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Capabilities and Program Implementation on Disaster Preparedness in Basic Education Schools

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***Abstract*— This study determined the capabilities and program implementation of disaster preparedness at the DepEd Naga City division under disaster risk reduction management (DRRM). There were ninety-four (94) respondents in the study. The respondents were composed of DRRM coordinators, school principals and teachers.**

A mixed-methods approach, which is a combination of quantitative and qualitative methods, was used in the study. The study revealed that lack of emergency supplies, human resources, financial resources, school security, and seminars and training are the challenges in the implementation of the programs on disaster preparedness. The strategies used to address such challenges are resource mobilization and innovation; augmenting human resources; fundraising activities; partnerships with stakeholders; and the conduct of seminars and training, respectively.

***Index Terms*— Disaster Capabilities, DRRM Program Implementation, Disaster Preparedness, Basic Education Schools, Disaster Risk Reduction Management**

I. INTRODUCTION

A safe and secure school environment is essential for effective teaching and learning. To retain this type of environment, school disaster preparedness programs are essential.

Philippine schools are prone to damages due to disasters. There were seven (7) regions with reported volcanic eruptions, with 361 schools affected; 281 regions with reported earthquakes, with 3,557 schools affected; 24 regions with reported landslides, with 840 schools affected; 528 regions with reported flooding incidents, with 2, 692 schools affected; 711 regions with reported tropical cyclones, with 4,025 schools affected; 360 regions with reported fire incidents, with 1, 571 schools affected; and 347 regions with reported schools used as evacuation centers due to various disasters[1].

This study aimed to determine the capabilities and program implementation of disaster preparedness in basic education schools to fill a gap in the current literature and to propose recommendations to boost DRRMP implementation to improve disaster response capabilities.

II. THEORETICAL FRAMEWORK

The National Disaster Risk Reduction and Management (NDRRM) Framework is one of the bases of this study. One of the four quadrants of the NDRRM Framework is disaster preparedness. This component indicates an intended outcome which is to establish and strengthen the capabilities of communities to prepare, respond and recover from the negative effects of disasters.

The other basis of this study is the DRRM in Basic Education Framework. This Framework comprises three (3) programs that are in accordance with the thematic areas of RA 10121, which are prevention and mitigation, preparedness, response, rehabilitation, and recovery. These cover the global Comprehensive School Safety Framework's three (3) pillars that are aligned with the Sendai Framework for DRR. These pillars are safe learning facilities, disaster risk management, and DRR in education [2].

III. STATEMENT OF THE PROBLEM

This study determined the capabilities and extent of program implementation of disaster preparedness in Basic Education Schools under DRRM at the DepEd Naga City Division, Camarines Sur. Specifically, the study answered the following questions:

1. What are the schools' capabilities in the implementation of disaster preparedness under DRRM along the following:
   a. Human resources
   b. Material facilities
   c. Knowledge, innovation and education
   d. Policies, plans and procedures
   e. Capacities and mechanisms?
2. What is the extent of implementation of disaster preparedness under DRRM along the following:
   a. Safe learning facilities
   b. School disaster management
   c. Risk reduction and resilience education?
3. Are there significant differences among the components of capabilities and the extent of implementation of disaster preparedness in schools under the DRRM?
4. Is there a significant relationship in the schools' capabilities and extent of implementation of disaster preparedness of schools under DRRM?
5. What are the challenges in the implementation of the disaster preparedness programs and the strategies employed to address them?
6. What intervention plan may be proposed based on the

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result of the study?

IV. RESEARCH METHODOLOGY

Research Design

For the quantitative method, the study employed a descriptive-evaluative-correlational design. Descriptive design determined the schools' capabilities and the extent of program implementation of disaster preparedness. An evaluative design was used to find out whether there are significant differences among the components of capabilities and the extent of program implementation of disaster preparedness. The correlational design was used to determine whether there is a significant relationship between the capabilities and the extent of program implementation of disaster preparedness in schools.

