



## Disaster preparedness of DepEd schools in the first district of Isabela

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### Abstract

Isabela Province is prone to various natural disasters, including typhoons, floods, and earthquakes. In the recent years, the frequency and intensity of natural disasters have highlighted the need for effective disaster preparedness and response strategies. Among the most crucial institutions affected are schools, which serve as vital learning environment for learners. In light of these hazards, ensuring the disaster preparedness of schools under the Department of Education (DepEd) in the province is of paramount importance. The study aimed to determine the level of disaster preparedness and awareness of public elementary and secondary schools in the First District of Isabela province in the perception of School Heads in terms of five (5) Disaster Risk Reduction Management (DRRM) program components: project & activities, personnel, budget, facilities & equipment and monitoring & evaluation. It also focused on the assessment of DepEd schools' building vulnerability to disasters specifically strong winds and flooding through a rapid visual survey. It also aimed to address the challenges faced by DepEd schools in their disaster preparedness endeavors. Hence, the study emphasized the importance of disaster preparedness for DepEd Schools by implementing robust risk assessment processes, adhering to appropriate building codes, and developing comprehensive disaster preparedness plans ensuring the safety and resilience of schools and its buildings contributing to the overall well-being and educational continuity of learners, teachers and staff.

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## Introduction

Climate change is leading to more natural disasters around the world, with Asia being considered the “disaster central”. Forty-five percent (45%) of natural disasters globally happen in the region, and it is home to 3 of the 5 most disaster-prone countries in the world, namely the Philippines, India, and Indonesia (followed by Colombia and Mexico).

In 2015, the United Nations Office for Disaster Risk Reduction (UNISDR) divulged that there are three hundred forty-six (346) reported disasters in the whole wide world. In line with these cataclysms, 22,773 people died and 98.6 million individuals got affected. Also, 66.5 billion US Dollars were lost due to economic damages. These numbers are mere proofs that a disaster is uncontrollable especially to vulnerable countries like the Philippines.

According to Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the Philippines is greatly prone to disasters especially to storms due to its geographical location and typhoons averaging around 19-20 every year with Northern Luzon among the worst-affected areas. Varying from mild occurrences to catastrophic events such as super-typhoon *Haiyan* (local name Yolanda) which left 10,000 people dead in southern Visayas region in November 2013. Typhoons bring strong winds, intense amount of rainfall and flooding to the country, causing great damage to both land and property. Table 1 presents the list of the deadliest and costliest typhoon events occurred in the country.

In the case of extreme events such as *Haiyan*, the magnitude and level of damage and destruction is significant enough that action must be taken by the global community to concentrate on and achieve disaster risk reduction for those who are vulnerable to such events.

Disaster preparedness plays a vital role in saving lives and preventing undesirable events from happening. Additionally, being prepared helps people feel less stressed to ensure they can react

calmly and positively when a disaster is wreaking havoc. Disaster preparedness, according to the National Disaster Risk and Reduction Management Council (NDRRMC), an agency established by the Philippine government to prepare for and respond to natural disasters or human-caused emergencies, establishes and strengthens community capacities to anticipate, cope with, and recover from the negative impacts of emergency occurrences and disasters (NDRRMP, 2011 Final Version). However, problems still exist in facilitating the execution and implementation of disaster risk reduction measures in critical areas such as education sector. Schools serve an important role in educating a nation's future generations; learners are among the most vulnerable members of society according to their age and developmental stage. A more safe and resilient school can save children's lives and offer a refuge for the neighborhood especially here in the country. However, based on the country's inventory records of all public elementary and secondary school facilities nationwide, many of these school buildings were constructed as early as 1990s. It is evident that these old school buildings are no longer in compliance to the latest Philippine building laws and codes (PD 1096 or the National Building Code of the Philippines, RA9266 or The Architectural Act of 2004, Fire Code, Accessibility Law, and the National Structural Code).

Schools are classified as "Essential Structures" under the aforementioned standards, placing them in the same category as hospitals, which are required for emergency response and disaster recovery. School buildings and infrastructure are frequently repurposed as evacuation centers or for other purposes, which is a sad fact and contradicts the duty of guaranteeing learning continuity. If schools are not aware of the problem and take proactive measures, unsafe schools will keep betraying the faith and hope that people have in them. Students will be killed, injured, and drop out in large numbers unless everyone takes responsibility for keeping them safe.

**Table 1.** Deadliest and costliest typhoon events in the Philippines

No.	Typhoon name	Year	Damage cost (in Php)	Reference
1	Yolanda ( <i>Haiyan</i> )	2013	95.5 billion	Del Rosario, 2025
2	Odette ( <i>Rai</i> )	2021	51.8 billion	NDRRMC, 2022
3	Pablo ( <i>Bopha</i> )	2012	43.2 billion	Uy <i>et al.</i> , 2018
4	Glenda ( <i>Rammasun</i> )	2014	38.6 billion	Ramos, 2014
5	Omping ( <i>Mangkhut</i> )	2018	33.9 billion	Jalad, 2018

The country’s educational system continuously strengthens Republic Act (RA) No. 10121, otherwise known as the Philippine Disaster Risk Reduction and Management (PDRDM) Act of 2010, to protect vulnerable populations from both natural and man-made disasters. This law mandated that all branches of the national government, including schools, create programs for disaster risk reduction and management. The primary goals of RA 10121 are preparedness, disaster response, recovery, and rehabilitation, as well as disaster prevention and mitigation (Florano, 2018; Turpin, 2019).

Due to the challenges and problems that occur during disasters, this study was conducted to determine the status on the level of disaster preparedness and implementation among public elementary and secondary school heads in the First District of Isabela province.

School’s Disaster Risk Reduction Management (DRRM) program implementation has a greater positive influence on the lives of the learners, but School’s Disaster Management is futile if the school buildings where they are housed are vulnerable to disaster/calamities. Thus, the main focus of this study is to determine the status of school structure/buildings of the First Congressional District of Isabela with researcher’s notion that if school, communities and the Department of Education (DepEd) take responsibility for the safety in school, the first and foremost consideration is the school buildings to safeguard the precious lives of the learners during natural or man-made calamities, specifically in San Pablo, Sta. Maria, Cabagan, Sto. Tomas, Delfin Albano and Tumauni and City of Ilagan, the catch basin areas during floods in Isabela.

This quantitative research entitled “Disaster Preparedness of DepEd Schools in the First District of Isabela” sought to achieve the following objectives:

1. Identify the level of the implementation of DepEd public elementary and secondary schools’ Disaster Risk Reduction Management (DRRM) through the perception of School
2. Determine the preparedness of DepEd elementary and secondary school buildings in the face of calamities;
3. Identify schools that are vulnerable to multiple hazards; and
4. Identify the problems and issues on the implementation of disaster preparedness of the schools.

*Conceptual/Theoretical framework*

This research endeavor is anchored on concepts, theories and findings from assessment of various studies and reports about disaster preparedness of school structures. The findings will be acknowledged in order to support and validate the claims established in this study.

*School building sector*

*National*

The Department of Education (DepEd) issued Department Order No. 83 s. 2011 Disaster Preparedness Measures for Schools in accordance to the agency’s Disaster Risk Reduction Management – Climate Change Adaptation (DRRM-CCA) policies. Stipulated on the said order addressed specifically to School Division Heads/City Superintendents and Public and Private Elementary and Secondary Schools is the addressing of disaster risk reduction in education on the underlying disaster risk drivers such as (i) poorly built school structures; (ii) teacher’s lack of knowledge about risks and risk reduction skills; (iii) teachers’ and administrators’ lack of capacity in

disaster preparedness and response; and (iv) a lack of warning mechanisms and risk assessments. Actions must be taken to mitigate the effects of disasters, particularly in schools, where the effects are mostly visible and on children's education are most apparent.

Assessing school buildings reveals many school building designs that have been modified to reflect the culture, historical period, and responsiveness to changing climate and new requirements. Designs vary depending mainly from the private and public initiators – LGU, private donations, or the national government through the Department of Education.

*Responsible agencies and collaborators*

*a. Design*

Department of Education, Architectural and Engineering Consultants, Local Government Unit, National Government, Department of Budget Management, School Heads, Parent/Teacher Associations, Students, Department of Health, Disaster Risk Reduction Management Office, Fire Services

*b. Construction*

Contractors, Architectural and Engineering Consultants, Department of Education, Insurance Agencies, Financial Institutions

*c. Reconstruction after destruction*

Department of Education, Architectural and Engineering Consultants, Financial Agencies, Contractors

*d. Retrofit*

Department of Education, Architectural and Engineering Consultants, Financial Agencies, Contractors

*e. Rehabilitation*

Department of Education, Architectural and Engineering Consultants, Financial Agencies, Contractors

*f. Repair after damage*

Department of Education, School Heads, Teaching and other Staff, Architectural and Engineering Consultants, Financial Agencies, Contractors

*g. Maintenance*

School Heads, Teaching and other Staff, Students, Department of Education, Parent/Teacher

Associations, Financial/Funding Agencies, Architectural and Engineering Consultants, Contractors

*Building a profile and database*

Building a profile and database starting with the particular use and description of the building in terms of architectural, structural, electrical, plumbing, sanitary and mechanical aspect and the profile of school heads in terms of level of preparedness.

