OVERVIEW OF COMMUNITY PREPAREDNESS IN FACING WHIRLWIND NATURAL DISASTERS

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ABSTRACT

Indonesia is one of the countries that is very vulnerable to natural disasters. One of them is a tornado disaster. A tornado destroys everything in its path. Preparedness plays an important role in dealing with a tornado disaster. The population in this study was the community in Lae Pinang Village, Sidikalang District, Dairi Regency, totaling 2,258 people, a sample of 44 people using the Slovin formula. The results of the study based on the characteristics of the respondents are as follows: The preparedness of the community of Lae Pinang Village, Sidikalang District, Dairi Regency in Hamlet I is in the very unprepared category with an index value of (36%). Hamlet II is in the very unprepared category with an index value of (44%). Hamlet IV is in the very unprepared category with an index value of (27%). Hamlet V is in the very unprepared category with an index value of (34%). It is recommended that health institutions provide health education to the community to carry out disaster preparedness after a tornado so that community knowledge about disaster preparedness after a landslide increases

Keywords: Preparedness, Tornado, Lae Pinang Village

INTRODUCTION

Indonesia is one of the countries that is very vulnerable to natural disasters. This is due to its unique and complex geographical position, located between 6°LU-11°LS and 95°BT-141°BT. In addition, its location in the Intertropical Convergence Zone (ICCZ), where air masses meet and have the potential to form convective rain, increases the risk of extreme weather (Murwanto & Purwanto, 2021).

According to Supriyono, 2015 Whirlwinds damage everything in their path. During the transitional season, changes in temperature and air conditions can cause whirlwinds to appear. Air turbulence such as whirlwinds is caused by whirlwinds that rotate and move quickly. With the meeting of wind and cloud movements from various directions, the strength of the wind increases significantly. As a result, whirlwinds will suck and throw various objects. Very high wind speeds can cause serious damage to buildings, infrastructure, plants, and trees.

Preparedness plays an important role in dealing with tornado disasters. Preparedness is a series of steps taken to anticipate disasters, thus ensuring that the response taken can be carried out appropriately and effectively during and after a disaster occurs (Yanuarto, Pinuji, Utomo & Satrio, 2019).

According to information released by the National Disaster Management Agency (BNPB) for the period 2021 to 2023, there were 923 natural disasters recorded in North Sumatra Province. Based on data obtained from the Regional Disaster Management Agency (BPBD), Dairi Regency experienced 244 natural disasters during the period 2021 to 2023, of which 36 natural disasters were caused by tornadoes. The areas most vulnerable to tornadoes are Siempat Nempu Hulu with 5 incidents, Parbuluan with 4 incidents, and Sidikalang with 4 incidents.

Dairi Regency has an area of 191,625 hectares, which is equivalent to around 2.68% of the total area of North Sumatra Province which reaches 7,160,000 hectares. Most of the land is covered by mountains and hills with various slopes, so this area has a tropical rainy climate. Several sub-districts such as Sumbul, Sidikalang, Kerajaan, and Tanah Pinem are located at an altitude of 700-1,600 meters above sea level (Dairi Portal, 2024).

Reported by the daily news page SIB.com, on April 22, 2023, Lae Pinang Village in Sidikalang District, Dairi Regency, North Sumatra Province experienced a natural disaster in the form of a tornado. Provet Sitanggang, Head of the Rehabilitation and Reconstruction Division of the Dairi Regency Regional Disaster Management Agency (BPBD), explained by telephone that in the incident, 12 houses were damaged to the roof. Sitanggang emphasized the importance of data collection to validate the number of victims affected by the disaster.

Research conducted by Fachmawi, Anwar, Wulandari, Rahma & Azizah, 2017 on the level of public knowledge regarding preparedness for tornado disasters in Sragen District showed that the percentage of moderate knowledge levels was 27.8%. Meanwhile, the results of research conducted by Bancin in 2023 at SMK Negeri 1 Sitinjo regarding student knowledge of tornado natural disasters in Sitinjo District, Dairi Regency showed that most participants, namely 42.26%, were included in the less category. Research conducted by Naibaho in 2022 on the preparedness of the elderly in facing tornado disasters in Sumbul Regency showed that the unfinished category reached 71.8%. The initial survey conducted by researchers to 12 communities in Lae Pinang Village regarding tornado natural disaster preparedness included 8 people in the Not Ready category and 4 people in the Ready category. Based on the research results, this is what interests researchers to conduct research design because from several sources, no description of community preparedness in facing natural disasters such as tornadoes has been found in Lae Pinang Village, Sidikalang District, Dairi Regency.