For the qualitative method, qualitative-descriptive was used. Individual interviews with teachers were conducted to determine the challenges in implementing the disaster preparedness program and the strategies to solve them. The data from the open-ended questions was analyzed using thematic analysis.

Respondents of the Study

The quantitative part of the study was composed of eighty-two (82) respondents. The respondents consisted of the school DRRM coordinator and forty-one (41) basic education schools' principals in the DepEd Naga City Division, Camarines Sur.

The qualitative portion of this study was composed of twelve (12) teachers. These teachers were not part of the quantitative study. These respondents were chosen based on their geographical location: the Naga City Division's North, South, East, and West Districts.

Research Instruments

The researcher used survey questionnaires for the quantitative part of the study. The content of the first part (I) was taken from the NDRRM Plan Manual, 2011–2018. The questions were contextualized based on the school setting while the second part (II) used the SDRRM Manual Booklet I as a reference. A set of open-ended questions was employed for the qualitative portion of the study.

Statistical Treatment

The data was statistically treated through the use of mean to determine the capabilities and the extent of program implementation of disaster preparedness in schools. A one-way ANOVA was utilized to find out whether there are significant differences among the components of capabilities and the extent of program implementation of disaster preparedness in schools. Pearson R. was used to determine if there is a significant relationship between the capabilities and the extent of program implementation of disaster preparedness in schools.

The qualitative part of the study used thematic analysis of Clarke and Braun (2006). This was to find out the challenges in the disaster preparedness programs' implementation and the strategies employed to address them.

V. RESULT AND DISCUSSION

Table 1 shows that regarding capabilities in implementing disaster preparedness programs along human resources, the respondent schools have a very high level of capabilities. This signifies that the indicators under human resources are existing and established in the schools. The result shows that the schools agree with the advocates of NDRRM, whose framework emphasizes that being prepared lessens the impacts of disasters and prevents risks and minor crises from becoming disasters. This is made feasible through conducting drills and simulation exercises and educating school community members on disaster risk reduction. This results to fewer loss of lives and economic resources.

The research of Wagle (2021) supports this result. The previous study recommended that adequate human resources are needed to complete the tasks of DRRM to acquire a resilient community [3].

The fundamental implication is greater safety for all members of the school community. Schools can predict, respond to, and mitigate the negative effects of disasters because they have built DRRM capabilities.

The qualitative part of the study found that one of the challenges in implementing disaster preparedness programs is the lack of training and seminars. The study by Valencia (2018) contrasted this result. The previous study found that the school supports training and seminars about disaster preparedness [4].

One of the implications of inadequate training and seminars is that when there are fewer or a lack of crisis management trainings and seminars available to teachers and students, they may have insufficient knowledge and skills to respond to and minimize the effects of disasters, which can lead to a lack of readiness, making handling situations more difficult and increasing possible risks and vulnerabilities.

Table 1. Level of Schools' Capabilities in the Implementation of Disaster Preparedness under DRRM along Human Resources

Indicators	Mean	Interpretation
Prayers are recited before and after class.	3.72	Very High
Dedicated and adequate DRRM team is available to implement DRR activities.	3.66	Very High
Members of the school community are well-oriented on DRRM.	3.61	Very High
The SDRRM team is using a standard management command system.	3.52	Very High
DRRM-related activities are integrated into the curriculum.	3.50	Very High

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Simulation exercises are done with the involvement of concerned stakeholders.	3.49	Very High
School personnel are skilled in carrying out the contingency plan.	3.37	Very High
Availability of disaster management training and seminars for teachers and students.	3.33	Very High
Overall Mean	**3.52**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

It can be seen from the data in Table 2 that the overall mean is 3.16, which is interpreted as "high." This indicates that the indicators under material facilities are almost present in the respondent schools. This finding conforms with DepEd Order No. 21, s. 2015, also known as "Disaster Risk Reduction and Management Coordination and Information Management Protocol." This DepEd Order mandates schools to keep, distribute, and display essential and updated emergency hotlines in strategic areas [5].

The absence or insufficient presence of material facilities in school can lead to a lack of readiness, thus limiting the ability to practice emergency procedures and responses.

