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ASSESSING DISASTER RISK MANAGEMENT AND PREPAREDNESS OF SCHOOLS IN A DISTRICT

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Abstract: *The Department of Education has implemented a comprehensive Disaster Risk Reduction and Management (DRRM) framework within the Basic Education Framework, aimed at controlling practices and procedures in DepEd offices and schools. The Disaster Risk Reduction and Management Service (DRRMS) is responsible for ensuring the security and continuous advancement of education. This research project aimed to assess disaster risk management and preparedness in public elementary schools in Dinalupihan East District, Bataan, during 2023-2024. The majority of schools are medium-sized, with seven having 300-300 student enrollments. A mega school is defined as one with 51 or more teachers. Two schools have not conducted emergency preparedness summaries in the last three years, and 66.67% of respondents have only one trained first responder. The study recommends a Disaster Risk Reduction and Management (DRRM) strategy to increase school administrators' and instructors' preparedness. Regarding community risk assessment and capacity building, perceptions of disaster risk management and emergency readiness correlate significantly. There is also a strong but moderate link between emergency readiness and perceptions of disaster risk management concerning the school's physical infrastructure and community risk. Furthermore, there is a strong but moderate association between emergency preparation and perceptions of disaster risk management, particularly in terms of community involvement and risk assessment.*

Keywords*: Assessing, Disaster, Risk, Reduction, Management, Preparedness, Philippines, Dinalupihan East District, Schools Division of Bataan*

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INTRODUCTION

The Philippines, a country consisting of a group of islands, is highly susceptible to natural disasters, with 74% of its population and 60% of its land area being vulnerable to a range of hazards, such as floods, cyclones, droughts, earthquakes, tsunamis, and landslides. People widely recognize the country for its high susceptibility to disasters, including a notable occurrence rate of natural and artificial calamities. The islands are susceptible to frequent disaster damage due to their location at the convergence of major tectonic plates and within the heart of a storm's path. The Philippines ranks among the top three globally in terms of population exposure and risk susceptibility. The Philippines has had a long history of natural catastrophes, so the government has built robust coping systems. Research shows that the Philippines has made strides in integrating DRR into the education sector through legislative frameworks such as the Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121). Sumbillo & Madrigal (2020) highlight how the law mandates the inclusion of DRR in the curricula of both public and private educational institutions, thereby emphasizing the role of education in building community resilience. As of 2012, the Philippines ranked among the top three countries with the highest frequency of disasters, according to the United Nations World Disasters Report (2013). This forecast is based on the fact that the Philippines experiences an annual average of 20 typhoons, five of which are pretty intense. While Typhoon Ondoy in 2009 killed 464 people and caused over P10 billion in damage, Typhoon Yolanda in 2013 killed over 6,300 people and caused over P12 billion in damage. When a typhoon hits the Philippines, it not only kills people; it also destroys crops and schools. The fact that Yolanda destroyed 4,000 educational facilities indicates the scale of the disaster (UNISDR). In 2022, according to the World Risk Index (WRI), as reported by Rita (2022) on GMA News Online, the Philippines had the most significant catastrophe risk among 193 nations worldwide. The WRI evaluated a nation's susceptibility to natural calamities and the

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repercussions of climate change. The computation was conducted to ascertain the amount of exposure for each country, which pertains to the degree to which the general population is susceptible to the impact of natural calamities such as storms, floods, droughts, and rising sea levels. Additionally, the assessment also considered the vulnerability of each country, which encompasses its susceptibility to these events and its ability to cope with and adapt to them.