1.2. Problem Formulation

Based on the background above, the formulation in this study is to evaluate how "Community Preparedness in Facing Natural Disasters of Whirlwinds in Lae Pinang Village, Sidikalang District, Dairi Regency in 2024".

1.3. Literature Review

Disaster preparedness is an effort to enable communities to face the threat of natural disasters by building emergency response structures and mechanisms in an organized manner, with the aim of reducing the number of fatalities and damage to public infrastructure (Anies, 2018).

According to Kusumasari, 2014, some basic principles of preparedness are as follows:

- 1. Preparedness is a process that takes place continuously.
- 2. Preparedness aims to reduce ignorance during a disaster.
- 3. Preparedness involves educational activities.
- 4. Preparedness is based on adequate knowledge.
- 5. Preparedness encourages taking appropriate action.
- 6. Preparedness provides resilience to the impact of disasters.
- 7. Simple planning is considered the best approach to anticipating disasters.

According to IDEP 2007 in Berutu, Herlina, Rugun, 2023 there are four main objectives of disaster preparedness:

- 1. Reducing the risk of threats cannot always be completely avoided, such as in the case of earthquakes and volcanic eruptions.
- 2. Reducing the level of community vulnerability can be achieved through preparations made by the community itself, thus facilitating the rescue process when a disaster occurs.
- 3. Communities need to be prepared to deal with disasters efficiently so that their impacts can be minimized.
- 4. Cooperation can occur according to the scale and ability of the community in dealing with disasters, either involving direct participation of the community itself or, if necessary, involving cooperation with related parties.

According to Kusumasari, 2014, some of the reasons why preparedness is an important part of overall disaster management include:

- 1. Effective response and preparedness actions can save lives, reduce injuries, minimize property losses, and reduce disruption caused by disasters.
- 2. Preparedness helps maintain community integrity and reduce the negative impacts that may arise during a disaster.
- 3. Preparedness facilitates coordination and communication between various organizations, and establishes responsibilities for key parties such as government officials, state agencies, local governments, and health institutions.
- 4. Preparedness helps in identifying the resources needed by the community for response and recovery activities, including personnel, time, funds, equipment, supplies, and facilities.
- 5. Preparedness helps in recognizing important functions that must be carried out during a disaster, such as resource management, evacuation processes, and damage assessments.

According to BPBD Banyumas, 2022 various preparedness efforts have significant benefits in various disaster situations. Some crucial preparedness efforts include:

- 1. Understanding the risks in the surrounding environment.
- 2. Knowing the early warning system that applies in the local area.
- 3. Having the ability to evaluate the situation accurately and take steps to protect yourself.
- 4. Preparing a disaster anticipation plan for the community and conducting regular exercises.
- 5. Reduce the impact of disaster risks through mitigation exercises.
- 6. Actively participate in training programs held.

According to Yanuarto, Pinuji, Utomo & Satrio, 2019, community knowledge and skills in dealing with disasters are very important because disasters often occur without warning. Preparedness plans are a key part of dealing with disasters. Here are three main steps needed to prepare the plan:

- 1. Create a family emergency plan, which includes:
 - 1) Analyze the threats that exist in the area.
 - 2) Identify gathering points for the family.
 - 3) Save important contact numbers.
 - 4) Know the right evacuation route.
 - 5) Identify locations to turn off sources such as water, gas, and electricity.
 - 6) Establish safe points in the building or house.
 - 7) Recognize vulnerable family members such as children, the elderly, pregnant women, and those with disabilities.
- 2. Disaster Preparedness Bag (TSB)

A Disaster Preparedness Bag is a bag that is water-resistant, which is used by family members as preparation in emergency situations or when a disaster occurs. The purpose of the TSB is to prepare us to survive when help is not yet available and to assist in the evacuation process to a safe place. Basic needs that must be in the TSB for three days include: important documents, long-lasting snacks, drinking water, masks, spare clothes, toiletries, first aid and personal medicines, radio or mobile phone with batteries, portable lighting, whistle, and money.

3. Seek information from legitimate sources such as radio, television, and online media. The public can obtain official information regarding emergency response from BPBD, BNPB, and relevant institutions and ministries. If the local post is already active, they will provide additional information.