Table 2. Level of Schools' Capabilities in the Implementation of Disaster Preparedness under DRRM along with Material Facilities

Indicators	Mean	Interpretation
Presence of emergency hotlines on the school premises.	3.74	Very High
Functional early warning systems such as fire alarms are situated in strategic places and are checked regularly.	3.57	Very High
Availability of information, education and communication materials.	3.21	High
Fire extinguishers are installed strategically and refilled periodically.	3.04	High
Adequate number of functional safety equipment and emergency supplies.	3.03	High
CCTV cameras are situated in strategic places.	2.97	High
Availability of go bags in the school community.	2.55	High
Overall Mean	**3.16**	**High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

It is evident in Table 3 that most of the indicators have "very high" interpretation. Thus, the indicators under this component are existing and established in schools. The result shows that the public schools in the DepEd Naga City Division give importance to providing knowledge, education, and crafting innovations on disaster preparedness to help better equip the school community members with the necessary skills and knowledge during emergencies or disasters.

Table 3. Level of Schools' Capabilities in the Implementation of Disaster Preparedness under DRRM along with Knowledge, Innovation and Education

Indicators	Mean	Interpretation
Availability of DRRM information walls or boards and an evacuation plan.	3.47	Very High
Training and seminars such as first aid training and search and rescue training are available to the students and school personnel.	3.38	Very High
Disaster management is integrated into the school curriculum.	3.36	Very High
Availability of disaster awareness outreach activities.	3.29	Very High
Overall Mean	**3.37**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Table 4 shows that the indicators overall mean is very high. Figures revealed that the indicators under this component are existing and established in schools. As specified in DepEd Order No. 21, s. 2015, Safety and readiness measures and evacuation plans shall be posted in schools. Among the strategies the NDRRM provides in its framework that may be used to improve disaster preparedness are having customized training programs to train school community members in the necessary skills and integrating DRR concepts into the curriculum.

When schools have present and well-established disaster preparedness capabilities along with policies, plans, and procedures, many implications emerge, such as the fact that schools can successfully respond to a variety of disasters such as earthquakes, floods, or fires, reducing the possibility of injuries or fatalities.

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Table 4. Level of Schools' Capabilities in the Implementation of Disaster Preparedness under DRRM along with Policies, Plans and Procedures

Indicators	Mean	Interpretation
Earthquake drills are conducted quarterly.	3.76	Very High
The school has implemented Brigada Eskwela.	3.66	Very High
An evaluation is done after every drill.	3.65	Very High
The standard procedure for conducting the earthquake and fire drills is followed.	3.56	Very High
Unannounced earthquake and fire drills are conducted twice a month.	3.52	Very High
An established protocol is followed for a self-reporting process during an emergency among the school personnel.	3.7	Very High
There is an inventory of DRRM resources.	3.46	Very High
Availability of guidelines for emergency response teams.	3.40	Very High
Availability of a student-family reunification protocol in a real emergency.	3.38	Very High
Availability of a School Watching Team responsible for identifying risks and hazards.	3.30	Very High
Presence of SDRRM plan and materials for operation.	3.00	High
Overall Mean	**3.48**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

The Table 5 result signifies that schools in the DepEd Naga City division are complying with the mandate of the government, which is Republic Act (RA) 10121, also known as the Philippine Disaster Risk Reduction and Management Act of 2010. This demands government entities to implement DRRM frameworks, collaboration, procedures, and activities [6]. When established capacities and mechanisms are present, schools can activate emergency protocols, mobilize resources, and coordinate measures to protect the school community members, reducing the effects of disasters.