The United Nations Office for Disaster Risk Reduction (UNISDR) (UNISDR, 2010b) has acknowledged the importance of disaster risk reduction (DRR) in mitigating, avoiding, and preparing for calamities. Disaster risk reduction (DRR), as stated by the United Nations Office for Disaster Risk Reduction (UNISDR), encompasses the theoretical framework and practical implementation of measures to mitigate the hazards associated with disasters. These strategies include systematic analysis, identifying, and addressing the underlying variables that contribute to disaster occurrence and severity (UNISDR, n.d.). The DRR strategy entails identifying hazards and assessing the risks they pose. Disaster management entails developing and implementing methods aimed at preventing, mitigating, preparing for, or recovering from catastrophic disasters. Additionally, evaluating existing programs and strategies is integral to this approach (Cutter, 2013). Implementing the Disaster Risk Reduction (DRR) approach involves focusing on the vulnerabilities within a community. These vulnerabilities encompass various aspects, including the physical stability of buildings and bridges, societal awareness and risk assessment, socio-economic factors impacting readiness and response, and the administration and operation of government and emergency response agencies (Bang, 2013). After identifying and assessing disaster risk, the DRR strategy is implemented by undertaking activities aimed at mitigating or preventing the identified disaster risk (Tuladhar et al., 2015). The "Philippine Disaster Risk Reduction Management (DRRM) Act of 2010" (Republic Act No. 10121), commonly referred to as the "DRRM Act of 2010," mandates the government to enforce precise methods for incorporating disaster risk reduction (DRR) strategies and institutions into the overall framework of national development planning for important sectors like health, public housing, and education. In line with this, the Department of Education (DepEd) has issued DepEd No. 37, s. 2017, which establishes the Basic Education Framework and incorporates a more extensive approach to disaster risk reduction management. Within this system, the offices and educational institutions under the Department of Education (DepEd) are expected to establish and incorporate disaster risk mitigation and management (DRRM) systems, structures, protocols, and practices as part of their institutional framework. Therefore, it is imperative to examine the existing disaster-related policies in the Philippines, given its susceptibility to natural calamities (Catanus, 2018; Mamhot, 2019). Furthermore, the Department of Education has published DepEd Order No. 37, s. 2015 establishes a comprehensive Disaster Risk Reduction and Management (DRRM) framework within the Basic Education Framework. The framework asserts its authority for disaster risk reduction and management (DRRM) strategies, methods, and procedures in both DepEd offices and schools. DepEd recognizes the importance of this framework in executing a unified set of programs and activities, in contrast to previous fragmented efforts. The Department of Education's most recent policy initiative is this comprehensive strategy. The Department of Education (DepEd) established the Disaster Risk Reduction and Management Office in conformity with Department Order (D.O.) No. 50 Series of 2011 to effectively address the many risks and hazards that the Philippines encounters. This undertaking complies with the stipulations of the Philippine Disaster Risk Reduction Management Act of 2010 (Republic Act 10121). Kagawa and Selby (2012) state that disaster risk reduction (DRR) education aims to develop students' understanding of disasters' origins, features, and effects.

DRR education has been sought after by humanitarian workers, politicians, and educators to provide pupils with a deeper understanding of the situation. The factors above have

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increased the topic's status domestically and internationally (UNESCO/UNICEF, 2014) According to Bugental & Corpuz (2019), private schools have better disaster risk management operations for earthquakes, fires, and floods, and better catastrophe preparedness due to their extensive land area than public schools. The more disaster risk management practices are implemented at a school, the more prepared it will be in a crisis. According to Comighud (2020), the degree to which a program is implemented may be influenced by the training individuals have received. The primary factors of significance are the information and skills gained by individuals throughout their foundational training, in conjunction with their level of dedication. Kay (2013) emphasizes the importance of active participation from the entire school community in obtaining knowledge about disaster planning and developing plans to protect educational institutions. Therefore, it is imperative to evaluate the level of awareness among learners and educators regarding safety plans and their preparedness for potential disasters, as highlighted by Shaw et al. (2013). According to Mercer et al. (2013), the provision of adequate training and simulations by the national and local governments has been observed to motivate LGU DRRM responders to effectively and efficiently carry out their duties, particularly in rehabilitating communities affected by disasters. According to Tizon Comighud (2020), a pressing issue is the level of preparedness shown by SRDDMC leaders and responders in effectively addressing such situations. This problem necessitates a coordinated effort to devise improved rehabilitation procedures. While engaging in proactive planning may present challenges, it is essential to achieve favorable outcomes. Moreover, preparing ahead progressively gains moral and economic importance after many occurrences (Cutter, 2013). Engaging in disaster preparedness measures can mitigate the extent of damage and save human lives, hence facilitating the expeditiousness and efficacy of subsequent recovery endeavors (King & Tarrant, 2013). Disaster risk reduction (DRR) education is a comprehensive approach that aims to mitigate the adverse effects of disasters by thoroughly examining the elements that contribute to their occurrence. Furthermore, it involves obtaining the information and abilities required to minimize the consequences of catastrophes, such as environmental preservation and readiness for efficient disaster response. The concept consists of reducing damage and vulnerabilities while improving the capacities of a specific group or society (Saraswati et al., 2020).

