APJETPSS Volume 1 Issue 2 | E-ISSN: 3082-4052 | DOI: https://doi.org/10.70847/631027

Asia Pacific Journal of Educational Technologies, Psychology, and Social Sciences

Journal Homepage: https://ijmshe.com/index.php/apjetps

Research Article

Disaster Preparedness Among Households in a High-Risk Philippine City: A Descriptive-Causal Analysis

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Article Info

Article history:

Received: 31 July 2025
Accepted: 07 August 2025

Keywords:

Disaster Preparedness, Household Resilience, Risk Communication, Trust in Authorities, Earthquake Risk, CDRRMC, Logistic Regression, Kidapawan City, Disaster Risk Reduction, Community Engagement

A b s t r a c t

Kidapawan City, situated in a disaster-prone area of the Philippines, has repeatedly experienced natural hazards such as earthquakes, flash floods, and droughts. This study assessed the disaster preparedness of 200 households across ten high-risk barangays, using a descriptive-causal research design. Data were gathered through a validated, structured questionnaire and analyzed using descriptive statistics and logistic regression. Findings revealed that earthquakes were the most frequently experienced and severe disasters, with significant impacts on infrastructure and livelihoods. Households demonstrated a high level of preparedness, particularly in communication planning, evacuation awareness, and securing essential documents. However, preparedness for specific hazards like flooding remained low due to economic and logistical constraints. Trust in the City Disaster Risk Reduction and Management Council (CDRRMC) was notably high and positively correlated with household preparedness, alongside education level, marital status, perceived severity of disasters, and quality of interventions received. The study recommends enhancing community engagement, aligning institutional priorities with localized needs, and strengthening risk communication through trusted and accessible channels. Results underscore the critical role of socio-demographic and institutional factors in shaping disaster readiness and advancing community resilience strategies.

Cite as: Cabiles-Bacalla , R., & Alba, M. A. (2025). Disaster Preparedness Among Households in a High-Risk Philippine City: A Descriptive-Causal Analysis. Asia Pacific Journal of Educational Technologies, Psychology, and Social Sciences, 1(2), 16–35. https://doi.org/10.70847/631027

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1. Introduction

Natural disasters pose persistent threats to human life, property, infrastructure, and livelihoods worldwide. Disasters such as floods, hurricanes, earthquakes, volcanic eruptions, and droughts not only cause immediate casualties but also result in secondary impacts such as landslides, explosions, tsunamis, and public health crises (Kannadhasan et al., 2021). Globally, the frequency and intensity of such events have been escalating, with climate change widely recognized as a contributing factor (Jeziorski et al., 2015; Endo, 2018; Spitzig, 2019). Countries located within the Pacific Ring of Fire—such as the Philippines—are particularly vulnerable due to their geological and climatic conditions. The Philippines, situated along the tropical typhoon belt and seismically active Pacific ring, experiences frequent and severe natural disasters. Within the past decade, these hazards have resulted in thousands of deaths, the displacement of millions, and extensive economic losses (Domingo & Manejar, 2018). In 2018 alone, nearly 60 million people were affected by extreme weather events, with thousands displaced by earthquakes, tsunamis, volcanic activity, and typhoons (United Nations Office for Disaster Risk Reduction [UNDRR], 2019).

Effective disaster preparedness is recognized as a cornerstone of disaster risk reduction and management. Abosuliman et al. (2013) emphasized that preparedness plays a critical role in minimizing loss during emergencies, while Kunz et al. (2014) noted that it is a central element in reducing the adverse effects of disasters worldwide. However, challenges persist, especially in developing countries where preparedness measures often demand substantial financial investment, advanced planning, and international cooperation. Furthermore, Kannadhasan et al. (2021) underscored that disaster management encompasses not only preparedness but also coordinated response and recovery, integrating both natural and man-made hazards. In the Philippine context, disaster management efforts have evolved through various legislative and institutional frameworks. The government has instituted systems aimed at mitigating the effects of disasters by strengthening local response mechanisms and community-based preparedness (Villanueva et al., 2017).

Despite these institutional efforts, local experiences reveal persisting vulnerabilities. Kidapawan City, located in the southern part of the Philippines, has experienced multiple significant natural disasters in recent years. A severe drought in 2016 led to widespread food insecurity and civil unrest (Unson, 2016), while a series of powerful earthquakes in 2019 resulted in landslides and infrastructure collapse, further exacerbating community risks (Lagsa, 2019). These events underscore the urgent need to assess the preparedness capacity of local households and determine whether existing disaster risk reduction and management efforts effectively translate into community resilience.

To address this critical gap, the present study investigates the disaster preparedness of households in Kidapawan City. Specifically, it examines the level of exposure to natural disasters, the quality and accessibility of emergency response interventions, the households' preparedness levels, and their trust in local disaster risk reduction institutions. Furthermore, this study explores household risk perception, preferred communication methods, and the influence of socio-demographic characteristics on preparedness behaviors. By providing empirical data on these dimensions, this research seeks to inform the design of a localized risk communication plan that will enhance the effectiveness of disaster preparedness and response initiatives in the city.

