as Agree, which means that the respondents generally agreed and acknowledged preparedness and response efforts in handling disasters and response operations, with minor areas of improvement in the sufficiency of restrooms at the evacuation center. These findings align with IFRC (2024), which reported that Typhoon Kristine affected thirty-two (32) cities and municipalities, disrupting access to safe drinking water and sanitation. [5]

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank

Sleeping materials were provided.	3.15	0.483	Agree	1st
The evacuation center had an adequate evacuation plan for evacuees.	3.03	0.528	Agree	2nd
Coordination with relevant agencies ensured smooth operation.	2.97	0.48	Agree	3rd
Charging stations were available for communication	2.9	0.47	Agree	4th
Medical services were adequate at the evacuation center	2.89	0.548	Agree	5th
Power supply was stable	2.89	0.553	Agree	5th
Child-friendly areas and learning areas were provided.	2.89	0.446	Agree	5th
The water was sufficient during our stay at the evacuation center.	2.86	0.575	Agree	6th
Restrooms were sufficient.	2.87	0.548	Agree	7th
Composite Mean	**2.94**		**Agree**	

Table 8: Level of Assessment of the Lemery MDRRMC's Disaster Preparedness in terms of Evacuation Centers

Significant Difference on the Perceived Level of Assessment of Lemery MDRRMC's Disaster Preparedness When Grouped According to Demographic Profile

Significant Differences in terms of Residence: Table 9 shows no significant differences in the perceived level of assessment of MDRRMC's disaster preparedness when grouped according to residence. As supported by Concern Worldwide (2023), this consistency highlights the importance of inclusive and uniform disaster risk reduction strategies that cater to the entire community, ensuring that no group is left underserved. [6]

Variables	p-value	Decision on H0	Interpretation
Early Warning System	0.388	Accept	No Significant
Resource Mobilization	0.522	Accept	No Significant
Evacuation Center	0.697	Accept	No Significant

Table 9: Significant Difference in the Perceived Level of Assessment of Lemery MDRRMC's Disaster Preparedness When Grouped According to Residence

Significant Differences in terms of Socioeconomic Status: Table 10 presents significant differences in the perceived level of assessment of MDRRMC's disaster preparedness in terms of early warning system, resource mobilization, and evacuation center when grouped according to socioeconomic status. These findings align with Viardo (2020), highlighting that having equity in disaster preparedness not only enhances the effectiveness of MDRRMO's interventions but also fosters resiliency, regardless of their socioeconomic standing, can face disasters with greater security and readiness. [7]

Variables	p-value	Decision on H0	Interpretation
Early Warning System	<.001	Reject	Significant
Resource Mobilization	0.018	Reject	Significant
Evacuation Center	0.005	Reject	Significant

Table 10: Significant Difference in the Perceived Level of Assessment of Lemery MDRRMC's Disaster Preparedness When Grouped According to Socioeconomic Status

Significant Differences in terms of Family Structure: Table 11 shows no significant differences in the perceived level of assessment of MDRRMC's disaster preparedness in terms of the early warning system. However, the table shows significant differences in the perceived level of assessment in terms of resource mobilization and evacuation center when grouped according to family structure. This supports by IFRC (2024), which suggests that the diversity of family structure may have shaped varying experiences regarding spaces, accessibility, and support services.

Variables	p-value	Decision on H0	Interpretation
Early Warning System	0.072	Accept	No Significant
Resource Mobilization	0.022	Reject	Significant
Evacuation Center	0.014	Reject	Significant

Table 11: Significant Difference in the Perceived Level of Assessment of the Lemery MDRRMC Preparedness When Grouped According to Family Structure

Proposed Inputs for the Enhancement of Lemery MDRRMC's Disaster Preparedness Plan

The proposed inputs for enhancing the Lemery MDRRMC disaster preparedness plan, entitled "D.R.R.M P.R.E.P. Program," aim to boost disaster preparedness in Lemery through three (3) key activities. First, entitled "R.I.S.E.," which enhances Municipal Disaster Risk Reduction and Management Office personnel's skills via re-training. Secondly, entitled as "L.I.G.T.A.S" which focuses on training of stakeholders, Barangay Officials, and youth regardless of their socioeconomic status through theory and simulation exercises and training seminars. Lastly, the activity entitled as "K.A.M.U.S.T.A.H.A.N" which fosters inclusive dialogue among stakeholders to assess evacuation plans, resources, and disaster funding. Thus, these initiatives promote a more resilient and inclusive community which aligns with the Disaster Risk Reduction Theory and mandates of Republic Act 10121.