*International*

The Global Program for Safer Schools (GPSS) a program funded by the Global Facility for Disaster Reduction and Recovery (GFDRR) launched in 2014, aims to increase significant financial resources in order to improve the safety and resilience of school infrastructure that is highly vulnerable to natural disasters as well as the quality of learning environments for the children. The programs also provide technical assistance in countries including the Philippines to design and implement safer schools' programs including recovery and reconstruction in post-disaster conditions. The program developed an operational tool offering guidance to project managers interested in advancing the safer school agenda which is the Roadmap for Safer and Resilient Schools (RSRS).

*Roadmap for Safer and Resilient Schools Step by Step Process*

*Step 1 – School infrastructure baseline*

To establish a baseline of existing school infrastructure facilities and the demand for new school infrastructure.

*Step 2 – School infrastructure policy*

To gain an understanding of the policy framework that governs school infrastructure and the projected demand for classrooms.

*Step 3 – Construction environment*

To gain an understanding of the regulatory framework, construction management practices and construction technologies within which school infrastructure is planned, designed, built, operated and maintained.

*Step 4 – Financial environment*

To gain an understanding of the financial environment within which school infrastructure is planned, designed, constructed, operated and maintained.

*Step 5 – Risk and resilience assessment of school infrastructure*

To allow task teams to identify different intervention options by quantifying the potential harm to children, damage and losses to existing school infrastructure, and disruption of services caused by the occurrence of hazard events of varying intensity and frequency.

*Step 6 – Intervention strategy*

To set up objectives, priorities, and expected results within the timeframe of the plan and define an intervention strategy accordingly.

*Step 7 – Investment plan*

To estimate the cost of the intervention strategy and propose an investment plan within the plan’s time frame.

*Step 8 – Implementation strategy*

To define implementation arrangements for the plan in line with the intervention strategy, the investment plan, and the country’s institutional and legal framework.

**Materials and methods**

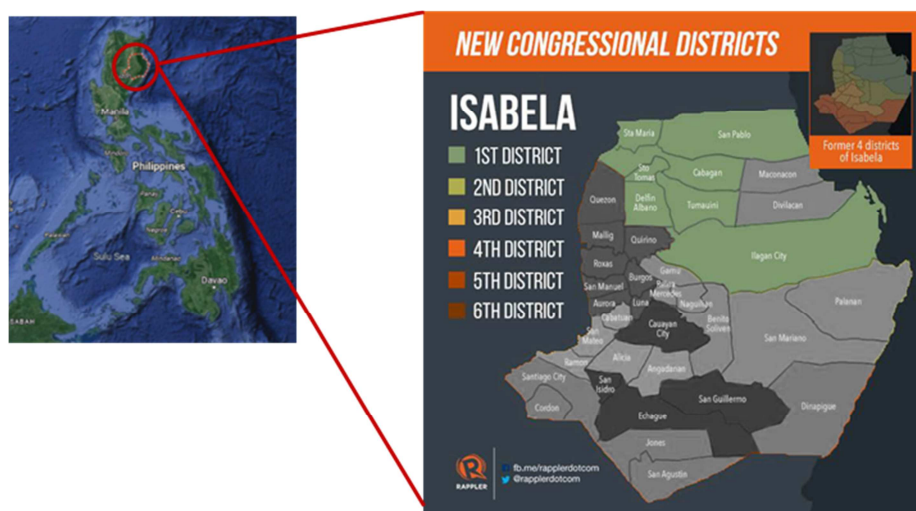
*Research design*

The study made use of the descriptive assessment research design with quantitative method by using questionnaire and rapid visual screening as data gathering instruments. Calmorin (2003) cited that descriptive research focuses at gathering data of present situation, describes the events and then organizes and describes the data.

*Locale of the study*

The study was conducted among the school heads of public elementary and secondary schools among the seven (7) selected municipalities in the First Congressional District of Isabela.

The first district of Isabela is one of the six congressional districts of the province in the Philippines. The district consists of the capital City of Ilagan and northern municipalities of Cabagan, Delfin Albano, Divilacan, Maconacon, Tumauni, San Pablo, Sta. Maria and Sto. Tomas. The district, representing 36.41% of the entire Isabela Province, has a land area of 4,519.71 square kilometers. Fig. 1 shows the imagery map of the 1<sup>st</sup> District of Isabela.

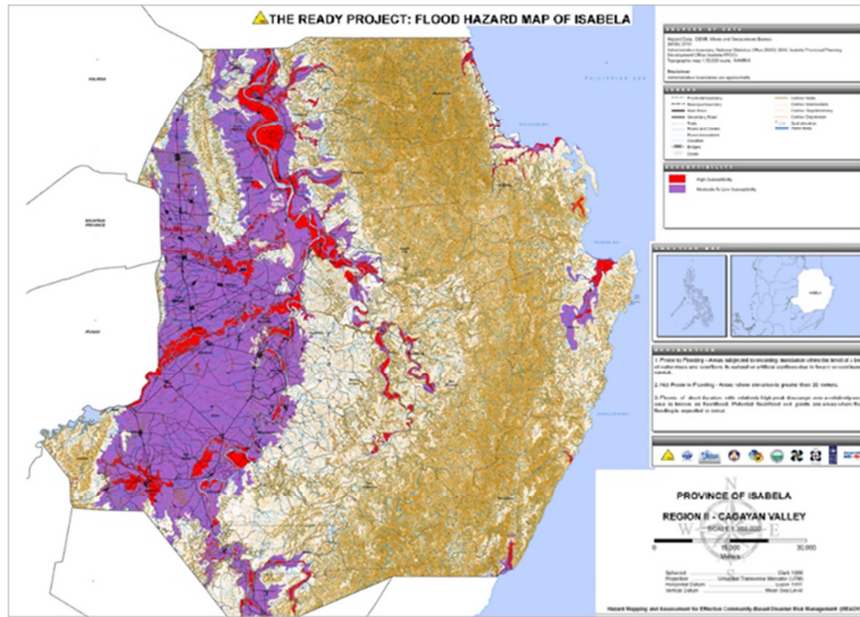


**Fig. 1.** Location of the study area, 7 municipalities from the 1<sup>st</sup> District of Isabela Province, Philippines

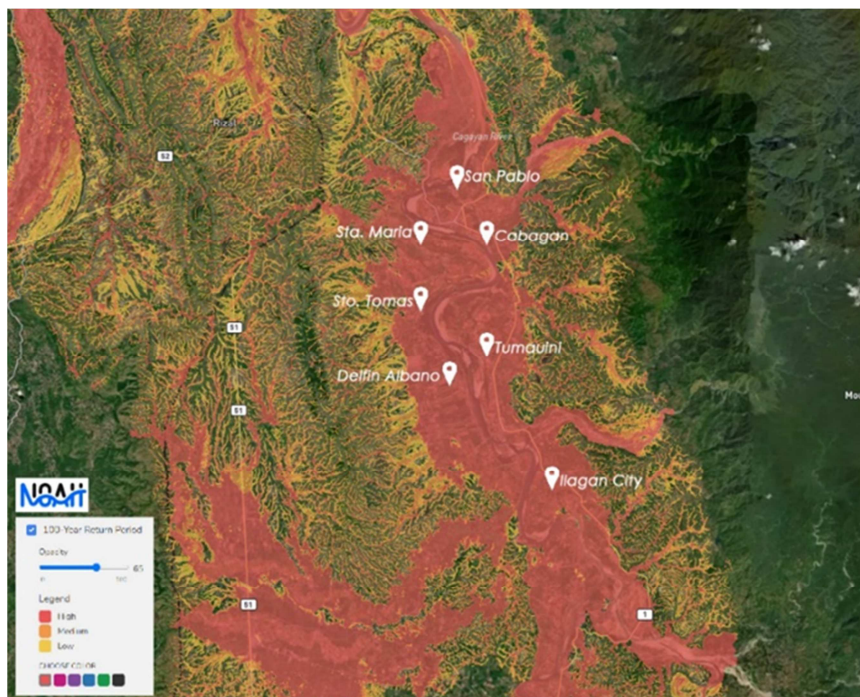
Geomorphology has a substantial impact on the nature of risks in the case of typhoon events, which appear as high wind and flood hazards. These two hazards are considered in this study attributed with

other typhoon effects. As indicated on the Flood Hazard Map of Isabela province (Fig. 2), the First District located on the northern part of the province is the area highly susceptible to flooding.