METHOD

The research method applied in this study is a descriptive method that aims to provide an objective picture or description of a particular situation. The descriptive method is used to answer the problems faced in the current situation. This research process involves the steps of data collection, classification, data analysis, drawing conclusions, and compiling reports. This study specifically describes the community's preparedness for natural disasters such as tornadoes in Lae Pinang Village, Sidikalang District, Dairi Regency in 2024. The duration of the study lasted for five months, starting from January to April 2024. The population studied included the entire population of Lae Pinang Village, Sidikalang District, Dairi Regency in 2023, with a total of 2,258 people. Sampling used (method / formula) simple random sampling (simple random) because the sampling of sample members from the population was carried out randomly without considering the strata (levels in the population). So each population is 2,258 people.

There are two types of data used in this study, namely primary data and secondary data.

- 1. Primary data is obtained from respondents by distributing questionnaires containing questions about basic information such as name, gender, age, and occupation.
- 2. Secondary data is information obtained by researchers from other sources such as Lae Pinang Village, Sidikalang District, Dairi Regency, if relevant to the research objectives.

According to Notoatmodjo, 2012 This data management process aims to change the data that has been collected into information that can be used as a basis for decision making. The steps for data management are as follows:

- 1) The data collection stage is carried out through a special instrument that has been prepared.
- 2) The editing stage is when checking the clarity and completeness of filling in the data collection instrument.
- 3) The coding stage is the process of identifying and clarifying each question in the data collection instrument according to the variables being studied.
- 4) The data tabulation stage is carried out by creating data tables according to the research objectives or the needs of the researcher.

In this study, an analysis was conducted to describe the community's preparedness in facing natural disasters such as tornadoes in Lae Pinang Village, Sidikalang District, Dairi Regency in 2024. The collected data were analyzed to obtain a picture of the frequency distribution of respondents, which were then presented in the form of tables and narratives. This analysis includes the frequency of variables such as knowledge and attitudes, emergency response plans, early warning systems, resource mobilization, age, gender, and occupation of respondents.

RESULTS AND DISCUSSION

RESULT

To reduce the risk of tornado disasters, there needs to be participation and awareness from the community. One of them is through community preparedness so that a community that is ready for disasters will be formed. So that it can reduce losses and casualties if the tornado disaster comes. Because the most appropriate disaster management efforts are efforts made by the community, one of which is preparedness. In this study, community preparedness is divided into four parameters, namely, knowledge and attitude parameters/Knowledge and Attitude (KA), emergency response plan parameters/Emergency Planning (EP), early warning system parameters/Warning System (WS), and resource mobilization parameters/Resource Mobilization Capacity (RMC).

Table 4.2. Distribution of Community Preparedness in Lae Pinang Village Regarding Whirlwinds Based on Question Items as Follows:

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No	Kesiapsiagaan	Dusun <u>Desa Lae</u> Pinang										Total	
	(parameter)	D	- I])-II]	D-III	D	-IV	D- V			
	Pengetahuan	R	%	R	%	R	%	R	%	R	%	R	%
	dan Sikap												
1.	Apakah anda mengetahui												
+													
	<u>bahwa</u> <u>daerah</u>	0	0	1	20	2	22	4	44	1	14	8	18
	anda rawan												
	bencana angin												
2	puting beliung?												
2.	Apakah angin												
	kencang yang datang secara tiba-												
	tiba dengan												
	kecepatan												
	40-50 km/jam												
	merupakan	10	71	5	100	6	67	5	56	1	11	27	61
	angin puting												
	beliung?												
3.	Pada siang hingga												
	sore <u>hari</u> (<u>sekitar</u>												
	pukul												
	13.00 hingga												
	17.00) <u>awan</u>												
	cumulus												
	nimbus dengan cepat akan	10	71	4	80	9	100	5	56	3	13	31	70
	berubah warna	10	/1	4	80	,	100	3	30	3	43	31	70
	menjadi hitam												
	gelap merupakan												
	tanda tanda												
	terjadinya angin												
	putting beliung?												
	E.HIMAN E.EMINOR'												

Tabel 4.2. Lanjutan

4.	Membangun armah												
	rumah atau bangunan yang												
	kokoh, apakah												
	dapat	6	43	1	20	8	89	2	22	3	43	20	45
	mengurangi												
	dampak angin puting beliung?												
5.	Apabila melihat												
٠.	awan yang tiba-												
	tiba gelap,												
	semula cerah												
	sebaiknya untuk tidak												
	mendekati												
	daerah awan	10	71	5	100	8	89	6	67	5	57	33	75
	gelap tersebut												
	merupakan solusi dari												
	solusi dali												
	kesiapsiagaan												
	menghadapi												
6.	bencana angin puting beliung?												
0.	Apakah												
	dengan												
	<u>berlindung</u>												
	dibawah meja merupakan												
	sikap dalam	3	21	3	33	7	78	2	22	0	0	14	32
	menghadapi												
	bencana alam												
	angin puting beliung?												
	Rencana	R	%	R	%	R	%	R	%	R	%	R	%
	tanggap												
	Application and a												
7.	<u>Apakah anda</u> sudah												
	menyediakan												
	kotak P3K atau												
	Obat – obatan	11	70	_	100	2	22	2	22	4	57	26	50
	penting untuk pertolongan	11	19	5	100	3	33	3	33	4	57	26	59
	pertama saat												
	keadaan darurat?												
	comment and at the comment and a												