The Dinalupihan District schools have successfully implemented and integrated disaster risk reduction education. The concerted efforts of various agencies focused on creating a safer and more resilient community through integrated civil defense and DRRM programs have achieved this. However, key officials attended most training and seminar workshops. Only some individuals, whose inputs in many of these activities were not cascaded to the clients and stakeholders at the community and school levels, were not fully engaged. Disaster risk reduction advocates were unmet and prioritized because of financial constraints and resource insufficiencies. Currently, disaster risk reduction education remains underdeveloped and has not been implemented extensively across all districts, which may also lack adequate assessment and study. Thus, this study is necessary because it will generate an empirical review of these difficulties in readiness and the significance of being prepared, an analysis of the role of schools, and present preparedness resources.

FRAMEWORK

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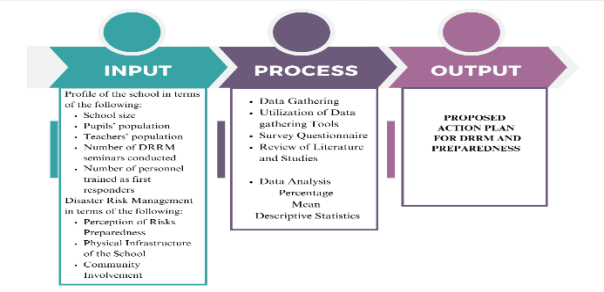

The conceptual framework above explains the concepts of the study. The study employed the IPO system approach. The input includes the school's profile regarding the school size, school location, pupils' population, teachers' population, number of DRRM seminars conducted, and number of personnel trained as first responders. The data gathered from the respondents were used to supply the necessary input for the study. The data gathering and analysis processes utilized statistical tools such as percentage, weighted mean, t-test, and Pearson r to process the data from the variables. The final output is expected to enhance the Disaster Risk Management of elementary schools in the Dinalupihan East District.

OBJECTIVES OF THE STUDY

This study aimed to evaluate the effectiveness of disaster risk management and preparedness measures in the Dinalupihan East District during the academic year 2023-2024. Specifically, this study profiled the school in terms of school size, pupil population, teacher population, the number of DRRM seminars conducted, and the number of personnel trained as first responders. It also sought to identify personnel (teachers and heads) ' perception of disaster risk management in the elementary schools in Dinalupihan East in terms of perception of risks, preparedness, physical infrastructure of the school, and community involvement. The level of personnel's (teachers' and heads') emergency preparedness was described in terms of community risk assessment, communication system, and capacity building. The significant relationship between the perception of personnel (teachers and heads) on the disaster risk management of elementary schools and the level of personnel's (teachers' and school heads') emergency preparedness was also identified. An action plan for disaster risk reduction management and preparedness was proposed.

METHODOLOGY

Research Design

This study employed a descriptive-correlational research approach to evaluate the Disaster Risk Management practices of public elementary schools in the Dinalupihan East District, Dinalupihan, Bataan. Since data collection assumes the present phenomena, the current state is unquestionably adequate for inquiry. This is related to what Fraenkel and Wallen (2010) characterized as the descriptive evaluative method's definition, which is the collecting of knowledge regarding current existing situations. This technique analyzes the nature of the condition at the time of the research and investigates the reasons for specific events.

Research Site

The Dinalupihan East District, located at Dinalupihan, Bataan, has 15 public elementary schools, namely (alphabetically arranged) Bayan-Bayanan Elementary School, Daang Bago

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Elementary School, Dalao Elementary School, Dinalupihan Elementary School, Layac Elementary School, New San Jose Elementary School, Old San Jose Elementary School, Pagalanggang Elementary School, Pita Elementary School, San Simon Elementary School, Sapang Balas Elementary School, Sta Isabel Elementary School, Sto Niño Elementary School, Tucop Integrated School, and Pentor Elementary School.

Participants

The study involved 15 school principals and 237 primary school teachers from Dinalupihan East District, Dinalupihan, Bataan.