**Fig. 2.** Province of Isabela flood hazard map gathered from provincial disaster risk reduction management council



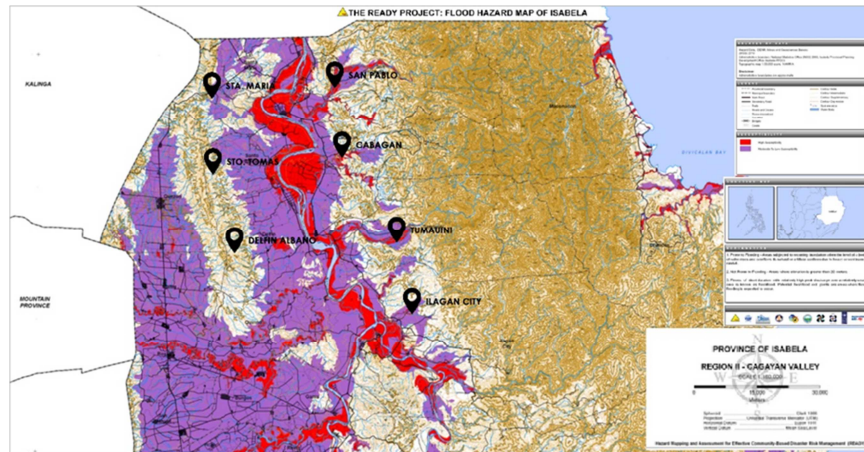
**Fig. 3.** Map generated from project NOAH 100-year flood map indicating the seven (7) selected LGUs of the first district of Isabela province

As seen on Fig. 3 and 4, among the nine (9) LGUs of the First District, the study focused on the municipalities of San Pablo, Cabagan, Sta. Maria, Tumauni, Delfin Albano, Sto. Tomas and the capital City of Ilagan, the catch basin areas during floods excluding the coastal towns of Divilacan and Maconacon.

*Respondents of the study and sampling procedures*  
 The participants in this study were the school heads of both public elementary and secondary schools of the First Congressional District of Isabela. There was no required age limit, sex, and other qualities to be a participant of this study as

long as they handle a school which is located in the First Congressional District of Isabela. The criteria in the selection of participant schools is their vulnerability to hydro-meteorological hazards (e.g., flooding). The participants consisted of School Head of (1) public elementary school and one (1) secondary school per municipality, a total of seven (7) public elementary schools and seven (7)

secondary schools. The researcher consulted the Schools District Supervisor of each municipality/city to specify schools prone to flooding under their jurisdiction. Using purposive sampling, the researchers rely on her own judgment in choosing the participants of this study. The following were the selected schools per municipality/city.



**Fig. 4.** Flood hazard map of the first district indicating the 7 LGUs

**Table 2.** List of participant schools in the first district of Isabela province

Municipality/City	Elementary school	Secondary school
Sta. Maria	Mozzozzin Elementary School (Bldg ID: 103847)	Sta. Maria National High School (Bldg ID: 300077)
San Pablo	Auitan Elementary School (Bldg ID: 103796)	Saint Paul Vocational and Industrial High school (Bldg ID: 300601)
Cabagan	Pilig Alto Elementary School (Bldg ID: 103159)	Alfreda Albano National High School (Bldg ID: 300521)
Ilagan City	Bangag Elementary School (Bldg ID: 102867)	Manaring Integrated High School (Bldg ID: 306139)
Delfin Albano	Ragan Elementary School (Bldg ID: 103272)	San Antonio National High School (Bldg ID: 305408)
Tumauni	Don Manuel Moldero Elementary School (formerly San Francisco Elementary School) (Bldg ID: 103880)	Fermely National High School (Bldg ID: 306109)
Sto. Tomas	San Vicente Integrated High School (Bldg ID: 103870)	San Vicente Integrated High School (Bldg ID: 103870)

This paper introduces a series of operational tools for a rapid visual multi-hazard vulnerability of school infrastructures against the most prevalent disasters of the country.

*Research instruments*

The researcher adapted a standardized questionnaire by Dr. Nelson R. Bello on his study “Disaster Preparedness of Schools in region 8, Philippines After Typhoon Haiyan”. It is a five scale Likert’s type

questionnaire categorized into five items namely: Projects and Programs, Personnel, Budget, Facilities and Equipment and Monitoring and Evaluation. Five levels were determined to interpret the responses on the given items such as ‘Very Well Prepared’ (5), ‘Well Prepared’ (4), ‘Prepared’ (3), ‘Unprepared’ (2) and ‘Not Prepared at all’ (1).

The researcher also utilized a Rapid Visual Screening (RVS) tool to create a profile and database of the

school building structure. The survey tool was based from the Safer Communities through Safer Schools (SCOSSO) Rapid Visual Survey version 3 form. SCOSSO is a project that investigates the safety of school buildings and infrastructure against different natural hazards in the country.

The researcher modified these instruments to make these tools more in line to the objectives of the current study.

#### *Data gathering procedures*

The researcher visited seven municipalities on the First District of Isabela: Cabagan, San Pablo, Sta. Maria, Sto. Tomas, Delfin Alabano, Tumauni and City of Ilagan. The researcher requested for the approval of research adviser. Upon getting the approval, the researcher collected the information from various sources such as books, articles, internet and even magazines to develop the research. After collecting, the researcher analyzed all the information taken from different sites and authors then synthesized them. The participants were selected through purposive sampling procedure. Afterwards, the researcher used a sidewalk survey of a school building profile and database wherein accomplishing the survey through visual observation of the building (exterior). Considering the duration of time needed for each building assessment, the parameters in assessing is based on the importance and practicality of available and measurable data. Moving on, the data gathered from the respondents was computed and interpreted for the advancement of the study.

#### *Statistical tools and treatment*

The collected data were tabulated after the questionnaire had been evaluated and information had been gathered. The preparation of the public elementary and secondary school heads from the First District of Isabela were evaluated using mean and standard deviation computation. The relationship between the school respondents' levels of preparedness was examined using *t-test*. The *p-value* then was used to test the hypothesis. Following all statistical treatments, the outcomes were examined and discussed. Conclusions and suggestions

for further research were drawn and based on these findings.

Information gathered from the rapid visual survey was used for a quick assessment of the structural integrity and to assess whether the building is capable of resisting lateral and vertical loads.

## **Results and discussion**

### *Disaster preparedness of elementary and secondary schools*

#### *Profile of the respondents*

The profile includes the schools' level of disaster preparedness in terms of projects and activities, budget allocation, personnel, and facilities and equipment for DRRM response in the perception of the school heads.

#### *Facilities and equipment for disaster response*

Table 3 above presents the responses of the respondents on the profile of the public elementary and secondary schools in terms of the availability of facilities and equipment for disaster. The result implies that the schools have little to no equipment in preparation for disasters. Flood markers indicate critical levels of flooding and its highest level documented in the area. Based from the data gathered, mostly elementary schools were provided with flood markers in which some were erected by the local government and some were only paint marks on the building. Twenty-nine (29%) percent and thirty-six (36%) percent of public elementary and secondary schools from the first district have only DRRM kits prepared respectively. Most of the schools do not have back-up generators in case of local power outage and to charge communication and information devices for weather updates.

Communication devices like hand-held radios are not typically used instead personal cellular phones are utilized to help easily communicate with other concerned agencies and fifty percent (50%) for both school levels have computers with internet connection which can help them track and gain updates from the local weather forecasting news online.



**Table 3.** Level of preparedness of DepEd schools in the first district of Isabela province in terms of the availability of facilities and equipment for disaster

Facilities & equipment	Elementary school		Secondary school	
	f	%	f	%
Fire extinguisher	6	43	6	43
Telephones & Cellphones	5	36	5	36
Computers with internet connection	7	50	7	50
A gym or covered court	5	36	7	50
Temporary learning areas (TLA)	1	7	5	36
DRRM Kits (e.g. disaster kits)	4	29	5	36
Emergency evacuation plan indicating fire exits	4	29	5	36
Back-up generators	2	14	1	7
Hand-held communication radios (walkie-talkie)	0	0	1	7
Land vehicles	0	0	2	14
Search and rescue boats	0	0	0	0
Life vests/Jackets	2	14	1	7
Flood water and school ground marker	4	29	0	0

**Table 4.** Mean on the level of disaster preparedness of the seven (7) DepEd elementary schools in the first district of Isabela in terms of projects and activities

Projects and activities	Elementary schools (Building ID)							Total $\bar{x}$
	103847	103796	103159	10867	103272	103880	103870	
The school ensures the establishment of Early Warning System (i.e bulletin board for weather advisories, bell/siren emergency signal and the like);	5	3	5	5	5	4	5	4.57
The school conducts and annual student-led risk identification and mapping within and around the school premises to ensure safe environment that is conducive to teaching and learning;	4	3	4	5	5	5	5	4.42
The school maintains close coordination with local DRRM Council on the conduct of preparedness activities and on response needs;	5	4	4	5	5	5	5	4.71
The school provides capacity building activities for teachers, non-teaching staff and learners on DRRM;	5	3	5	4	5	4	4	4.29
The school maintains, disseminate, and post relevant and updated emergency hotlines in strategic locations throughout the school;	5	4	5	5	5	5	5	4.86
Safety preparedness measures and evacuation plans are posted;	5	3	3	5	5	5	5	4.43
Disaster preparedness measures, including but not limited to multi-hazard drills applicable to schools identified are periodically conducted;	5	3	5	5	5	5	4	4.57
The school maintains the safekeeping of vital school records and learning materials;	5	5	5	5	5	5	4	4.86
The school organizes a DRRM team to support the implementation of preparedness and responses measures;	5	3	4	5	5	4	5	4.43
The school ensures the availability of DRRM updated baseline education data;	5	3	3	4	5	5	5	4.29
DRRM is integrated in regular school programs/activities and School Improvement Plan (SIP);	5	3	5	5	5	5	5	4.71
The school identifies possible Temporary Learning Spaces (TLS) and alternative delivery modes of education;	4	3	4	4	4	4	4	3.86
The school monitors the effects of hazards, including the use of the school as evacuation center;	4	3	4	4	5	5	4	4.14
All school personnel during disasters and/or emergencies are tracked/followed up;	5	3	5	5	5	5	5	4.71
The school prepares and submits reports on the effects of any hazard;	5	3	5	5	5	5	5	4.71
The school ensures the implementation of DepEd Order No. 43, s. 2012 or the "Guidelines on the Implementation of Executive Order NO. 66 s. 2012 (Prescribing Rules on the								