Table 5. Level of Schools' Capabilities in the Implementation of Disaster Preparedness under DRRM along with its Capacities and Mechanisms

Indicators	Mean	Interpretation
Availability of a contingency plan.	3.41	Very High
Advocacy campaign for DRRM is present.	3.40	Very High
Stakeholders help in ensuring the school's disaster preparedness	3.34	Very High
The Bureau of Fire Protection and the Philippine National Police monitor and evaluate the emergency drills.	3.33	Very High
Availability of contingency plan rehearsals and training drills.	3.29	Very High
There is education for the members of the school community on DRRM.	3.28	Very High
Presence of DRRM a customized training program.	3.26	Very High
Annual review on disaster management is done with the SDRRM team and the stakeholders.	3.14	High
Studies or innovations regarding instructional materials to support the DRRM programs are done.	3.14	High
Overall Mean	**3.29**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Table 6 shows that only one indicator, the material facilities, is "high" with a mean of 3.16, while the rest are considered "very high." This figure revealed that this component has generally been established in schools in the DepEd Naga City Division, except for material facilities which are almost present but not well-established in some schools.

Inadequate material facilities, such as communication systems and emergency equipment, are critical for effective emergency coordination. The absence of such facilities may jeopardize communication routes and coordination efforts among school staff, emergency responders, and authorities. These are required for carrying out actual drills and exercises to train students and staff on emergency response and evacuation procedures.

Table 6. Summary Table on the Level of Schools' Capabilities in the Implementation of Disaster Preparedness Programs

Components	Mean	Interpretation
Human resources	3.52	Very High
Policies, plans and procedures	3.48	Very High
Knowledge, innovation and education	3.37	Very High
Capacities and mechanisms	3.29	Very High
Material facilities	3.16	High
Overall Mean	**3.36**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Based on Table 7, all the indicators are interpreted as "very high," with an overall mean of 4.38. This result reveals that all the indicators are fully implemented in the respondent

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schools. This indicates that the school is well maintained and safe for the community members.

Full preparedness and implementation guarantee that learning facilities are designed, built, and maintained to withstand and reduce the effects of various hazards.

Table 7. Extent of the Program Implementation of Disaster Preparedness under DRRM as it Relates to Safe Learning Facilities

Indicators	Mean	Interpretation
Recreation, facilities on sanitation and classrooms are adequate.	4.57	Very High
The school is near the populations it serve.	4.48	Very High
Hygiene and health are evident in the learning environment.	4.45	Very High
Safe drinking water is available.	4.41	Very High
The routes to the school are safe for all.	4.41	Very High
The school is accessible to the public.	4.40	Very High
Availability of safety signs and boundaries.	4.38	Very High
Communities are involved in the school maintenance.	4.38	Very High
The school is danger free.	4.35	Very High
The prescribed ratio of teacher and learner is followed.	4.34	Very High
Availability of facilities for special education and gender of the learners.	4.34	Very High
Feeding programs are conducted.	4.33	Very High
Psychosocial support is offered in school.	4.28	Very High
Overall Mean	**4.39**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Table 8 shows the extent of the program implementation of disaster preparedness under DRRM as it relates to school disaster management.

The study of Bañares (2018) supported this result, which studied the DRRM implementation in the nine most disaster-prone municipalities in Camarines Norte. The study's result on the level of implementation was high; however, one of its hindering factors is the inadequacy of equipment needed during disasters. When the extent of disaster preparedness program implementation under DRRM as it relates to school disaster management is fully implemented, it leads to improved student and staff safety.

Table 8. Extent of the Program Implementation of Disaster Preparedness under DRRM as it Relates to School Disaster Management

Indicators	Mean	Interpretation
There is a documentation of accidents in school.	4.54	Very High
Pedestrian safety for learners is implemented.	4.51	Very High
The vital records of the school are in safe areas.	4.48	Very High
There is a database of learners and parents' information.	4.40	Very High
Availability of posted emergency contact numbers of government agencies.	4.37	Very High
Presence of updated hazard maps.	4.35	Very High
Students and school personnel wear identification cards.	4.33	Very High
The SDRRM team promotes individual and groups disaster preparedness.	4.30	Very High
Presence of a strong partnership with non-government organizations.	4.30	Very High
The SDRRM team maintains strong links between local disaster management offices. and other schools.	4.29	Very High
There are disaster preparedness trainings for community members.	4.05	High
Overall Mean	**4.36**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Table 9 results show that DRRM is integrated in the curriculum and extracurricular activities of the schools.