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2. Materials and Methods

2.1 Research Design

This study utilized a descriptive-causal research design to examine disaster preparedness among households in Kidapawan City. Descriptive methods were employed to profile respondents, assess levels of exposure to natural disasters, evaluate the quality of emergency response interventions, and identify priorities in risk reduction planning, communication channels, and trust in the City Disaster Risk Reduction and Management Council (CDRRMC). The causal component explored how household characteristics, disaster exposure, and the quality of interventions influence disaster preparedness. This approach is consistent with the use of non-manipulative, quantitative methods to describe and assess relationships among observed variables (Fisher & Marshall, 2009; Kaur et al., 2018; Nick, 2007).

2.2 Locale of the Study

The research was conducted in Kidapawan City, the capital of Cotabato Province, Philippines. The city, located at the foot of Mt. Apo, is known for its agricultural significance and is prone to natural disasters such as earthquakes, flash floods, landslides, and droughts. Ten barangays identified as high-risk areas were selected: Balabag, Ginatilan, Ilomavis, Indangan, Nuangan, Manongol, Meohao, Mua-an, Perez, and Poblacion.

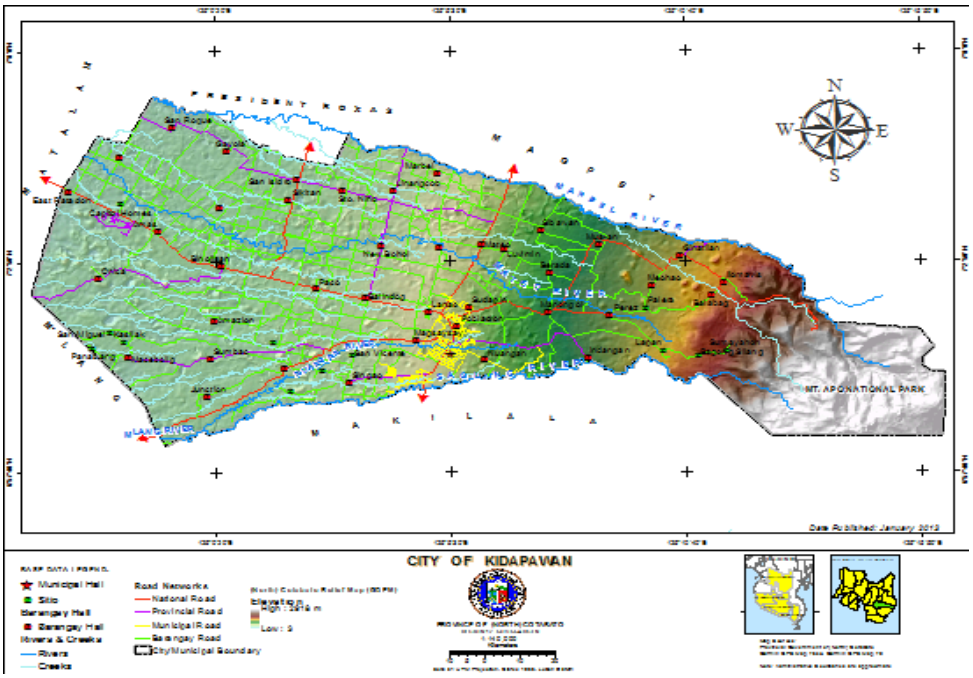

Figure 1. Map of the Cotabato Province

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2.3 Respondents of the Study and Sampling Method

The study focused on household heads in the ten most disaster-prone barangays. Using simple random sampling, 200 respondents were selected from a population of 10,619 households. Although the computed sample size was 371 (based on Raosoft calculator), a 54% response rate was achieved, which meets the acceptable threshold for social research (Babbie, 2007, as cited in Luo, 2020; Cycyota & Harrison, 2006, as cited in Ali et al., 2021; De Vaus, 2013).

2.4 Research Instrument

Data were collected using a structured questionnaire adapted from the GAWAD Kalasag Assessment Toolkit and the Household Natural Hazards Survey of the Oregon Natural Hazards Workgroup (2007). The instrument was modified for contextual relevance and underwent expert validation. It comprised seven sections: (1) household profile, (2) exposure to disasters, (3) quality of emergency interventions, (4) preparedness activities, (5) risk reduction priorities, (6) information sources and dissemination methods, and (7) trust in the CDRRMC. Questionnaires are widely recognized tools in quantitative research for their capacity to gather standardized and reliable data (Taherdoost, 2016).

2.5 Data Gathering and Analysis

Data collection followed approved research protocols. Prior authorization was obtained from the City Mayor of Kidapawan and the head of the City Disaster Risk Reduction and Management Council (CDRRMC). Coordination with the Association of Barangay Captains and barangay officials facilitated the mobilization of respondents. Each barangay captain convened 20 household heads at a designated site, where the researcher conducted a guided survey by reading and explaining each questionnaire item to ensure clarity and data completeness. Completed responses were collected onsite and translated into English when necessary. Supplementary data were sourced from the CDRRMC, City and Provincial DRRM Offices, and the Philippine Statistics Authority.

Descriptive statistics—frequencies, percentages, means, and weighted means—were used to summarize household demographics, disaster exposure, intervention quality, preparedness levels, and trust in the CDRRMC. Standardized scales were applied to assess severity, frequency, damage, quality of interventions, preparedness activities, and trust. A composite exposure index was computed using weighted values for frequency (0.20), severity (0.50), and damage (0.30).

For inferential analysis, Kendall's Coefficient of Concordance (W) assessed consensus between households and implementers on disaster risk reduction priorities, while the Mann-Whitney U test identified differences in prioritization rankings. Logistic regression identified predictors of high preparedness, including demographic factors, disaster exposure, perceived severity, trust in authorities, and intervention quality. All analyses adhered to assumptions of independence and homogeneity to ensure statistical rigor.