Cancellation or Suspension of Classes and Work in Government Offices Due to Typhoons, Flooding, Other Weather Disturbances, and Calamities”);	5	5	5	5	5	5	5	5
The school conducts rapid assessment of damages after every hazard and submit RADaR (Revised Rapid Assessment of Damages Report) within 72 hours via text/SMS;	5	5	5	5	5	5	5	5
Immediate resumption of classes is facilitated to track learners after the disaster;	4	3	4	4	4	4	3	3.71
Recovery and rehabilitation intervention activity being implemented in the school are regularly monitored.	4	4	4	5	5	4	3	4.14
Total $\bar{x}$	4.74	3.47	4.42	4.47	4.89	4.68	4.53	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 5.** Mean on the level of disaster preparedness of the seven (7) DepEd secondary schools in the first district of Isabela in terms of projects and activities

Projects and activities	Secondary schools (Building ID)							Total $\bar{x}$
	300077	300601	300521	306139	305408	306109	103870	
The school ensures the establishment of Early Warning System (i.e bulletin board for weather advisories, bell/siren emergency signal and the like);	5	3	5	4	5	3	5	4.29
The school conducts and annual student-led risk identification and mapping within and around the school premises to ensure safe environment that is conducive to teaching and learning;	5	3	5	5	5	2	5	4.29
The school maintains close coordination with local DRRM Council on the conduct of preparedness activities and on response needs;	5	5	4	5	5	4	5	4.71
The school provides capacity building activities for teachers, non-teaching staff and learners on DRRM;	4	3	4	5	4	3	4	3.86
The school maintains, disseminate, and post relevant and updated emergency hotlines in strategic locations throughout the school;	4	5	5	5	5	5	5	4.86
Safety preparedness measures and evacuation plans are posted;	4	5	5	5	5	3	5	4.57
Disaster preparedness measures, including but not limited to multi-hazard drills applicable to schools identified are periodically conducted;	4	4	5	5	4	4	4	4.29
The school maintains the safekeeping of vital school records and learning materials;	5	4	5	5	5	4	4	4.57
The school organizes a DRRM team to support the implementation of preparedness and responses measures;	5	4	4	5	5	3	5	4.43
The school ensures the availability of DRRM updated baseline education data;	5	4	4	4	4	3	5	4.14
DRRM is integrated in regular school programs/activities and School Improvement Plan (SIP);	5	4	5	5	5	4	5	4.71
The school identifies possible Temporary Learning Spaces (TLS) and alternative delivery modes of education;	4	4	5	5	4	3	4	4.14
The school monitors the effects of hazards, including the use of the school as evacuation center;	5	3	5	4	4	3	4	4.00
All school personnel during disasters and/or emergencies are tracked/followed up;	5	4	5	5	4	3	5	4.43
The school prepares and submits reports on the effects of any hazard;	5	4	5	5	5	4	5	4.71
The school ensures the implementation of DepEd Order No. 43, s. 2012 or the “Guidelines on the Implementation of Executive Order NO. 66 s. 2012 (Prescribing Rules on the Cancellation or Suspension of Classes and Work in Government Offices Due to Typhoons, Flooding, Other Weather Disturbances, and Calamities)”;	5	5	5	5	5	4	5	4.86

The school conducts rapid assessment of damages after every hazard and submit RADaR (Revised Rapid Assessment of Damages Report) within 72 hours via text/SMS;	5	5	5	5	5	4	5	4.86
Immediate resumption of classes is facilitated to track learners after the disaster;	4	4	5	5	4	4	3	4.14
Recovery and rehabilitation intervention activity being implemented in the school are regularly monitored.	5	5	4	5	4	3	3	4.14
Total $\bar{x}$	4.67	4.10	4.73	4.84	4.58	4.37	4.53	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

The IRR of the Fire Code of the Philippines (2008) or the Republic Act of 9514 states that every classroom should be provided with a fire extinguisher especially buildings that have combustible materials.

Inadequacy and absence of some facilities like schools' land vehicles, life jackets/vests and rescue boats. Flooding swept away some of these facilities and equipment. Though these cannot be acquired easily, it is also the initiative of the schools to take action to purchase these essential facilities as these are essential for safety and survival of the learners.

Furthermore, facilities like evacuation plans indicating fire exits are not provided on some of the schools surveyed. These plans guides learners to safe location in case of disaster.

*Status on disaster preparedness*

The following categories were based from School's DRRM implementation support and mechanisms.

Table 4 shows the level of awareness and implementation of the respondents in terms of existing preparedness projects and activities. The set of guidelines under projects and activities survey were based from DepEd Order No. 21, s. 2015 to which this protocol will serve as pre-assessment for the school heads or DRRM coordinators in determining the level of preparedness of their respective schools.

The result presented on Table 4 implies that most of the public elementary and secondary schools in the First District of Isabela province are aware of the extent and impact of disasters in their area. Hence, these schools integrate DRRM program and activities, conduct trainings and capacity building for the

teachers and learners, and maintain a close coordination with the DRRM council.

It was also observed that among all of the schools visited, public elementary buildings are mostly constructed at one-storey level and situated at flood prone areas forcing the school heads and teachers to safekeep vital school records and learning materials back to their homes. Some schools seek help to neighboring medium-rise buildings to safeguard these materials.

As observed from the result of the Table 5, among the seven (7) secondary schools, the school least prepared to disaster in terms of project and activities is Fermely National High School. On the other hand, Manaring Integrated School is the school very well prepared to implement disaster related projects and activities. As soon as the schools are notified by incoming disaster, cancellation of classes and other activities is implemented. However, all of these schools were observed to provide inadequate capacity building activities for teachers, non-teaching staff and learners on DRRM.

After the onslaught of a disaster, the schools play a vital role in supporting the recovery process and ensuring the well-being of learners, staff and the broader community. The responses of the respondents show that they conduct a thorough safety assessment of the school buildings and facilities to identify any damage caused by the disaster. Then, prioritization of repairs and reconstruction of the buildings is proposed to ensure a safe learning environment.

**Table 6.** Mean on the level of disaster preparedness of the seven (7) DepEd elementary schools in the first district of Isabela in terms of personnel

Personnel	Elementary schools (Building ID)							Total $\bar{x}$
	103847	103796	103159	102867	103272	103880	103870	
Teacher's leadership is recognized during disasters	5	4	5	5	5	5	5	4.86
There exist a good coordination between school and LGU in the DRRM Program Implementation.	5	4	4	5	5	5	5	4.71
There is a strong working unit or team culture in the school in the implementation of DRRM Program.	5	3	5	5	5	5	5	4.71
The school provides capacity building activities for teachers, non-teaching staff and learners on DRRM;	5	3	5	5	5	4	5	4.57
Teachers and students are well-prepared in any disaster in school.	5	3	5	5	5	5	4	4.57
School personnel are well-oriented of their roles during disaster.	5	3	5	5	5	5	5	4.71
Teacher and students are given freedom on DRRM matters they can control of.	5	3	5	5	5	4	3	4.29
There exist an organizational structure to consider in the discharge of functions/responsibilities during disaster.	5	3	5	5	5	4	4	4.43
The teachers and students attend DRRM trainings and seminars.	4	4	4	4	5	5	2	4.00
The flow of authority and coordination is clearly indicated in the organization chart.	5	3	3	5	5	5	4	4.29
There is a sufficient number of school manpower to meet the demands during disaster.	5	3	5	5	4	4	4	4.29
Total $\bar{x}$	4.91	3.27	4.63	4.91	4.91	4.63	4.18	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

The schools also recognize and address the emotional and psychological needs of the learners, teachers and staff who may have experienced trauma or loss during the disaster. Implementing counseling services and provide access to mental health professionals to help individuals cope and recover. Continuing education is implemented as the school respondents provide temporary learning spaces and provide necessary resources for the learners and teachers.

Recognizing and supporting the leadership of teachers during disasters is crucial for fostering a culture of preparedness, resilience, and collaboration withing schools and communities. Their dedication and expertise contribute significantly to the overall safety and well-being of students and the successful recovery from disasters.

At the basic level, school personnel have a good understanding of the importance of disaster preparedness but lack detailed knowledge about specific hazards, response protocols, and

preventive measures. Based from the results shown in Table 5 & 6, teachers' leadership is indeed recognized and valued during disasters for their crucial role in ensuring the safety, well-being and education of learners. They demonstrate leadership by adapting the curriculum and instructional strategies to address the unique needs and challenges that arise after a disaster. They collaborate with colleagues to actively participate in planning recovery efforts and advocating for the needs of students and the school community.