Full implementation of risk reduction and resilience education results in increased risk awareness, effective risk reduction strategies, improved preparedness and response, engagement and collaboration within the school and with stakeholders, knowledge and skill transfer, and resilient and adaptive future generations.

Table 9. Extent of the Program Implementation of Disaster Preparedness under DRRM as it Relates to Risk Reduction and Resilience Education

Indicators	Mean	Interpretation
The school strengthens the National Greening Program (NGP) implementation through "Gulayan sa Paaralan,"	4.60	Very High

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Availability of storage area for the safekeeping of records, computers, and other equipment.	4.51	Very High
Availability of a proper waste management.	4.35	Very High
The school conducts tree planting activities.	4.32	Very High
Psychosocial support is offered to the learners' education after disasters.	4.20	High
DRRM is integrated in the subject areas and other co-curricular activities.	4.11	High
Availability of needed emergency supplies.	4.07	High
Overall Mean	**4.31**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

It is revealed in Table 10, the summary of the extent of implementing disaster preparedness programs under DRRM. All the components are interpreted as "very high," which results in an overall mean of 4.34. The result conforms with the Comprehensive DRRM in Basic Education Framework. These pillars serve as the framework for risk assessment, implying that the responding schools have taken sufficient safeguards to have few, if any, possible dangers that could cause injury to their members.

The full implementation of these components demonstrates that responding schools have taken extensive efforts to protect the safety and preparedness of students, faculty, and the school community. It implies that the schools have created safe learning environments, robust disaster response methods, and educational programs encouraging risk reduction and resilience.

Table 10. Summary Table on the Extent of the Program Implementation of Disaster Preparedness under DRRM

Components	Mean	Interpretations
Safe learning facilities	4.38	Very High
School disaster management	4.33	Very High
Risk reduction and resilience education	4.31	Very High
Overall Mean	**4.34**	**Very High**

Legend: Very Low (1.00-1.75); Low (1.76-2.50); High (2.51-3.25); Very High (3.26-4.00)

Table 11 shows that there were significant differences in the schools' capabilities at the $p<.05$ level among the five (5) components [F 4, 405) = 6.349, p= .000]. It then signifies that the results on the differences in the components of schools' capabilities was "very highly significant," which means that there are significant differences in the schools' capabilities along the five (5) components.

Significant differences in capabilities suggest that some schools may be better prepared for disasters than others. Schools with stronger capabilities may have more robust rules, strategies, and processes in place, better-equipped facilities and more knowledgeable and skilled personnel. Schools with lower capabilities, on the other hand, may experience difficulties adopting effective disaster preparedness measures.

The NDRRM framework emphasizes reducing vulnerability and increasing the people's capacities in the community. Some of its principles address the root causes of vulnerability, emphasizing the importance of community empowerment, shared responsibilities and good responsive governance and mutually reinforcing partnerships. It requires strong and responsive political will, commitment, and leadership [7].

Table 11. One-Way ANOVA Results on the Differences in the Components of Schools' Capabilities

	Sum of Squares	df	Mean Square	F	Sig.	Interpretation
Between Groups	4.552	4	1.138	6.349	.000	Very Highly Significant
Within Groups	72.593	405	.179			
Total	77.145	409				

Legend: $p \leq 0.001$ very highly significant, $p \leq 0.01$ highly significant, $p \leq 0.05$ significant, $p > 0.05$ not significant

Table 12 shows the presence of significant differences in the components of the extent of implementation of disaster preparedness at the $p<.05$ level among the three (3) components [F 2, 243) =.602, p= .549]. It then signifies that the results on the differences in the components of program implementation were "not significant," which means that there were no significant differences in the program implementation along the three (3) components.

This study's findings are in accordance with the DRRM in Basic Education Framework. This framework intends to lead the basic education schools in their DRRM activities to promote resilience in schools and offices [8].