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3. Results and Discussions

3.1 City Disaster Risk Reduction and Management Council Historical Data

Table 1 shows the records of disaster scenarios in Kidapawan City from January 2018 to December 2022, highlighting consistent occurrences of various disasters. Man-made disasters (Emergency/Medical, Fire Incidents, Noxious Odor) were most frequent, happening yearly. Hydro-meteorological disasters (Flash Floods, Toppled Trees, Strong Wind) also recurred in multiple years, while geological disasters (Earthquakes) were less frequent, occurring only in specific years. The impact varied: man-made disasters primarily affected individuals and households, hydro-meteorological disasters caused significant damage to infrastructure, homes, crops, and fisheries, and earthquakes led to the most severe consequences, including casualties, damaged buildings, and widespread displacement.

Trends indicated a slight increase in individuals affected by man-made disasters over the years and a more significant impact from hydro-meteorological disasters in 2021 and 2022, with more affected families and damaged homes. The table's detailed data, including dates, locations, and types of damage, can aid in disaster risk assessment, preparedness planning, and mitigation strategies for Kidapawan City.

Table 1. Local disaster scenario historical data

Disaster Type	Disaster Scenario	Date	Place	Extent of Damage	Affected Population
Man Made	Emergency/Medical	January-December 2018	Kidapawan City	Varied, Consolidated	5,463 individuals
Man Made	Emergency/Medical	January-December 2019	Kidapawan City	Varied, Consolidated	5,596 individuals
Man Made	Emergency/Medical	January-December 2020	Kidapawan City	Varied, Consolidated	5,733 individuals
Man Made	Emergency/Medical	January-December 2021	Kidapawan City	Varied, Consolidated	4619 individuals
Man Made	Emergency/Medical	January-December 2022	Kidapawan City	Varied, Consolidated	2586 individuals
Man Made	Noxious Odor	October 21, 2021	Ilomavis, Kidapawan City	Noxious Odor	93 families
Man Made	Fire Incidents (9)	March-December, 2021	Kidapawan City (Different Barangays)	9 totally damaged house, 1 partially damaged house	2 households, 6 families, 11 borders, 4 stall owners

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Man Made	Emergency Mountain Rescue	February 17, 2021	Mt. Apo Natural Park,	Swelling of both knees	1 individual
Hydro-Meteorological	Flash Flood	July 22, 2019	Kidapawan City	Flood Water reaches households	52 families
Hydro-Meteorological	Flash Flood	July 5, August 17, August 18, November 7, 2020	Different Barangays of Kidapawan City	Flood Water reaches households, Stranded Motorists.	5 houses, 10 families, 14 households.
Hydro-Meteorological	Flash Flood	October 26, October 31, November 14, Dec 13, 2021	Different Barangays of Kidapawan City	Flood Water reaches households	200 has damaged 102 families,
Hydro-Meteorological	Strong Wind	November 6, 2020	Kidapawan City	2 totally damaged houses, 6 partially damaged houses, Crop Damage	26 individuals, 1 family
Hydro-Meteorological	Strong Wind with heavy rain	July 9, 2020	Kidapawan City	15 partially damaged houses	15 households
Geological	Earthquake	October 16, 29, 31, 2019	Kidapawan City	102 casualties, damaged buildings and infrastructure, 5218 partially damaged houses, 1217 damages classrooms	469 hospital patients, 2737 displaced families, 6091 households
Geological	Earthquake	February 27, 2020	Kidapawan City Kidapawan City	13 students suffered hyper-ventilation Patients from the hospitals	13 students 75 families evacuated
Geological	Earthquake	February 7, 2021			

3.2 Level of Exposure of the Households to Natural Disasters

Among the identified hazards, earthquakes were perceived to occur most frequently (M = 2.38, “sometimes”), followed by flash floods (M = 1.65), landslides (M = 1.48), and droughts (M = 1.30), all categorized as “rarely” occurring. Although flash floods and landslides were less frequent, local incident reports in August 2022 confirmed their disruptive potential. These findings highlight the prominence of seismic risk in the area, consistent with the city’s tectonic location.

Earthquakes were rated as the most severe hazard (M = 3.33, “very strong”), reflecting the

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substantial damage from the 2019 seismic events. Flash floods and landslides were considered moderately severe (M = 1.79), while droughts were perceived as least severe (M = 1.36, "light"). Despite lower ratings, even low-intensity disasters can result in cumulative impacts, especially in agrarian communities.

Table 2. Frequency of occurrence of natural disasters

Disaster	Rarely		Sometimes		Often		Always		Mean	Qualitative Description
	f	%	f	%	f	%	f	%		
Earthquake	3	1.5	129	64.5	56	28.0	12	6.0	2.38	Sometimes
Flashflood	90	45.0	95	47.5	10	5.0	5	2.5	1.65	Rarely
Landslide	123	61.5	63	31.5	9	4.5	5	2.5	1.48	Rarely
Drought	146	73.0	49	24.5	5	2.5	0	0	1.30	Rarely

Legend: *1.00-1.75-Rarely; 1.76-2.50-Sometimes; 2.51-3.25-Often; 3.26-4.00-Always*

3.3 Severity and intensity of Disasters.

Perceptions of disaster severity among households in Kidapawan City reveal that earthquakes are regarded as the most intense hazard (M = 3.33, "very strong"), consistent with historical seismic events in the area that caused widespread structural damage. This underscores the urgency for sustained investment in earthquake-resilient infrastructure and public safety education.