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Tabel 4.2. Lanjutan

8.	Apakah anda menyiapkan tas siaga sebelum												
	terjadinya bencana alam angin uting	0	0	0	0	1	11	2	22	2	29	5	11
9.	beliung? Apakah anda												
	memiliki nomor telepon penting (seperti layanan darurat												
	lembaga kesehatan, polisi, BPBD) untuk menghubungi	3	21	0	0	4	44	1	11	3	43	11	25
	ketika bencana alam angin												
	puting beliung terjadi?												
		R	%	R	%	R	%	R	%	R	%	R	%
10.	terjadi? Sistem Peringatan	R 8	%	R 0	0	R 4	%	R 1	%	1	%	R 14	32

Tabel 4.2. Lanjutan

11.	Apabila akan terjadi / saat terjadi bencana alam angin puting beliung, apakah anda mengingatkan keluarga dan warga sekitar dengan menggunakan pengeras suara masjid?	5	36	3	60	3	33	4	44	3	43	18	41
	Mobilisasi Sumber Daya	R	%	R	%	R	%	R	%	R	%	R	%
13.	Apakah anda pernah mendapatkan atau mengikuti seminar/penyu luhan kesiapsiagaan bencana alam angin puting beliung? Apakah anda memiliki keterampilan yang berkaitan dengan	3	21	0	0	3	33	2	22	2	29	10	23
	kesiapsiagaan terhadap bencana alam angin puting beliung?	2	14	0	0	3	33	0	0	2	29	7	16
	N	1	4		5		9		9		7	4	4

Based on Table 4.2, it can be seen that the respondents' preparedness from the parameters of knowledge and attitudes about natural disasters such as tornadoes, respondents living in Hamlet I have a percentage of 0%, Hamlet II has a percentage of 20%. Hamlet III has a percentage of 22%, and Hamlet V has a percentage of 14%. The four hamlets do not yet know that the area is prone to natural disasters such as tornadoes and are categorized as very unprepared. Hamlet IV has a percentage of 44% categorized as less prepared.

Indeks Parameter	Dusun Desa Lae Pinang												
u .	D-I	Kategori	D-II	Kategori	D-III	Kategori	D-IV	Kategori	D-V	Kategori			
KA	46	Kurang Siap	57	Hampir Siap	74	Siap	46	Kurang Siap	33	Sangat Tidak Siap			
EP	33	Sangat Tidak Siap	33	Sangat Tidak Siap	29	Sangat Tidak Siap	22	Sangat Tidak Siap	43	Kurang Siap			
WS	46	Kurang Siap	30	Sangat Tidak Siap	39	Sangat Tidak Siap	28	Sangat Tidak Siap	29	Sangat Tidak Siap			
RMC	18	Sangat Tidak Siap	0	Sangat Tidak Siap	33	Sangat Tidak Siap	11	Sangat Tidak Siap	29	Sangat Tidak Siap			
KM	36	Sangat Tidak Siap	30	Sangat Tidak Siap	44	Kurang Siap	27	Sangat Tidak Siap	34	Sangat Tidak Siap			

Table 4.3. Community Preparedness Index in Lae Pinang Village, Sidikalang District, Dairi Regency

Based on table 4.3, the Lae Pinang Village area, Hamlet I, received a preparedness index value of 36%, indicating that the Lae Pinang Village area, Hamlet I is in the very unprepared category. The knowledge and attitude parameter index is in the less prepared category with an index value of 46%. The emergency response plan parameter index is in the very unprepared category with an index value of 33%. The early warning system parameter index is in the less prepared category with an index value of 46%. The resource mobilization parameter index is in the very unprepared category with an index value of 18%.

The Lae Pinang Village area, Hamlet II received a preparedness index value of 30%, indicating that the Lae Pinang Village area, Hamlet II is in the very unprepared category. The knowledge and attitude parameter index is in the almost ready category with an index value of 57%. The emergency response plan parameter index is in the very unprepared category with an index value of 33%. The early warning system parameter index is in the very unprepared category with an index value of 30%. The resource mobilization parameter index is in the very unprepared category with an index value of 0%.