The results also show that the public elementary and secondary schools in the first district have a sufficient number of school manpower during a disaster in ensuring the safety and well-being of the learners. The sufficient manpower allowed for proper student supervision, evacuation management, safety protocols and having enough personnel ensures that each learner can be accounted for and that their immediate needs are attended to.



**Table 7.** Mean on the level of disaster preparedness of the seven (7) DepEd secondary schools in the first district of Isabela in terms of personnel

Personnel	Secondary schools (Building ID)							Total $\bar{X}$
	300077	300601	300521	306139	305408	306109	103870	
Teacher's leadership is recognized during disasters	5	4	5	5	5	4	5	4.71
There exist a good coordination between school and LGU in the DRRM Program Implementation.	5	4	5	5	5	4	5	4.71
There is a strong working unit or team culture in the school in the implementation of DRRM Program.	5	5	5	5	5	4	5	4.86
The school provides capacity building activities for teachers, non-teaching staff and learners on DRRM;	4	4	4	5	4	4	5	4.29
Teachers and students are well-prepared in any disaster in school.	4	3	5	5	4	4	4	4.14
School personnel are well-oriented of their roles during disaster.	4	4	5	5	5	4	5	4.57
Teacher and students are given freedom on DRRM matters they can control of.	5	4	4	4	5	3	3	4.00
There exist an organizational structure to consider in the discharge of functions/responsibilities during disaster.	4	4	5	5	4	3	4	4.14
The teachers and students attend DRRM trainings and seminars.	4	5	4	5	4	3	2	3.86
The flow of authority and coordination is clearly indicated in the organization chart.	4	5	5	5	4	3	4	4.29
There is a sufficient number of school manpower to meet the demands during disaster.	5	3	5	5	4	3	4	4.14
Total $\bar{X}$	4.45	4.09	4.73	4.91	4.45	3.54	4.18	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 8.** Mean on the level of disaster preparedness of the seven (7) DepEd elementary schools in the first district of Isabela in terms of budget allocation

Budget allocation	Elementary Schools (Building ID)							Total $\bar{X}$
	103847	103796	103159	102867	103272	103880	103870	
The school has plans and strategies to attract financial support from stakeholders.	5	3	5	4	4	5	3	4.14
Donation, solicitation and voluntary contributions are well-accounted for.	5	4	5	4	5	5	5	4.71
There is a school budget to finance DRRM programs and activities.	5	3	5	4	4	4	4	4.14
Transparency is observed in the disbursement of DRRM funds.	5	3	5	5	5	5	5	4.71
Liquidation of funds are made after the DRRM project is done.	5	3	5	5	5	5	5	4.71
The financial support is posted to inform everybody of the program financial status.	5	3	5	5	5	5	5	4.71
The national government provide financial support for the DRRM Program implementation in school.	4	4	4	5	4	4	4	4.14
There is financial support from stakeholders for the implementation of DRRM in the school.	4	3	4	5	4	4	3	3.86
The budget allocation is sufficient to maintain the DRRM program in school.	4	3	4	5	3	4	3	3.71
School has income generating projects to support DRRM programs and activities.	5	3	1	5	3	5	2	3.43
Total $\bar{X}$	4.70	3.20	4.30	4.70	4.20	4.60	3.90	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 9.** Mean on the level of disaster preparedness of the seven (7) DepEd secondary schools in the first district of Isabela in terms of budget allocation

Budget allocation	Secondary Schools (Building ID)							Total $\bar{X}$
	300077	300601	300521	306139	305408	306109	103870	
The school has plans and strategies to attract financial support from stakeholders.	5	3	5	4	4	3	3	3.86
Donation, solicitation and voluntary contributions are well-accounted for.	5	5	5	4	5	4	5	4.71
There is a school budget to finance DRRM programs and activities.	5	5	5	4	5	3	4	4.43
Transparency is observed in the disbursement of DRRM funds.	5	5	5	5	5	3	5	4.71
Liquidation of funds are made after the DRRM project is done.	5	5	5	5	5	3	5	4.71
The financial support is posted to inform everybody of the program financial status.	5	5	5	5	5	3	5	4.71
The national government provide financial support for the DRRM Program implementation in school.	5	4	4	5	4	3	4	4.14
There is financial support from stakeholders for the implementation of DRRM in the school.	5	4	4	4	4	3	3	3.86
The budget allocation is sufficient to maintain the DRRM program in school.	5	3	4	3	4	3	3	3.57
School has income generating projects to support DRRM programs and activities.	5	3	4	4	3	3	2	3.43
<b>Total <math>\bar{X}</math></b>	<b>5.00</b>	<b>4.20</b>	<b>4.60</b>	<b>4.30</b>	<b>4.40</b>	<b>3.10</b>	<b>3.90</b>	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 10.** Mean on the level of disaster preparedness of the seven (7) DepEd elementary schools in the first district of Isabela in terms of facilities and equipment

Facilities and equipment	Elementary Schools (Building ID)							Total $\bar{X}$
	103847	103796	103159	102867	103272	103880	103870	
School personnel has the technical knowledge in handling the facilities and equipment.	3	3	3	3	4	3	4	3.29
There is an assigned in-charge of the facilities and equipment	4	4	3	4	4	4	4	3.86
Procurement process of the facilities and equipment subscribes the COA rules and regulation	5	5	5	5	5	5	5	5.00
Functional facilities and equipment is given priority during procurement.	4	4	4	3	4	3	5	3.86
Maintenance of the facilities and equipment is periodically done.	3	3	3	3	3	3	4	3.14
Purchase of facilities and equipment is made by one who has technical know-how.	3	4	3	3	4	3	4	3.43
There are available facilities/materials/supplies (like disaster kits, learning areas, etc.) during disaster	5	4	4	4	3	3	3	3.71
Regular inventory of the facilities is done.	3	3	3	3	4	3	4	3.29
There is a storage room for the facilities and equipment.	3	3	3	3	3	3	4	3.14
There is a sufficient number of supplies and materials to be used during disaster	3	2	2	2	3	2	2	2.20
<b>Total <math>\bar{X}</math></b>	<b>3.57</b>	<b>3.53</b>	<b>3.33</b>	<b>3.29</b>	<b>3.67</b>	<b>3.15</b>	<b>3.89</b>	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 11.** Mean on the level of disaster preparedness of the seven (7) DepEd secondary schools in the first district of Isabela in terms of facilities and equipment

Facilities and equipment	Secondary Schools (Building ID)							Total $\bar{X}$
	300077	300601	300521	306139	305408	306109	103870	
School personnel has the technical knowledge in handling the facilities and equipment.	4	3	4	4	4	3	4	3.71
There is an assigned in-charge of the facilities and equipment	5	4	5	5	4	4	4	4.43
Procurement process of the facilities and equipment subscribes the COA rules and regulation	5	5	5	5	5	5	5	5.00
Functional facilities and equipment is given priority during procurement.	5	4	5	5	4	4	5	4.57
Maintenance of the facilities and equipment is periodically done.	4	4	4	5	4	3	4	4.00
Purchase of facilities and equipment is made by one who has technical know-how.	4	4	5	5	4	4	4	4.29
There are available facilities/materials/supplies (like disaster kits, learning areas, etc.) during disaster	5	5	5	5	5	3	3	4.43
Regular inventory of the facilities is done.	4	4	4	4	4	3	4	3.86
There is a storage room for the facilities and equipment.	3	4	4	5	4	3	4	3.86
There is a sufficient number of supplies and materials to be used during disaster	3	3	3	2	2	1	2	2.47
Total $\bar{X}$	4.25	3.97	4.45	4.53	4.03	3.32	3.89	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

**Table 12.** Mean on the level of disaster preparedness of the seven (7) DepEd elementary schools in the first district of Isabela in terms of monitoring and evaluation

Monitoring and evaluation	Elementary Schools (Building ID)							Total $\bar{X}$
	103847	103796	103159	102867	103272	103880	103870	
There is a special committee that monitors the implementation of DRRM in school.	4	4	4	4	4	4	4	4.00
There is consultation with the division/district/region DRRM personnel for the improvement of DRRM Implementation in school.	5	4	5	5	5	5	5	4.86
The records/report/output of the monitoring and evaluation are kept for consultation and reference.	5	4	5	5	5	5	5	4.86
Periodic monitoring and evaluation is done by the monitoring team	5	4	5	5	5	5	5	4.86
Fund utilization is monitored.	5	4	5	5	5	4	4	4.57
Total $\bar{X}$	4.80	4.00	4.80	4.80	4.80	4.60	4.60	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

The specific number of personnel required also depended on the size of the school and the potential risks in the area. The schools in the first district have adequate number of trained and prepared personnel to respond effectively to the demands of a disaster.

The budget allocation for some schools is not sufficient to maintain the DRRM projects and

activities hence it is recommended that the schools in the first district have plans and strategies to attract financial support that can be instrumental in securing resources and funding for their various school initiatives. They have clearly highlighted areas where financial support is needed to potential donors. The support could include infrastructure improvements, technology updates, educational programs or other

specific projects related to disaster preparedness (Table 7-10).