Flash floods and landslides were both rated as moderately severe (M = 1.79), reflecting their disruptive but more localized impact. These hazards, though less intense, still warrant mitigation through early warning systems and infrastructure reinforcement.

Droughts received the lowest severity rating (M = 1.36, "light"), yet their gradual and cumulative effects on agriculture, food security, and livelihoods pose long-term risks. This highlights the need for proactive adaptation strategies in water resource and agricultural planning.

These findings affirm the necessity of differentiated preparedness strategies—rapid response mechanisms for high-intensity hazards like earthquakes, and sustained resilience-building for slower-onset events such as droughts.

Table 3. Severity and intensity of natural disasters

Disaster	Light		Moderate		Strong		Very Strong		Mean	Qualitative Description
	f	%	f	%	f	%	f	%		
Earthquake	0	0	8	4.0	117	58.5	75	37.5	3.33	Very Strong
Flashflood	75	37.5	96	48.0	26	13.0	3	1.5	1.79	Moderate
Landslide	110	55.0	43	21.5	27	13.5	20	10.0	1.79	Moderate
Drought	133	66.5	62	31.0	5	2.5	0	0	1.36	Light

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3.4 Damage to property and livelihood.

Table 4 summarizes the perceived impact of natural disasters on property and livelihood. Earthquakes caused the most significant damage (M = 3.21, "moderate"), consistent with reports of widespread destruction during the 2019 seismic events, which affected over 6,000 homes. These results highlight the critical need for structural resilience in high-risk zones.

Flash floods and landslides were rated with low perceived damage (M = 1.68 and M = 1.66, respectively). However, these scores may underestimate their true risk, as recent events have caused localized destruction and livelihood disruption. Targeted investments in drainage, slope reinforcement, and early warning systems remain essential.

Droughts received the lowest damage rating (M = 1.35), yet their cumulative effects on agriculture and food security pose long-term threats. Although less visible, their economic impact underscores the need for sustained adaptation measures, including water management and resilient farming practices.

Table 4. Damage to property and livelihood of natural disasters

Disaster	No Damage		Minor		Moderate		Severe		Mean	Qualitative Description
	f	%	f	%	f	%	f	%		
Earthquake	0	0	23	11.5	113	36.5	64	32.0	3.21	Moderate Damage
Flashflood	88	44.0	89	88.5	22	11.0	1	0.5	1.68	No Damage
Landslide	119	59.5	37	18.5	36	18.0	8	4.0	1.66	No Damage
Drought	138	69.0	55	27.5	0	0	7	3.5	1.35	No Damage

Legend: *1.00-1.75-No damage; 1.76-2.50-Minor; 2.51-3.25-Moderate; 3.26-4.00-Severe*

3.5 Composite Exposure Index of Households to Natural Disasters

Table 5 shows that households in Kidapawan City are most exposed to earthquakes (Index = 3.11), indicating frequent occurrence and significant impact. This underscores the urgency for household-level preparedness such as structural retrofitting, securing fixtures, and maintaining emergency kits.

Floods registered a moderate exposure level (1.73), suggesting occasional disruption and property damage. Mitigation measures like improved drainage and elevated electrical systems are recommended.

Landslides (1.69) and droughts (1.34) were rated as low exposure hazards. While less frequent, both require sustained risk management—such as water conservation and slope stabilization—due to their potential long-term and localized impacts.

This index-based assessment highlights the need for hazard-specific preparedness: prioritizing high-exposure risks like earthquakes, while integrating adaptive strategies for less frequent but consequential hazards such as droughts and landslides.

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Table 5. Level of exposure of households to natural disasters

Disaster	Exposure Index	Description
Earthquake	3.11	High exposure
Flood	1.73	Moderate exposure
Landslide	1.69	Low exposure
Drought	1.34	Low exposure

Legend: 1.00-1.75 (low exposure); 1.76-2.50 (moderate exposure); 2.51-3.25 (high exposure); 3.26-4.00 (very high exposure)

3.6 Assessment of the Quality of Emergency Response Interventions Received

Table 6 shows that households rated the overall quality of emergency response interventions as "Very Good" (submean = 3.37), particularly in emergency services such as health care, contingency planning, and public health support. The presence of incident command posts (M = 3.45) and the provision of basic needs and psychological support further highlight the community's readiness and coordination capacity.

Public assistance was rated "Good" (submean = 3.13), with strengths in livelihood restoration and shelter support. However, infrastructure rehabilitation (M = 2.89) and psychological services (M = 3.03) indicate areas for improvement, especially in sustaining long-term recovery.

For immediate and short-term needs, the system performed well (submean = 3.27), particularly in relief distribution (M = 3.59), evacuation systems (M = 3.32), and temporary shelters (M = 3.33). These results affirm the local government's ability to respond promptly to urgent post-disaster needs.

Kidapawan City's emergency response system demonstrates strong capacity in immediate relief and coordination, with further attention needed in long-term recovery planning, infrastructure restoration, and mental health services to strengthen community resilience.

Table 6. Quality of emergency response interventions received by the households.