Instrumentation

The survey questionnaire was the primary tool for gathering information for the study. It is the most suitable instrument for achieving the stated study objective. This study adopted Garcia's research instrument in her study titled "Evaluation of Disaster Risk Management and Education Program of Elementary Schools in Balanga City." The questionnaire was also modified and updated to provide a more valid context for the new study. A dry run was conducted on ten teachers and ten school heads from another district for validation purposes. The dry run results were treated statistically with Cronbach's Alpha for the reliability test. Participants were not coerced into taking part in the research. The information collected was utilized only for this research. This survey's questions are in line with the guidelines laid forth in our code of ethics. The significance of the study was explained to all participants, emphasizing the potential benefits of participating in the study.

Data Collection

The researcher acquired authorization by submitting official correspondence to the Office of the School Division Superintendent of Bataan and the school heads of several primary schools in the Dinalupihan East District. Upon authorization of the endorsement letter and request, the researcher immediately delivered the questionnaire to the respondents. The data were acquired, validated, and computed. The tally summary was prepared to present, analyze, and interpret data using suitable statistical techniques. The data collected by the researcher were treated statistically to determine their practicality and worth. The tools the researcher utilized contain frequency, percentage, mean, standard deviation, average weighted mean, and Pearson correlation coefficient (r).

RESULTS AND DISCUSSION

The study showed the frequency and percentage distribution of the respondent schools regarding school size, location, number of students, number of seminars related to disaster preparedness, and number of personnel trained as first aid responders.

In terms of school size, the majority (6) of the schools are "medium-sized, followed by the small schools (4) and large schools (4), which consist of 26.67% of all schools. Only one school is categorized as a mega school. The number of pupils is also profiled. Regarding the pupil population, most schools, or seven (7), are within the 300-below school population range, or 46.67% of the total school respondents. There is one elementary school with a significant population range of 900-1200, and one mega school with a pupil population of 1201 and above. This mega school serves as the central school of the Dinalupihan East District.

The number of teachers was also profiled. Regarding teacher population, most schools, or seven (6) schools, are within the 10-29 teacher population range, or 40.00% of the total school

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respondents. There is one mega school with a teacher population of 51 or more. The number of seminars conducted on disaster preparedness was also identified. Based on the survey results, only two (3) schools could not conduct workshops on disaster preparedness for the last three years. Lastly, the number of personnel trained as first responders was also profiled. As per the results, 66.67% of the respondents, or ten (10) schools, have only one trained first responder. The disaster risk management among schools, in terms of risk perception, received a mean score of 4.16, indicating "Agree." Indicator 4 has the highest mean among all the indicators, with a mean of 4.36, which translates to "Strongly Agree."

On the other hand, the lowest mean was given to Indicator 1 with 3.97 (Agree). Within the context of disaster preparedness, the concept of risk perception encompasses an individual's cognitive understanding, beliefs, and attitudes toward the probability, magnitude, level of intrusion, and other related attitudinal aspects that may influence their perception of the potential risks associated with a particular hazard (Bodas et al., 2022). The perception of risk, often called subjective probability, plays a significant role in influencing individuals' behavior and shaping their approach to risk management (Wauters et al., 2014).

The level of preparedness of elementary schools in meeting disasters is average, resulting in an overall mean of 3.98 or "Agree." Among all the rated indicators, Indicator 6 received the highest mean from respondents, with a weighted mean of 4.32, described as "Strongly Agree."

All seven (7) indicators garnered a mean within the "Agree" level regarding physical structure. The highest-rated indicator (indicator 5 - Exit routes have been marked throughout the school) gained the highest weighted mean among all seven indicators. The lowest indicator, given the lowest mean, is Indicator 4, with a mean of 3.47. In terms of stairs, corridors, classrooms, and canteens, the mean rating is 4.13, or "Agree." The highest rated for classrooms, libraries, functional rooms, and campus is Indicator 1: "Tables, chairs, and beds are robust and flat, with rounded corners. The lowest computed weighted mean for this category is Indicator 5, which says, "Doors are wide enough and easy to open."

Regarding canteen and clean water construction, the lowest mean among all indicators is Indicator 2. In terms of toilets, all the respondents moderately agree that the toilets are ready to face a disaster. Indicator 1 is the highest-rated indicator for the toilet category. Regarding playgrounds, the respondents gave the highest weighted mean and generally “Strongly Agree” in indicator 5. Finally, the respondents rated these facilities for parking areas, school grounds, school gates, and other places with 3.64 (Agree).