The schools involve stakeholders in their DRRM initiatives to generate interest and support from these entities, leading to potential contributions. Many governmental, non-governmental, and private organizations offer donations and funding programs to support disaster preparedness and

resilience initiatives. Donations, solicitation, and voluntary contributions are then accounted for transparency, accountability and good financial management within the school. Some of the school respondents have set up designated bank accounts specifically for receiving and managing monetary donations and contributions. This helps maintain separation and clarity in tracking the funds separately from other school finances.

**Table 13.** Mean on the level of disaster preparedness of the seven (7) DepEd secondary schools in the first district of Isabela in terms of monitoring and evaluation

Monitoring and evaluation	Elementary schools (Building ID)							Total $\bar{x}$
	103847	103796	103159	102867	103272	103880	103870	
There is a special committee that monitors the implementation of DRRM in school.	4	4	4	4	4	4	4	4.00
There is consultation with the division/district/region DRRM personnel for the improvement of DRRM Implementation in school.	5	4	5	5	5	5	5	4.86
The records/report/output of the monitoring and evaluation are kept for consultation and reference.	5	4	5	5	5	5	5	4.86
Periodic monitoring and evaluation is done by the monitoring team	5	4	5	5	5	5	5	4.86
Fund utilization is monitored.	5	4	5	5	5	4	4	4.57
Total $\bar{x}$	4.80	4.00	4.80	4.80	4.80	4.60	4.60	

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

The results in Table 11 evidently show that schools had limited number of supplies, materials and storage rooms for facilities and inventory. The limited number of supplies and materials creates a gap for the schools to ensure the safety and well-being of learners, teachers and staff.

The schools in the district created a special committee for DRRM. Having a special committee dedicated to monitoring the implementation of DRRM in school is a proactive and effective approach. These designated committees ensure that DRRM initiatives are implemented effectively and that the school remains prepared for potential disasters. The committee reviews DRRM policies and guidelines specific to the school’s context and create a comprehensive DRRM plan for the school outlining various strategies, procedures and protocols to be followed in case of emergencies. Regular reviewing and updating of the

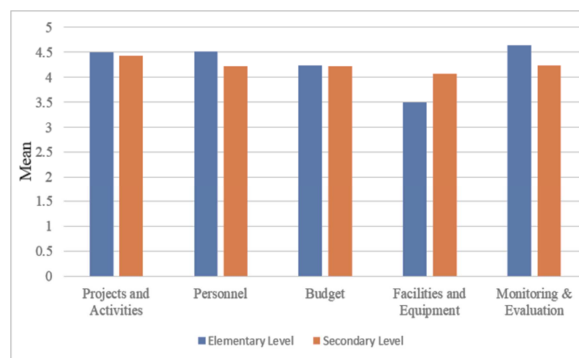
plan is also essential to address any evolving risks or changes in the school’s environment. The DRRM committee also provides teachers, staff and learners appropriate trainings and capacity building sessions by organizing workshops, drills, and simulations to enhance preparedness and response capabilities. Regular monitoring on the implementation of DRRM activities and assessing their effectiveness are done quarterly by the committee to ensure the preparedness of the school. The committee then develops evaluation frameworks, conduct inspections, and collect feedback from stakeholders to identify areas for improvement and track progress over time (Table 12-13).

*Overall perception on status of disaster preparedness*

The result on overall perception of the respondents shows that elementary schools are aware and yet the



least prepare in terms of facilities and equipment among all the five (5) DRRM components. Since the schools has a close coordination with the DRRM council of their respective LGUs, the schools conduct projects and activities in relation to disaster preparedness to level up the awareness of their teachers, staff and also the learners. Composition of DRRM team in every school aids in monitoring and evaluating the nature of disaster and provide necessary reports for the LGUs to determine schools that are most vulnerable (Fig. 5).



**Fig. 5.** Overall mean perception between elementary and secondary schools on their level of disaster preparedness of DepEd Schools in the first district of Isabela

*Difference in the perception*

The two-tailed P-value equals 0.8561. By conventional criteria, the result implies that there is no significant difference on the perception of school heads in status of disaster preparedness of public elementary and secondary schools in the First District of Isabela province in terms of the five (5) DRRM program aspects namely; projects and activities, personnel, budget, facilities and equipment, and monitoring and evaluation (Table 14).

*Problems encountered by the respondents*

Table 15 shows problems encountered by the respondents regarding the implementation of DRRM programs of the selected schools in the First District of Isabela. The result reveals that the pressing problems encountered by the school heads, in hierarchical order, are the absence of modern technology, limited facilities and equipment for the implementation of the DRRM programs, insufficient fund from the DepEd and limited financial support from the stakeholders. As gleaned above it is noted that the bottom line is financial. It is implied therefore that DRRM programs, projects and activities to fully realize, budget must be allocated by the DepEd and of course with the support of the stakeholders.

**Table 14.** Test of significant difference on the perception of the respondents on the level of disaster preparedness of DepEd schools in the first district of Isabela

Grade level	N	Mean	SD	SEM	t-test	df	SE
Public elementary school level	7	4.27	0.366	0.138	0.1853	12	0.229
Public secondary school level	7	4.23	0.482	0.182			

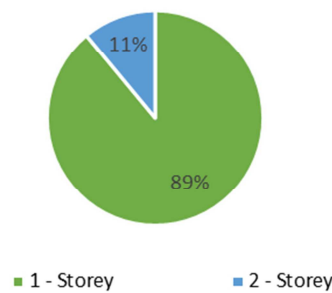
**Table 15.** Mean and standard deviation on the problems encountered by the respondents on the implementation of disaster preparedness programs of DepEd schools in the first district of Isabela

Items	Elementary school			Secondary school		
	$\bar{x}$	desc	Sd	$\bar{x}$	desc	Sd
Insufficient fund subsidy from DepEd for DRRM implementation in school	3.0	F	1.15	3.29	F	0.49
Limited financial support from the external stakeholders	3.71	MFP	1.38	3.29	F	0.49
Limited facilities and equipment of the school for DRRM implementation	4	MFP	0.82	3.71	MFP	0.76
Absence of modern technology needed for the implementation	4.43	MFP	0.79	3.86	MFP	0.90
No training provided for the DRRM personnel in school	2	LFP	1.41	2.71	F	1.11
Shortage/lack of resources and manpower	2.86	F	1.57	3.29	F	0.76
Absence of Disaster preparedness guides and manuals	2	LFP	1.15	2.28	LFP	0.95
Poor dissemination of information about DRRM	1.43	NP	1.13	2	LFP	1.15
Absence of support/encouragement for the DRRM	1.71	LFP	1.25	1.86	LFP	0.90

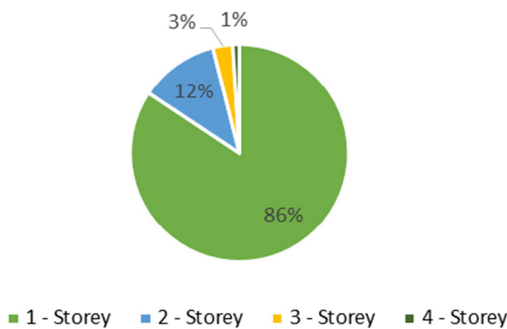
coordinators						
Poor communication and coordination on the part of the DRRM implementers	1.57	LFP	1.13	2.14	LFP	0.90
Mismanagement of the DRRM Program and its funds	1.57	LFP	1.13	1.86	LFP	0.69
Limited knowledge of school head and teachers in the implementation of DRRM in school	1.57	LFP	1.13	1.86	LFP	0.90
Pressure of political leaders in the DRRM implementation	1.43	NP	0.79	2.29	LFP	0.76
Delegation of DRRM responsibilities to incapable/incompetent personnel	2.14	LFP	1.57	2	LFP	0.82

Legend: 4.51 – 5.00 = VP (Very Well Prepared), 3.51 – 4.50 = WP (Well Prepared), 2.51 – 3.50 = P (Prepared), 1.51 – 2.50 = UP (Unprepared), 1.00 – 1.50 = NP(Not Prepared at all)

Number of Stories (Elementary)



Number of Stories (Secondary)