Emergency Responsive Interventions	Mean	Qualitative Description
1. ***Emergency* Services**		
1.1. Provision of health response, contingency planning, and public health interventions	3.46	*Very Good*
1.2. Presence of incident command post	3.45	*Very Good*
1.3. Provision of basic subsistence needs to affected population	3.42	*Very Good*
1.4. Mental health response, psychological support in emergency settings	3.31	*Very Good*
1.5. Provision of basic social services to affected population	3.23	*Good*
Submean	**3.37**	**Very Good**
2.Public Assistance	3.32	*Very Good*
1.6. Establishment of operation center that immediately respond during disasters		
1.7. Restoration of people's means of livelihood and economic activities and business	3.22	*Good*
2.3. Restoration of shelter and other buildings/facilities	3.18	*Good*

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2.4.	Conduct of physical and psychological interventions	3.03	*Good*
2.5.	Reconstruction of infrastructure and other public utilities	2.89	*Good*
Submean		**3.13**	**Good**
3.	***Delivery of Immediate and Short-term Needs***		
3.1.	Activation of relief distribution of food, water and medicine at points/center	3.59	*Very Good*
3.2.	Installation of temporary shelter and/or structural needs	3.33	*Very Good*
3.3.	Activation of evacuation system/procedures	3.32	*Very Good*
3.4.	Provision of logistical needs, such as transportation and communication	3.13	*Good*
3.5.	Implementation of systems for search, rescue, and retrieval (SSR) and medical services	3.00	*Good*
Submean		**3.27**	**Very Good**

Legend: 0.00-0.99 – None; 1.00-1.75-Poor; 1.76-2.25-Acceptable; 2.26-3.25-Good; 3.26-4.00-Very Good

3.7 Level of Disaster Preparedness among Households

As shown in Table 7, households in Kidapawan City demonstrated a generally high level of disaster preparedness (M = 3.94). Most respondents reported strong engagement in core preparedness actions, particularly in communication, evacuation planning, and participation in disaster-related meetings and trainings. Notably, the highest scores were recorded for knowing evacuation facilities (M = 4.61), keeping drainage systems clean (M = 4.55), receiving emergency information (M = 4.51), and first aid/CPR training (M = 4.51), reflecting both behavioral and structural readiness.

However, preparedness levels were notably low in hazard-specific and technical mitigation measures. For instance, ownership of flood-resilient tools like boats received the lowest rating (M = 1.64), largely due to cost and logistical barriers. Similarly, households in high-risk areas reported lower readiness for landslides and flash floods, often due to informal housing or livelihood practices.

Financial preparedness, while rated "high," remains a concern. Few households availed of housing (M = 3.85) or crop insurance (M = 3.79), suggesting economic constraints in risk transfer mechanisms. These findings highlight gaps in localized mitigation and the need for targeted support for vulnerable sectors.

While household preparedness is commendably high, the study emphasizes the need for hazard-specific interventions and integrated planning. Addressing economic and locational vulnerabilities, as suggested by Shamkhi and Ebraheem (2020), remains essential to build inclusive and resilient communities.

Table 7. Level of disaster preparedness among households.

Disaster Preparedness Activities	Mean	Qualitative Description
1. Know that there is an evacuation facility	4.61	*Very High*
2. Attend meetings on natural disasters or emergency preparedness	4.58	*Very High*
3. Kept drainage systems clean at all times	4.55	*Very High*
4. Planted trees that can help soil through roots	4.55	*Very High*

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5. Received written information on natural disasters or emergency preparedness	4.51	*Very High*
6. Trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)	4.51	*Very High*
7. Know whom to ask for help	4.45	*Very High*
8. Established backyard gardening	4.42	*Very High*
9. Kept and secured the important documents to easily pick up it in case of emergency	4.30	*Very High*
10. Discussed means of communication in case of emergency	4.27	*Very High*
11. Talked with household members about what to do in case of a natural disaster or emergency.	4.24	*Very High*
12. Prepared a "Disaster Supply Kit"	4.24	*Very High*
13. Prepared area for the safety of the pets	4.24	*Very High*
14. Have a copy of emergency hotlines	4.21	*Very High*
15. Know the evacuation route	4.12	*High*
16. Know the credible source of information and communication	4.03	*High*
17. Secured the home to its foundation	4.03	*High*
18. Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster.	3.94	*High*
19. Ground assessment of the property (experienced landslides or near at fault line)	3.91	*High*
20. Stored food in case of crop failure	3.88	*High*
21. Prepared seeds to be planted that will grow during drought	3.85	*High*
22. Availed housing insurance	3.85	*High*
23. Availed crop insurance	3.79	*High*
24. Identified color coding scheme for different disasters and its severity	3.79	*High*
25. Know the early warning system for each disaster	3.76	*High*
26. Attended the disaster simulation/drill exercise	3.76	*High*
27. Prepared area for the safety of livestock	3.76	*High*
28. Elevated home in preparation for floods	3.76	*High*
29. Secured cabinets to the wall	3.73	*High*
30. Braced unreinforced masonry, concrete walls, and chimney	3.70	*High*
31. Know the characteristics of disaster	3.61	*High*
32. Fit the appliances with flexible connections	3.58	*High*
33. Prepared a boat in case of high level of water during flood	1.64	*Low*
Mean	**3.94**	**High**

Legend: 1.00-1.80-below 20% (very low); 1.81-2.60-20%-39% (low); 2.61-3.40-40%-59% (moderate); 3.41-4.20-60%-79% (high); 4.21-5.00-80% and above (very high)

3.8 Households' Priorities on Planning for Risk Reduction

Table 8 compares disaster risk reduction (DRR) priorities between households and implementers in Kidapawan City. Both groups identified protection of critical facilities (rank 2) and natural ecosystems (rank 4) as key priorities, reflecting consensus on the importance of resilient infrastructure and ecosystem-based DRR.