D.R.R.M. P.R.E.P Program *(Disaster Risk Reduction Management for Preparedness, Resilience, Education, and Planning)*	
ACTIVITY 1 – R.I.S.E *(Resilience Improvement through Skills Enhancement of the Municipal Disaster Risk Reduction and Management Office Personnel)*	
Activity	MDRRMO Re-training Version 2.0
Objectives	To strengthen their knowledge and capabilities in times of calamities.
Implementing Strategy	To conduct a training seminar for MDRRMO personnel with knowledgeable speakers.
Responsible Office	Philippine Red Cross, Provincial Disaster Risk Reduction and Management Office, and Office of Civil Defense.
Budget	Php 85,000 for resource speaker, materials, meals, trainers, and honoraria.
Performance Indicator	At least 85% of MDRRMO personnel who completed the re-training seminar and 80% of trained personnel applied learned techniques during actual disaster drills or operations.
ACTIVITY 2 – L.I.G.T.A.S *(Learning Initiatives for General Training and Actual Simulation)*	
Activity	Integrated Learning Activity: Theoretical Training and Live Action Simulation
Objectives	To equip Barangay Officials, youth, and community members regardless of their socioeconomic status with essential knowledge and strategies for preparedness through a combination of theoretical instruction and simulation exercises, which promotes a resilient and proactive community.
Implementing Strategy	To provide comprehensive theoretical training and simulation exercises to empower all community sectors, including Barangay Officials, youth, and other residents, regardless of socioeconomic status.
Responsible Office	MDRRMO, Barangay Disaster Risk Reduction and Management Office (BDRRMO), Sangguniang Kabataan, Philippine Red Cross, and LGU Lemery.
Budget	Php 85,000 includes resource speaker, practical training materials, meals, honoraria, and certificates.
Performance Indicator	At least 80% of Barangays in Lemery incorporated their seminar learnings into the barangay disaster risk reduction and management plan. Establishment of a youth organization, such as Red Cross Youth, that is responsible in promoting disaster preparedness and welfare of the youth.
ACTIVITY 3 – K.A.M.U.S.T.A.H.A.N *(Knowledge Sharing and Action planning through Multi-sectoral Sessions for Transparency, Awareness, and Harmonized Advocacy in Needs-based decision making)*	
Activity	Collaborative Disaster Risk Reduction and Management Conference
Objectives	To provide inclusive platforms among youth, barangay officials, MDRRMO personnel, and LGU Lemery representatives regarding community needs and concerns, such as assessment of evacuation protocols, resources, rescue equipment, and review of fund allocations for disaster and calamity situations.
Implementing Strategy	Implement a semi-annual focus group discussion featuring MDRRMO, LGU Lemery, Barangay Officials, and Youth to collaboratively conduct a conference in order to identify concerns, assess evacuation protocols, resources, rescue equipment, and review fund allocations for disaster and calamity situations.
Responsible Office	Municipal Disaster Risk Reduction and Management Office (MDRRMO), BDRRMO, Sangguniang Kabataan, and LGU Lemery.
Budget	Php 60,000 including facilitator, speakers, honoraria, certificates, and

	refreshments.
Performance Indicator	At least 80% of community concerns were raised and documented during the FGD. At least 80% were enhanced and crafted at the Barangay Disaster Risk Reduction and Management Plan.

V. CONCLUSION

The findings regarding the demographic profile reflect a stable yet vulnerable community with deep-rooted ties to the locality. Their long-term residency suggests familiarity with the risk of the community and response mechanisms. Their economic status underscores the need for accessible and well-targeted interventions. Thus, these highlight the importance of designing programs that are sensitive to the lived realities of the population, ensuring that training and awareness campaigns are informative and empowering for all sectors. However, the findings regarding the level of assessment of the MDRRMC disaster preparedness have an overall interpretation of "agree", which reflects a positive perception of the performance of Lemery MDRRMC and highlights the importance of continuous enhancement to ensure an inclusive disaster risk reduction and management practices. Thus, the perceived level of assessment of disaster preparedness implemented by the Lemery-MDRRMC reveals a consistent but not equitable system. While perceptions of preparedness are uniformed in terms of years of residency, there are still differences when grouped by socioeconomic status. Lower socioeconomic residents viewed the early warning system, resource mobilization, and evacuation center as less effective, accessible, and fair. Thus, family structure introduces significant disparities in resource mobilization and evacuation centers that fail to meet family needs. Lastly, the project strengthens the Lemery-MDRRMC plan through interconnected activities. It begins by re-training MDRRMO personnel to ensure high capacity and improved communication. Next, promoting of inclusive disaster awareness to empower all sectors to overcome family status and structure barriers. The final component establishes a process for participatory governance by holding focus group discussions to foster transparency and strengthen stakeholder coordination. These initiatives are firmly rooted in RA 10121 and the Disaster Risk Reduction Theory principles, which reinforce the municipality's commitment to continuous training, inclusive education, and building community-based resilience.

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