**Fig. 6.** Statistics on number of stories of surveyed buildings in the first district Of Isabela province

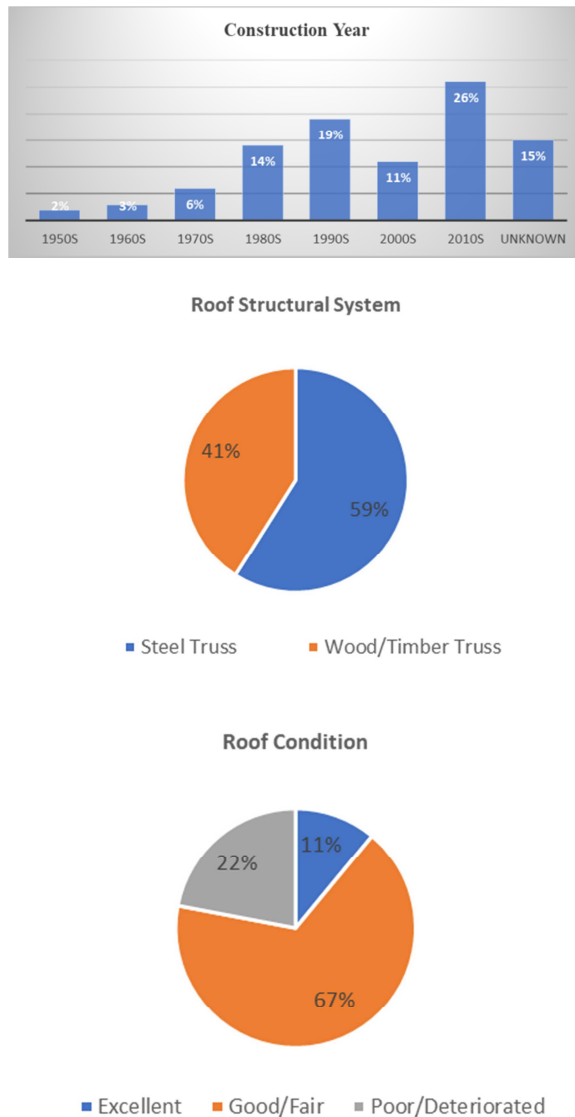
*Building vulnerability assessment*

A total of 115 school buildings have been visually surveyed in two (2) days composing of seven (7) selected public elementary and seven (7) secondary levels of the First District of Isabela Province. In each school, a combination of buildings with different construction materials were observed and the structural integrity of the school buildings ranges from reinforcing concrete to masonry to timber roofing construction (Fig. 6).

It is common for secondary DepEd school buildings to have more than one -storey compared to elementary school buildings. In the context of population, secondary schools generally have a larger student population compared to elementary schools. Hence, the construction of multi-storey buildings allowed for efficient use of limited land space and accommodated a higher number of students within a smaller footprint. Secondary schools often offer a wider range of subjects and specialized classrooms such as laboratories (e.g, computer, and science) and workshops.

Most of the selected elementary schools in the district are prone to flooding. Having one-storey buildings for elementary schools have both advantages and disadvantages in terms of disaster preparedness. It allows for easier and faster evacuation of students, teachers, and staff during floods. There are no stairs or multiple levels to navigate, which can reduce evacuation time and potential risks.

Despite being easier to evacuate, one-storey buildings in flood prone areas are still at risk of flood damage. Water enters the building causing damage to infrastructure, equipment and supplies. Hence, the problem that most of the selected schools are facing. Special attention needs to be given to storing and safeguarding these educational materials and equipment to prevent damage and ensure continuity of education activities. To mitigate the disadvantages of having one - storey buildings in flood prone areas of the district, the different school heads provided measures to enhance disaster preparedness. Erection of flood water level marker were present to some schools as early warning system.



**Fig. 7.** Statistics construction year, roof structural systems and roof condition of surveyed buildings in the first district of Isabela province

As surveyed, many of these public elementary and secondary school buildings were constructed as early as 1990s. It is evident that these buildings are no longer in compliance to the latest Philippine building laws and codes. As observed, schools constructed in early 2000s used steel trusses in their roofing system. Steel truss offers several advantages over wood/timber trusses in terms of disaster preparedness (Fig. 7).

Observation of roofing condition is crucial for disaster preparedness in school buildings. During the researcher’s inspection of the roofing system, the

condition mostly of the schools were rated good to fair. There were identified minimal visible signs of damage and deterioration.

DepEd classroom sizes measure approximately 9 x 7 m and a typical floor to ceiling height of three (3) meters tall with an average population per class of twenty-five (30) to thirty (40) students. Initial analysis of the data collected indicates that RC frames makes up the majority of school structures. The school buildings typically have gable-pitched roof design of twenty (20) to thirty (30) degrees slope with rafters anchored in steel or wooden trusses resisting external loads from typhoon and seismic activity.

*Building vulnerability index*

The collected data from the sidewalk survey is used for the calculation of the vulnerability index using the SCOSSO approach. The study used factors as parameters in identifying the vulnerability of the building (Nassirpour *et al.*, 2018) (Table 16).

**Table 16.** Parameters in estimating the vulnerability index according to hazard

Flood	Wind
Percentage (%) of openings	Roof structure
Material + Lateral system	Roof covering
Combination	
Number of storeys	Roof connection
Floor material	Roof condition
Vulnerability factors	Roof pitch
	Material + lateral system combination
	Construction year
	Connection quality
	Vulnerability factors

Generally, the parameters were hazards prevalent on the location with assigned attributes. For example, designs of roofing and its condition is attributed to strong winds, for flood attributes, consideration of the percentage of openings in the building.

Each attribute can be assigned a vulnerable rating (VR) on a scale of 0 to 100. According to the number of attributes, the scale is equally divided with the value 0 as the lowest vulnerability and 100 as the highest value. The ranking of attributes within the each parameter is based on the level of confidence of

the technical evaluator, in this instance the researcher.



**Fig. 8.** Vulnerability index of 7 surveyed public elementary schools in the first district of Isabela province

As shown in Fig. 8, among the seven (7) elementary schools surveyed, four (4) schools (57%) have a high overall vulnerability index (VI>70%), hence the need to have a more detailed structural assessment and retrofitting/strengthening of plans should be prioritized for these schools. Schools with moderate vulnerability (70%>VI>65%) is two (2) schools (29%), while one (1) school (14%) are characterized by a vulnerability index lower than 65%.

Based from the result, the most vulnerable school is Pilig Alto Elementary School (Building ID: 103159) in Cabagan, Isabela. Situated on the low agricultural lands near the river banks of the barangay, the school experiences flooding recorded up to 3.5 meters high. As the researcher surveyed the buildings of the school, one (1) building with three (3) classrooms were unused because of the damaged received from the previous flooding. Highly deteriorated masonry structure for the classrooms as flood height reaches up to 3.5 meters (Table 17) (Fig. 9 and 10).

As shown in Fig. 11, among the seven (7) secondary schools surveyed, one (1) school (14%) have a moderate vulnerability index (VI>65%), hence the need to have a more detailed structural assessment and retrofitting/strengthening of plans should be prioritized for these schools. Schools with moderate to low vulnerability (65%>VI>60%) is two (2) schools (29%), while four (4) schools (57%) are characterized by a vulnerability index lower than 60%.

**Table 18.** Ranking of surveyed secondary schools according to the most vulnerable to least vulnerable

Rank	Building ID	School name	Location
1	300601	Saint Paul Vocational and Industrial High School	San Pablo
2	306109	Fermely National High School	Tumauini
	103870	San Vicente Integrated School	Sto. Tomas
3	300521	Alfreda Albano National High School	Cabagan
4	300077	Sta. Maria National High School	Sta. Maria
5	305408	San Antonio National High School	Delfin Albano
6	306139	Manaring Integrated School	Ilagan



**Fig. 9.** Left: Pilig Alto Elementary School Multi-Purpose Hall, right: presence of flood ground marker as early warning advisory of the school

Based from the result, the most vulnerable school is Saint Paul Vocational and Industrial High School (SPVIHS) in San Pablo, Isabela (Fig. 12).



**Fig. 10.** Left: Pilig Alto Elementary School's Principal and Teachers providing information on the level of the highest recorded flood height at 3.5 meters just right above the top of beam of the school stage, right: unused building of the school due to extent of damage caused by the previous typhoon





**Fig. 11.** Vulnerability index of 7 surveyed public secondary schools in the first district of Isabela province



**Fig. 12.** Sample buildings of SPVIHS in San Pablo, Isabel

Situated on the low lands near the river banks of the barangay, the school experiences flooding whenever little to intense rain happens recorded up to 3.0 meters high. Highly deteriorated masonry structure for the classrooms as flood height reaches up to 3.0 meters.

### Conclusion

Disasters are inevitable, but their effects can be mitigated if adequate preparation is made in terms of trainings and availability of safety building facilities and equipment that can be used as the need arises. Nowadays, disasters occur frequently and nearly all places in the country has been affected by variety of disasters including floods brought on by intense rainfall, storms, fire and earthquakes.

Based on the study, the First District of Isabela province is prone to hydro-meteorological disasters such as floods, typhoons and intense rainfall. As promulgated by the DO No. 21, s. 2015, there is a designated School DRRM Coordinator to implement disaster preparedness, risk mitigation, awareness and preparedness in support to the School Head. The result of the surveyed schools' implementation of DRRM was high in terms of prevention and mitigation, response, recovery, and rehabilitation.

Disaster prevention and mitigation shows that DRRM was implemented at a high level among the schools. It denotes a high level of hazard assessment, risk assessment, and vulnerability analysis, as well as high level of community involvement in risk assessment. However, the findings of study also show that there is inadequacy on the safety facilities and equipment of the schools in the First District of Isabela province in times of emergency situations. Some of the schools are equipped with facilities but still are not enough in executing disaster preparedness.

The presented problems encountered in the implementation of DRRM shows that most of the school respondents receive insufficient budget from DepEd. Together with the facilities and equipment, budget allocation for some schools is not sufficient to maintain the DRRM projects and activities hence, it is commendable that the schools in the First District have plans and strategies to attract financial support that can be instrumental in securing resources and funding for their various school initiatives.