Households ranked strengthening emergency services highest (rank 1), emphasizing immediate access to aid during crises. In contrast, implementers prioritized utility protection (rank 1), highlighting a strategic focus on infrastructure continuity. Disparities also emerged regarding development restrictions in hazard-prone zones and disclosure of hazard risks in real estate transactions.

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Statistical tests confirmed significant differences in three areas: (1) hazard-zone development prevention (U = 1800.00, ***p < 0.01), (2) hazard disclosure in real estate (U = 2551.00, **p < 0.05), and (3) utility protection (U = 1328.00, ***p < 0.01). Kendall's W showed low agreement among households (W = 0.277) versus moderate agreement among implementers (W = 0.619), indicating more unified institutional perspectives.

These findings emphasize the importance of participatory planning that integrates community needs with institutional strategies. Bridging these priority gaps through localized engagement and inclusive DRR planning is essential for effective disaster resilience.

Table 8. CDRRMC ranking of priorities on planning for risk reduction among households and implementers.

CDRRMC Priorities on Planning for Risk Reduction	Household	Implementers	U[a]
1. Strengthening emergency services like police, fire station, hospital, DRRMC, and others	1	3	2892.00[ns]
2. Protecting critical facilities such as transportation, hospital, electrical, water, and others	2	2	3229.50[ns]
3. Protecting private property	3	5	3016.50[ns]
4. Enhancing the function of natural features (streams, rivers, lakes)	4	4	2977.50[ns]
5. Preventing development in hazardous areas	5	8	1800.00[***]
6. Disclosing natural hazard risk during real estate transactions	6	7	2551.00[**]
7. Protecting and reducing damage to utilities	7	1	1328.00[***]
8. Protecting historical and cultural landmarks	8	6	2795.00[ns]
Kendall's W	**0.277*** **	**0.619*** **	

*** , **- *significant at 1% and 5% level; ns – not significant; [a]Mann-Whitney U test.*

3.9 Information and Communication Sources and Preferred Dissemination Methods on Households' Risk Reduction

Table 9 outlines the key sources of disaster risk reduction (DRR) information and preferred communication methods among households in Kidapawan City. The findings indicate a strong reliance on formal institutions. The City Disaster Risk Reduction and Management Council (CDRRMC) (94.5%) and the Red Cross (71.5%) emerged as the most trusted sources, underscoring the public's confidence in government and humanitarian agencies. Other notable sources included the City Health Office (76.0%), Bureau of Fire Protection (53.0%), and the Department of Environment and Natural Resources (47.5%).

These results support the assertion by ADB (2013) that government agencies play a pivotal role in disseminating DRR information by coordinating actors, developing policy, and implementing localized strategies. The presence

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of academic and research institutions as information sources suggests recognition of the value of evidence-based knowledge. However, limited trust in insurance agents (5.5%) and uniformed services such as the Philippine National Police (2.0%) and Armed Forces (39.5%) indicates these actors are less central in DRR communication networks.

In terms of dissemination, households favored accessible and direct channels. Radio (88.0%) and house-to-house campaigns (74.0%) ranked highest, followed by calls (64.0%) and television (65.9%), reflecting a continued reliance on traditional and interpersonal communication. Community meetings, drills, and mobile communication (e.g., text or call alerts) were also well-rated. These findings align with Paul et al. (2021), who emphasize the utility of mobile technologies in disseminating time-sensitive DRR messages.

While internet use and digital tools such as group chats (40.5%) are gaining traction, their adoption remains moderate. This suggests opportunities for enhancing digital engagement strategies. However, de Corcuera et al. (2022) cautioned that current disaster apps are limited in scope, often covering only one phase of disaster management or type of hazard, limiting their effectiveness in systemic risk communication.

Table 9. Information and communication sources and preferred dissemination methods on risk reduction among households.

Information and Communication Sources & Preferred Dissemination Methods	Frequency*	Percentage (%)
A. **Information and Communication Sources**		
1. City Disaster Risk Reduction Management Council (CDRRMC)	189	94.5
2. City Health Office (CHO)	152	76.0
3. Red Cross	143	71.5
4. Non-Government Organization (NGO)	112	56.0
5. Bureau of Fire Protection (BFP)	106	53.0
6. Department of Environment and Natural Resources (DENR)	95	47.5
7. Academic Institutions	86	43.0
8. Armed Forces of the Philippine (AFP)	79	39.5
9. Department of Agriculture (DA)	71	35.5
10. Barangay Officials	25	12.5
11. Research Institutions	21	10.5
12. Insurance Agent	11	5.5
13. Philippine National Police (PNP)	4	2.0
B. **Effective Disseminations Methods**		
1. Radio	176	88.0
2. House-to-house	148	74.0
3. Call	128	64.0
4. Television	130	65.9
5. Drill exercise	125	62.5
6. Meeting	123	61.5
7. Rekorida	122	61.0
8. Internet	119	59.5
9. Training or workshop	98	49.0
10. Poster	91	45.5
11. Group chat	81	40.5
12. Newspaper	38	19.0
13. Brochure	25	12.6
14. Magazine	21	10.5
15. Fact sheet	13	6.5