Regarding electrical safety in elementary schools in Dinalupihan East, the respondents gave an “Agree” evaluation of the observance of school procedures on fire protection to avoid electrical tremors and fires. Electrical aspects are a critical area for disaster preparedness, as electrical wiring can cause immediate fires during a disaster strike. Therefore, it is essential to ensure that school electrical systems follow safety standards. On the other hand, the lowest-rated indicator is Indicator 2.

Regarding the preparedness of schools on various emergency tools, the respondents evaluated the availability of these emergency tools at an agreeable level, with a mean of 4.10 (Agree). Among the tool indicators, the highest-rated indicator is the availability of emergency kits (Indicator 4). Emergency kits are more accessible to acquire in the Philippines. In contrast, other emergency equipment is not readily available to elementary schools for various reasons, such as primarily the availability of funds or the timeframe for delivery to the schools when ordered. Among the indicators in this category, the lowest indicator is whether TV or radio broadcasts are regularly observed during difficult seasons.

Regarding other tools and equipment available for elementary schools in Dinalupihan East District, the highest rated mean is Indicator 4. This implies that schools allot storage space for tools

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and equipment that are valuable in disasters and emergencies. However, the lowest rated indicator is Indicator 2 with a weighted mean of 1.65, or disagree". It can also be observed that indicator 1 obtained a low weighted mean of 1.65, which indicates disagreement.

The community, as stakeholders, plays a crucial role in implementing emergency protocols in times of disaster. Table 6 shows that the overall evaluation of community involvement is 4.30 (Strongly Agree), which means that the community is generally involved in the disaster risk management of schools. This category includes, among other things, Indicator 1, which measures how well-informed the public is about their legal rights and those of the government and other relevant parties. It also assesses how frequently the community invokes these rights and obligations while interacting with or advocating with the government. achieves the maximum average of 4.48, characterized as "strongly agree." Indicator 4, which measures community involvement, has the lowest score. This indicator measures the frequent participation and representation of all vulnerable groups in decision-making sessions, as well as the presence of certain vulnerable group members in leadership positions within the decision-making body. These highest and lowest indicators show that the community is adequately educated and informed about managing disaster risks. It also reveals that vulnerable groups are not participating in schools' disaster management council meetings. This is a matter that requires attention from relevant school authorities.

The study reveals that elementary schools in the Dinalupihan East District are preparing for potential disasters through emergency preparedness. Instruction on safety guidelines during fire and earthquake drills received the highest score. The third score was for establishing and maintaining coordination with the Barangay Disaster Council, indicating increased community engagement in disaster risk management plans. The fifth score was for collaborating with local media to increase knowledge about disaster risk reduction. The study emphasizes the importance of effective public communication, as well as the use of various media platforms and non-media channels to mitigate disaster risks. The efficacy of disaster risk reduction efforts is heavily dependent on understanding catastrophic hazards and feasible measures to reduce vulnerability.

The overall weighted mean of emergency preparedness in terms of the communication system was 4.30, describing "strongly agree." Indicator 1 got the highest mean of 4.45. It is described as "Strongly Agree". On the other hand, indicators 9 and 10 obtained low weighted means of 3.99 and 4.02, respectively, with a description of "agree." The potential consequences of communication system failures are severe, significantly harming human life and economic endeavors. Such failures impede timely and efficient communication among individuals, hence hindering their ability to interact effectively (El Khaled, 2019)

Overall, the capacity building of the respondents resulted in a mean of 4.11 or "Agree." This means that the respondents perceive that they understand the risks of possible disasters in their school community and are equipped to perform as responders when a disaster occurs. Among the indicators, Indicator 8 has the highest mean, at 4.49, corresponding to "Strongly Agree." This indicates that the respondents are familiar with the implementing guidelines of DepEd Order 53, series of 2022, titled Mandatory Unannounced Earthquake and Fire Drills in Schools, which foster partnerships among relevant agencies. On the other hand, the respondents gave Indicator 4 the lowest mean of 2.56.

The study found that participants' perceptions of disaster risk management significantly correlate with their emergency readiness, particularly in community risk assessment and capacity building. The null hypothesis was rejected at a 95% confidence level. The study also found a moderate correlation between participants' opinions on disaster risk management and their preparedness for community risk assessment, indicating a strong correlation between disaster risk management and emergency preparedness.

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Furthermore, the perceptions of participants on disaster risk management in terms of community involvement have a significant moderate correlation with their emergency preparedness in terms of community risk assessment ($r = 0.629$, $p = 0.000$). The correlation is also substantial, thus rejecting the null hypothesis at 5% alpha.