Lae Pinang Village Area, Hamlet III received a preparedness index value of 44%, indicating that Lae Pinang Village Area, Hamlet III is in the less prepared category. In the knowledge and attitude parameter index, it is in the ready category with an index value of 74%. In the emergency response plan parameter index, it is in the very unprepared category with an index value of 29%. In the early warning system parameter index, it is in the very unprepared category with an index value of 39%. In the resource mobilization parameter index, it is in the very unprepared category with an index value of 33%. Lae Pinang Village Area, Hamlet IV received a preparedness index value of 27%, indicating that Lae Pinang Village Area, Hamlet IV is in the very unprepared category. In the knowledge and attitude parameter index, it is in

the less prepared category with an index value of 46%. In the emergency response plan parameter index, it is in the very unprepared category with an index value of 22%. In the early warning system parameter index, it is in the very unprepared category with an index value of 28%. In the resource mobilization parameter index, it is in the very unprepared category with an index value of 11%.

Lae Pinang Village Area, Hamlet V received a preparedness index value of 34%, indicating that Lae Pinang Village Area, Hamlet V is in the very unprepared category. The knowledge and attitude parameter index is in the very unprepared category with an index value of 33%. The emergency response plan parameter index is in the less prepared category with an index value of 43%. The early warning system parameter index is in the very unprepared category with an index value of 29%. The resource mobilization parameter index is in the very unprepared category with an index value of 29%.

DISCUSSION

From the results of the research conducted, it was found that the preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency in 2024 in Hamlet I was in the very unprepared category with an index value of (36%). Hamlet II was in the very unprepared category with an index value of (30%). Hamlet III was in the less prepared category with an index value of (44%). Hamlet IV was in the very unprepared category with an index value of (27%). The area of Hamlet V is in the very unprepared category with an index value of (34%). It can be concluded that the preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency in 2024 is in the less prepared category with an index value of (43%). According to the researcher's assumption, it is true that when filling out the questionnaire, the Lae Pinang Village community was still less prepared in increasing preparedness efforts in dealing with natural disasters such as tornadoes.

This is in line with the research of Fachmawi, Anwar, Wulandari, Rahma & Azizah, 2017 on the Level of Public Knowledge Regarding Preparedness for Whirlwind Disasters in Sragen District, showing that preparedness before being given disaster education was in the very unprepared category (27.8%). Further research with the results of Bancin's research entitled Knowledge of Students of SMK Negeri 1 Sitinjo Regarding Preparedness for Whirlwind Natural Disasters in Sitinjo District, Dairi Regency in 2023, the category of less was 82 people (42.26%). The results of Lingga's research, R.T on the Relationship between Public Knowledge and Attitudes with Handling Whirlwind Natural Disasters in Sumbul

District, Dairi Regency in 2021, the category of less was 30 people (60%). This is different from Naibaho's research on Elderly Preparedness in Facing Whirlwind Disasters in Sitinjo District in 2022, the category of not ready was 38 people (54.3%). Further research with the results of Darmawansa's 2020 research on the Overview of Nurses' Preparedness in Disaster Management in Bima City, West Nusa Tenggara Province, showed that the preparedness in disaster management for nurses was in the fairly prepared category (62.9%). Based on the results of research on community understanding of the tornado disaster in Lae Pinang Village, Sidikalang District, Dairi Regency, the parameters of knowledge and attitude were (63%) in the almost ready category. Emergency response plans were (40%) in the less prepared category. Early warning systems were (25%) in the very unprepared category. Resource mobilization was (23%) in the very unprepared category.

CONCLUSION

Based on the research that has been conducted on the preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency in facing the tornado disaster, the following conclusions are drawn:

- 1. The preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency in Hamlet I area is in the very unprepared category with an index value of (36%).
- 2. The preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency in Hamlet II area is in the very unprepared category with an index value of (30%).
- 3. The preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency, Hamlet III area is in the less prepared category with an index value of (44%).
- 4. The preparedness of the Lae Pinang Village community, Sidikalang District, Dairi Regency, Hamlet IV area is in the very unprepared category with an index value of (27%).
- 5. The preparedness of the community of Lae Pinang Village, Sidikalang District, Dairi Regency, Hamlet V is in the very unprepared category with an index value of (34%).
- 6. The preparedness of the community of Lae Pinang Village, Sidikalang District, Dairi Regency is in the less prepared category with an index value of (43%).

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We hope that this work can provide broad benefits and be the first step towards forming a more disaster-resilient society.

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