**Multiple responses*

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3.10 People's Trust on the Programs, Activities, and Project Implementation

Table 10 presents the levels of trust among residents toward the Kidapawan City Disaster Risk Reduction and Management Council (CDRRMC) concerning its programs, activities, and project implementation. Results show consistently very high trust levels, with mean scores ranging from 3.26 to 4.00. The highest trust is reported in maintaining a 24/7 operations center with trained personnel (M = 3.91), followed by the provision of evacuation centers (M = 3.79) and the use of mass media and technology for communication (M = 3.73). Trust also remains high in areas such as disseminating contextualized risk communication materials (M = 3.58), maintaining and sharing risk maps (M = 3.48), and keeping an updated inventory of emergency resources (M = 3.42).

These findings indicate strong public confidence in the CDRRMC's capacity to manage resources, communicate risks, and coordinate emergency services effectively. The high trust in both infrastructure and communication efforts suggests that residents view the CDRRMC as a competent and reliable authority for disaster risk management.

The overall trust rating (M = 3.94) further reinforces this positive perception. As emphasized by Bonfanti et al. (2024), community trust in disaster management institutions is vital for enhancing preparedness and response. When citizens believe in the credibility of DRR agencies, they are more likely to follow emergency protocols, participate in drills, and adopt protective behaviors. Ultimately, this fosters a culture of resilience and shared responsibility in disaster risk reduction.

Table 10. Level of trust on the programs, activities, and project implementation.

Statements	Mean	Qualitative Description
1. 24/7 CDRRMC operations center with trained manpower	3.91	*Very High*
2. Evacuation centers	3.79	*Very High*
3. Use and operation of mass media, other technologies for communication	3.73	*Very High*
4. Contextualized, laymanized, and popular language materials on hazards, risks, and vulnerabilities	3.58	*Very High*
5. Risk maps maintained, reproduced, and displayed and introduced to households	3.48	*Very High*
6. Updated inventory and location of vital resources needed during emergencies	3.42	*Very High*
7. Overall trust of residents to Kidapawan CDRRMC	3.94	*Very High*

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

3.11 Factors Affecting Preparedness Level Among Households

Table 11 presents the results of a logistic regression analysis examining the predictors of disaster preparedness among households in Kidapawan City. The model estimates the influence of various socio-demographic, experiential, and perceptual variables on the likelihood of households attaining a very high level of preparedness. Key variables found to significantly influence preparedness include education, marital status, disaster severity, trust in authorities, and perceived quality of intervention.

Education emerged as a strong and significant predictor ($\beta = 1.3462$, $p < 0.001$), with higher educational attainment increasing the probability

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of being highly prepared by 32.24%, all else being equal. This finding aligns with Yin et al. (2021), who found education to be positively associated with disaster preparedness, as it enhances knowledge, critical thinking, and access to information. However, the literature remains mixed, with Kim and Kim (2022) reporting no significant difference in preparedness by education level in certain contexts.

Marital status was also significant at the 10% level (β = 1.4018, p = 0.087), suggesting that married households are more likely to exhibit higher preparedness, increasing the probability by 31.23%. This may be attributed to shared responsibilities and pooled resources among spouses, enhancing their capacity to implement preparedness measures (Zamboni & Martin, 2020; Kim & Kim, 2022).

The perceived severity of disasters significantly influenced preparedness (β = 0.8944, p = 0.095), with a one-unit increase in perceived severity associated with a 22.35% increase in preparedness probability. This aligns with Espina (2015) and Yin et al. (2021), who highlighted that heightened risk perception drives proactive behaviors in disaster contexts.

Trust in the CDRRMC was a strong predictor (β = 1.4219, p = 0.001), increasing the likelihood of high preparedness by 35.53%. Households that trust authorities are more likely to follow early warnings, evacuation orders, and risk communication strategies (Bonfanti et al., 2023; Zhang et al., 2022). Trust enhances cooperation, facilitates information flow, and reinforces adaptive responses to risk.

Lastly, the perceived quality of interventions was significant at the 1% level (β = 1.4429, p = 0.011), suggesting that households who regard DRR interventions as high-quality are 36.06% more likely to report very high preparedness. Effective interventions foster trust, learning, and behavioral change, as supported by Seddighi et al. (2020).

The model accounts for 20.43% of the variation in preparedness (Pseudo R^2 = 0.2043), indicating that both individual-level characteristics and institutional trust factors are critical in shaping household readiness for disasters.

Table 11. Estimation of logistic model for preparedness level among households.