The overall perception of the school respondents was “very well prepared” and that there is “no significant” difference between the level of preparedness of public elementary schools and public secondary schools in the First District in terms of the five (5) DRRM program components namely; projects and activities, personnel, budget, facilities and equipment, and monitoring and evaluation.

In the assessment of building vulnerability, most of the building structures were constructed with concrete reinforcements but there are still buildings that are constructed with mix concrete and wood or timber for roofing support. Many of the schools especially public elementary schools have a single-storey type buildings, which are easily flooded and no safe place for storing books, ICT equipment and instructional materials. It was also revealed that Pilig Alto Elementary School is the most vulnerable among the surveyed public elementary schools in the first district of Isabela due to its location and its building condition. The latest building was constructed in 1990, and the rest were constructed in 1980s.

As to the level of awareness, it was noted that teachers in the schools and the community are equally aware of disaster preparedness programs. This is attributed to the information dissemination conducted not only by the DepED but also by the Local Government Unit. This is a good sign of cooperation, collaboration and partnership between the two organizations. Furthermore, the school's disaster preparedness program is being implemented consistently with the support of the external stakeholders. It was also noted that teachers need to attend seminars and training to equip them with knowledge and skills that are essential to the success on the implementation of DRRM program, projects and activities.

Collaborative efforts of the stakeholders, internal and external have greater impact in maintaining a safe and sustainable environment.

### **Recommendation(s)**

Based on findings and conclusions, it is recommended that:

1. There is the need to strengthen DRRM program implementation even throughout the country by ensuring that DRRM programs and activities will be properly implemented.
2. In support to the School Heads, there is a need for additional number of personnel designated for DRRM team implementers.
3. School fund raising and income generating projects (IGP) be conducted to enhance the insufficient budget allocation from DepEd.
4. The need of additional DRRM emergency response and rescue facilities and equipment which includes rescue boats, land vehicles, and life vests/jackets are needed especially in flood prone areas.
5. Designation of a technical DRRM personnel in assessing the vulnerability of school buildings.
6. Monitoring and evaluation on DRRM should be done periodically in order to continuously assess the schools in flood prone areas.
7. DepEd should have budget allocation on DRRM enough to support its program and activities for the betterment of delivery of basic services during disaster or calamities.
8. The use of modern technology is essential for disaster preparedness and disaster mitigation.
9. Erection of Flood Marker in every all schools prone to flood should be in place.
10. Proposal of multi-storey building for schools in flood-prone areas where upper floor will serve as storage for school documents, ICT instructional materials and evacuation area.
11. Construction of School buildings that are weather resistant, and adapting the DepED prescribed/suggested design/program of works as indicated below:
  - a. For the Architectural Features, most of the building designs are developed by DepEd, however with the intensifying change in the climate producing unexpected and more violent disasters, a climate resilient design is proposed to provide safety and sustainable environment for the learners.
    - i. For windows, awning type is proposed to provide full perimeter pressure seal, reduce external noise, and provide better insulation making it ideal for high wind location since glass jalousies can be destroyed easily by disasters.
    - ii. Considered in the study is the roofing system and condition of the buildings. However, roof slabs are being proposed for school buildings. Roof slabs with metal decking are safer and more practical in the long run especially in areas frequently visited by typhoons and flooded preventing roofs from being blown away by the strong winds.
  - b. Other features like storm shutters can be added to the designs of school buildings to block strong winds and flying debris caused by typhoons and prevents breaking of glass windows and damage to classroom property.

### **References**

**Alcaraz AJ, Austria GM, Delgado PF, De Mesa FJ.** 2017. Disaster preparedness of different public schools at Bauan West District [Research Proposal].

- Bello N.** 2020. Disaster preparedness of schools in Region 8, Philippines after super typhoon Haiyan. Department of Education, Schools Division of Calbayog City **4(2)**.
- D'Ayala D, Galasso C, Putrino V, Fanciullacci D, Barucco P, Fanciullacci V, Bronzino C, Zerrudo E, Manolo M, Fradiquela C.** 2016. Assessment of the multi-hazard vulnerability of priority cultural heritage structures in the Philippines. In Proceedings of the 1st International Conference on Natural Hazards and Infrastructure, Chania, Greece, 28–30 June 2016.
- Del Rosario ED.** 2014. Final report effects of typhoon Yolanda (Haiyan). NDRRMC.
- Department of Education (DepEd).** 2010. Revised edition of the 2007 handbook on educational facilities – Integrating disaster risk reduction in school construction. [https://gseuphsdlibrary.files.wordpress.com/2013/06/educational-facilities-manual\\_philippines.pdf](https://gseuphsdlibrary.files.wordpress.com/2013/06/educational-facilities-manual_philippines.pdf).
- Department of Education (DepEd).** 2011. DO 50, s. 2011 – Disaster Risk Reduction Management Office. August 27, 2011. [https://www.deped.gov.ph/wp-content/uploads/2011/10/DO\\_s2011\\_50.pdf](https://www.deped.gov.ph/wp-content/uploads/2011/10/DO_s2011_50.pdf) (accessed on February 2023).
- Department of Education (DepEd).** 2011. DO 83, s. 2011 – Disaster preparedness measures for schools. August 27, 2011. [https://www.deped.gov.ph/wp-content/uploads/2011/10/DO\\_s2011\\_83.pdf](https://www.deped.gov.ph/wp-content/uploads/2011/10/DO_s2011_83.pdf) (accessed on February 2023).
- Garcia MS.** 2016. Status and implementation of disaster risk reduction in flood-prone schools in the Division of Laguna. From <http://calabarzon.neda.gov.ph/wp-content/uploads/2016/10/Garcia-Status-and-Implementation-of-Disaster-Risk-Reduction.pdf>.
- Global Facility for Disaster Reduction and Recovery.** n.d. Global program for safer schools: The roadmap for safer and resilient schools. The World Bank. <https://gps.worldbank.org/roadmaps/roadmap-safer-and-resilient-schools-rsrs>.
- Jalad RB.** 2018. Situational report no. 55 re preparedness measures for ty Ompong (IN Mangkhut). NDRRMC.
- Llego MA.** Upgrading of DepEd school building designs to conform with the changing environment and building requirements of schools. <https://www.teacherph.com/upgrading-deped-school-building-designs/>.
- Magrin GO, Marengo JA, Boulanger JP, Buckeridge MS, Castellanos E, Poveda G, Scarano FR, Vicuña S.** 2014. Central and South America. In: Barros VR, Field CB, Dokken DJ, Mastrandrea MD, Mach KJ, Bilir TE, et al., Climate Change (2014). Impacts, adaptation, and vulnerability. Part B: Regional aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and NY, USA, pp. 1499-1566.
- Nassirpour A, Galasso C, D'Ayala D.** SCOSSO: Safer communities through safer schools. EPICentre Internal Report 2017; University College London, United Kingdom.
- Nassirpour A, Galasso C, D'Ayala D.** 2018. Multi-hazard physical vulnerability prioritization of school infrastructure in the Philippines. Proceedings of the 11th National Conference in Earthquake Engineering, Earthquake Engineering Research Institute, Los Angeles, CA.
- National Disaster Risk Reduction and Management Plan (NDRRMP).** 2011. [https://www.dilg.gov.ph/PDF\\_File/reports\\_resource/s/DILG-Resources-2012116-420ac59e31.pdf](https://www.dilg.gov.ph/PDF_File/reports_resource/s/DILG-Resources-2012116-420ac59e31.pdf).

**Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).** 2017. Annual tropical cyclone tracks. <https://www1.pagasa.dost.gov.ph/index.php/tropical-cyclones/annual-tropicalcyclone-tracks>.

**Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).** n.d. About tropical cyclone. <https://www.pagasa.dost.gov.ph/>.

**Philippine Institute of Volcanology and Seismology (PHIVOLCS).** n.d. Introduction to landslide. <https://www.phivolcs.dost.gov.ph/index.php/landslide/introduction-to-landslide>.

**Pineda M.** Disaster-sensitive architecture for the tropics: Building resilient communities in developing nations. A case study in Northern Costa Rica.

**Ramos BT.** 2014. Final report re effects of typhoon Yolanda (Haiyan). NDRRMC.

**SitRep No. 44 for Typhoon ODETTE.** 2021. NDRRMC.

**Solomon Islands.** 2011. Guidelines for preparing school. Ministry of Education and Human.

**Stephenson V, D'Ayala D.** 2014. A new approach to flood vulnerability assessment for historic buildings in England. *Nat. Hazards Earth Syst. Sci.* **14**, 1035-1048.

**Stephenson V, Finlayson A, Morel L.** 2018. A risk-based approach to shelter resilience following flood and typhoon damage in rural Philippines.

**Tan MJ.** 2015. Disaster preparedness of national high schools: An assessment.

**University of the Philippines (UP) Dream Program.** Project Nationwide Operational Assessment of Hazards (NOAH). <https://noah.up.edu.ph/noah-studio>.

**Uy LJG, Pilar LO.** 2018. Natural disaster damage at P374B in 2006-2015. *Business World*.