CONCLUSION

The study's findings led to the following conclusions. In terms of school size, the majority of the schools are "medium-sized. Only one school is categorized as a mega school. The number of pupils is also profiled. In terms of the pupil population, the majority of the schools are within the 300-student population range. There is one mega school, particularly the Dinalupihan Elementary School (DES), which also serves as the central school in the Dinalupihan East District. A municipality is expected to have a mega school since the population tends to be more prominent in the town proper of the Municipality of Dinalupihan. However, there are still small schools in the municipality because the area is a rural-urban mixed type of municipality with schools in upland communities that only cater to a few pupils.

The number of teachers was also profiled. In terms of teacher population, most schools are within the 10-29 teacher population range. There is one mega school with a teacher population of 51 or more. The number of seminars conducted on disaster preparedness was also identified. Only two schools have held workshops on disaster preparedness over the last three years. This school could not conduct quarterly seminars on disaster preparedness, which are necessary to maintain the skills and knowledge of disaster and emergency personnel. While laws require public institutions to conduct quarterly emergency drills, the number of workshops to be undertaken is not specified. However, it would be good practice for institutions to conduct quarterly refresher courses on emergency and disaster response, keeping personnel updated and reminded of emergency protocols. Lastly, the number of personnel trained as first responders was also profiled. As per the results, ten (10) schools have only one trained first responder. Based on the collected data, it can be inferred that there is a need for a Disaster Risk Reduction and Management (DRRM) guide to be developed to raise the level of readiness among teachers and school heads.

The perceptions of participants regarding disaster risk management, specifically their perception of risk, show moderate correlations with their emergency preparedness, particularly in terms of community risk assessment. The moderate correlations are substantial. There is a strong correlation between the participants' opinions on disaster risk management and their emergency preparedness regarding community assessment, and a moderate correlation between their views on disaster risk management and capacity building. The participants' perceptions of disaster risk management concerning the school's physical infrastructure exhibit a moderate correlation with their emergency readiness as measured by community risk assessment. Moreover, there is a moderate correlation between the participants' views on community engagement in disaster risk management and their level of emergency readiness, specifically regarding community risk assessment.

TRANSLATIONAL RESEARCH

Based on the study's results, the school head and personnel, including both teaching and non-teaching staff, should collaborate to review the physical structures of their respective schools. This collaboration will enable both groups to conduct an accurate evaluation of the schools' physical

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structures and close the perception gap. This could be achieved through the use of a standardized building assessment.

The school head, teachers, and staff must work together to strengthen their partnership with the community. The school head could establish a mechanism that enables teachers and staff to directly involve community members and leaders in disaster risk management programs. Schools can implement classroom-based community involvement programs on disaster preparedness to establish a direct link between teachers and community members (e.g., parents, guardians, barangay officials, and LGU, among others).

Since it has been proven in this study that the 'preparedness' of stakeholders towards the occurrence of unexpected disaster is supplemented by seminars conducted by government and non-government organizations, the school heads should continue and even intensify their seminars and training provided to teachers and staff as this continuous training is very important in disaster risk management. It begins with educating the people on how to be safe during calamities, so the local school administrators should continue supporting skills development for its teachers and disaster response teams. The school and community should develop a long-term strategic plan to provide DRRM equipment and tools.

School DRRM action plans are indispensable tools for ensuring the safety, continuity of education, and resilience of educational institutions and their surrounding communities. By prioritizing safety, promoting preparedness, fostering collaboration, and meeting legal obligations, these plans serve as crucial safeguards against the unpredictable nature of disasters. Furthermore, they offer tremendous educational opportunities for students, arming them with crucial life skills and enabling them to become proactive catalysts for change in constructing safer and more resilient communities. Therefore, it is both wise and morally necessary to invest in the creation and execution of solid disaster risk reduction and management (DRRM) action plans in order to protect future generations.

The main goal of this action plan is to improve the department's understanding and awareness of disaster risk reduction and management objectives among teachers and school leaders in the Dinalupihan East District. The document outlines a curriculum, sets out key goals, and enumerates the essential components of disaster risk reduction and management within the country. Developing a localized action plan for DRRM is of utmost importance. The public schools in Dinalupihan East District, specifically in disaster risk reduction and management (DRRM), may find the provided action plan beneficial as a guide.

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