Variables	Coef.	Rob. SE[a]	z	p-value	*dy/dx*
Age	0.0094[ns]	0.0155	0.60	0.546	0.0023
Sex	0.4936 [ns]	0.3396	1.45	0.146	0.1228
Marital status	1.4018[*]	0.8200	1.71	0.087	0.3123
Education	1.3462[***]	0.3536	3.81	0.000	0.3224
Total no. of vulnerable group	-0.0194[ns]	0.1248	-0.16	0.876	-0.0049
No. of earning household member	0.2079[ns]	0.2531	0.82	0.411	0.0520
No. of persons with disability	-0.4910[ns]	0.4063	-1.21	0.227	-0.1227
Severity	0.8944[*]	0.5359	1.67	0.095	0.2235
Occurrence	0.0374[ns]	0.6184	0.06	0.952	0.0093
Damage	-0.6144[ns]	0.7406	-0.83	0.407	-0.1535
Trust	1.4219[***]	0.4124	3.45	0.001	0.3553
Quality of intervention	1.4429[***]	0.5949	2.55	0.011	0.3606
Constant	-7.1704	1.7516	-4.09	0.000	

[***], [*] - significant at 1% and 10%; [ns] – not significant; Log likelihood = -110.2793; LR chi2 (11) = 42.89; Prob > chi2 = 0.000; Pseudo R^2 = 0.2043; [a]Robust Standard Error; Dependent Variable = Level of Preparedness (1=very high; 0=otherwise)

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4. Conclusion

This study investigated the disaster preparedness priorities, trust levels, communication preferences, and socio-demographic determinants of preparedness among households in Kidapawan City. The findings revealed both converging and diverging priorities between households and implementers. While both groups emphasized the protection of critical facilities and natural features, households prioritized immediate response services such as emergency responders and evacuation centers, whereas implementers focused more on systemic preparedness including utilities and long-term risk reduction strategies.

A significant insight emerged from the high level of trust households placed in the CDRRMC, particularly in its operational readiness, communication strategies, and project implementation. This trust translated into greater compliance with disaster protocols and increased perceived preparedness. Preferred communication channels also favored traditional methods, especially radio, house-to-house visits, and mobile calls, highlighting the importance of accessible and direct engagement strategies in DRR efforts.

Furthermore, the logistic regression analysis identified education, marital status, severity of prior disaster experiences, trust in authorities, and perceived quality of interventions as significant predictors of household preparedness. These findings reinforce the role of socio-demographic factors and institutional trust in shaping disaster readiness.

Collectively, these results underscore the need for inclusive, trust-centered, and contextually appropriate disaster risk reduction strategies that align with both household-level priorities and implementers' systemic goals.

5. Recommendations

5.1. Recommendations

Based on the findings of this study, several recommendations are proposed to enhance disaster preparedness at the household and community levels in Kidapawan City. First, the City Disaster Risk Reduction and Management Council (CDRRMC) should strengthen trust-based engagement with communities. Since trust emerged as a key predictor of household preparedness, it is imperative that authorities establish transparent, consistent, and participatory communication strategies that encourage feedback and community involvement. This could include regular consultations, community forums, and the use of trusted figures or local champions in disseminating information.

Second, the CDRRMC and partner agencies must invest in targeted education and awareness campaigns that promote disaster literacy. Given that education significantly influences preparedness, materials should be accessible, laymanized, and culturally contextualized. Integrating disaster risk education into schools and conducting workshops in barangays can empower households with the knowledge and skills necessary to make informed decisions before, during, and after disasters.

Third, communication strategies should be tailored to household preferences by leveraging traditional and accessible channels such as radio, house-to-house visits, mobile calls, and community meetings. While digital tools such as social media and online platforms offer opportunities for wider reach, they should complement—not replace—more direct and inclusive methods, especially for populations with limited internet access.

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Furthermore, the CDRRMC should align its technical priorities with the lived experiences and immediate needs of households. Divergences in risk perception—particularly regarding utilities, development in hazardous zones, and protection of cultural sites—should be addressed through joint planning sessions, scenario-based simulations, and capacity-building activities that bridge technical planning with community insights. This participatory approach ensures that interventions are both contextually grounded and socially acceptable.

Improving the perceived quality of disaster-related interventions is also crucial. As the study found, households are more likely to prepare when they view interventions as effective and responsive. Hence, regular evaluations of program delivery, enhanced transparency in resource allocation, and visible impact reporting should be institutionalized to build credibility and motivation among residents.

Finally, special attention must be given to vulnerable household structures. While marital status was found to positively influence preparedness, single-parent or resource-limited households may face greater constraints in preparing for disasters. Targeted support programs, subsidies for preparedness supplies, and neighborhood-based mutual aid systems can help mitigate these disparities and ensure a more inclusive approach to community resilience. Overall, a multidimensional and collaborative strategy is needed—one that bridges institutional priorities with grassroots realities to foster a culture of preparedness and resilience.

5.2 Limitations

While this study provides valuable insights into the disaster preparedness of households in Kidapawan City, several limitations should be acknowledged. First, the use of a structured self-report questionnaire may have introduced response biases, including social desirability or recall bias, potentially affecting the accuracy of reported preparedness behaviors and risk perceptions. Second, the study's sampling frame was limited to 200 respondents from ten high-risk barangays, representing only a subset of the city's total household population. This may constrain the generalizability of the findings to other barangays or cities with different socio-environmental contexts.

Third, the cross-sectional design captures perceptions and preparedness levels at a single point in time and does not account for seasonal or event-triggered changes in disaster behavior. Fourth, while the study examined significant socio-demographic and perceptual predictors of preparedness, qualitative insights that could deepen understanding of cultural, economic, or institutional nuances were not explored. Lastly, while the instruments were validated for contextual relevance, potential limitations in translation and interpretation may have influenced responses, especially among respondents with low literacy levels.

Future research could address these limitations by employing longitudinal or mixed-methods designs, expanding the geographic scope, and incorporating qualitative interviews or focus group discussions to enrich the quantitative findings.

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