The lack of statistically significant differences shows that there are identical efforts, resources, and strategies used in all areas. This implies that resources are distributed equally across these areas. Furthermore, it shows a comprehensive approach to disaster preparedness and resilience in the school context.

Moreover, the lack of significant differences in program implementation components shows that the program addresses safety, disaster management, and resilience education. All the three components are significant and given equal weight within the scope of the program. When there are no significant differences, stakeholders responsible for

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implementing the program across the various components will likely collaborate and coordinate. This collaboration could include teaching and non-teaching school personnel and external agencies working together to maintain program uniformity.

Table 12. One-Way ANOVA Results on the Differences in the Components of Extent of Implementation of Disaster Preparedness

	Sum of Squares	df	Mean Square	F	Sig.	Interpretation
Between Groups	.239	2	.119	.602	.549	Not Significant
Within Groups	48.177	243	.198			
Total	48.415	245				

Legend: $p \leq 0.001$ very highly significant, $p \leq 0.01$ highly significant, $p \leq 0.05$ significant, $p > 0.05$ not significant

Table 13 shows that human resources, knowledge, innovation, and education, policies, plans, and procedures, as well as capacities and mechanisms, are statistically very highly significant with safe learning facilities, school disaster management, and risk reduction and resilience education (sig =.000). Material facilities are statistically very highly significant with safe learning facilities (sig=.000). Still, they are statistically significant with school disaster management (sig =.033), risk reduction, and resilience education (sig =.020).

This result shows that while school capabilities are increasing, the extent of program implementation is also increasing. This shows that as schools improve their capabilities and resources, they also increase their focus on establishing disaster preparedness and response programs. The research of Comighud (2020) has similarity to the present study's outcome. The previous study discovered a well-implemented DRRM program in Bayawan City Division public schools. They are also effective and competent in disaster response [9].

With improved skills, schools are better prepared to deal with potential emergencies and threats.

Table 13. Relationship between Schools' Capabilities and Extent of Program Implementation of Disaster Preparedness under DRRM

(I) School Capabilities	(J) Extent of Program Implementation	(I-J) Correlation	Sig. (2-tailed)	Interpretation
Human resources	Safe learning facilities	.587	.000	VHS
	School disaster management	.550	.000	VHS
	Risk reduction and resilience education	.548	.000	VHS
Material facilities	Safe learning facilities	.520	.000	VHS
	School disaster management	.235	.033	S
	Risk reduction and resilience education	.256	.020	S
Knowledge, innovation and education	Safe learning facilities	.526	.000	VHS
	School disaster management	.447	.000	VHS
	Risk reduction and resilience education	.509	.000	VHS
Policies, plans and procedures	Safe learning facilities	.724	.000	VHS
	School disaster management	.567	.000	VHS
	Risk reduction and resilience education	.419	.000	VHS
Capacities and mechanisms	Safe learning facilities	.572	.000	VHS
	School disaster management	.685	.000	VHS
	Risk reduction and resilience education	.771	.000	VHS

Legend: $p \leq 0.001$ very highly significant (VHS), $p \leq 0.01$ highly significant (HS), $p \leq 0.05$ significant (S), $p > 0.05$ not significant (NS)

This Figure is the concept map that underlines the qualitative data's outcome. It demonstrates the challenges and strategies involved in implementing disaster preparedness programs. The themes that emerged were the following: lack of emergency supplies, which can be resolved through resource mobilization and innovation; lack of financial resources with fund-raising activities as a strategy to cope with it; lack of school security, which is dealt with by having strong partnerships with stakeholders; lack of seminars and trainings, which are being resolved through the conduct of trainings and seminars; and lack of human resources with augmenting human resources as a strategy to deal with this.

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Figure 1. Challenges and strategies in the implementation of disaster preparedness programs.

The figure was created using elements and templates available on Canva (www.canva.com).

VI. CONCLUSION

Most schools in the DepEd Naga City Division have initiated disaster preparedness programs and activities and have fully implemented the programs required by the government. However, some challenges were encountered in implementing disaster preparedness programs that were not focused on. Some schools strategize to address such challenges but more effort should be made to address them.

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