

PAPER • OPEN ACCESS

## Community preparedness in facing earthquake in disaster-prone areas of the Lembang fault at Pasirlangu Village Cisarua District, West Bandung Regency

To cite this article: Sutrisno Utomo and Tukino 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **989** 012022

View the [article online](#) for updates and enhancements.

You may also like

- [Impact of potential earthquake disasters in the areas located in zone lineaments and the surrounding areas](#)  
Edo Barlian, Johannes Tarigan, Zulkifli Nasution et al.
- [Analysis of disaster literacy on student behavioral responses in efforts to reduce earthquake disaster risk at SMA Negeri 1 Klaten](#)  
M A Kesumaningtyas, S H N Hafida and M Musiyam
- [The effect of android-based earthquake game toward Bengkulu City elementary school student's knowledge about earthquake disaster preparedness](#)  
E W Winarni, E P Purwandari and W Wachidi



**ECS** The Electrochemical Society  
Advancing solid state & electrochemical science & technology

### 242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Early hotel & registration pricing ends September 12

Presenting more than 2,400 technical abstracts in 50 symposia

The meeting for industry & researchers in  
**BATTERIES**  
**ENERGY TECHNOLOGY**  
**SENSORS AND MORE!**

 Register now!

 **ECS Plenary Lecture featuring M. Stanley Whittingham,**  
Binghamton University  
Nobel Laureate –  
2019 Nobel Prize in Chemistry



## Community preparedness in facing earthquake in disaster-prone areas of the Lembang fault at Pasirlangu Village Cisarua District, West Bandung Regency

**Sutrisno Utomo and Tukino**

Bandung Polytechnic of Social Welfare`

\*Email: [sutrisno.utomo.001@gmail.com](mailto:sutrisno.utomo.001@gmail.com), [tukinoktn@gmail.com](mailto:tukinoktn@gmail.com)

**Abstract.** This research aims to determine the community's preparedness in dealing with earthquake disasters in the Lembang Fault disaster-prone area, Pasirlangu Village, Cisarua District, West Bandung Regency, covering six critical aspects including respondent characteristics, knowledge aspects, policy, emergency response planning, early warning system, and system mobilization resources aspects in dealing with earthquake disasters.

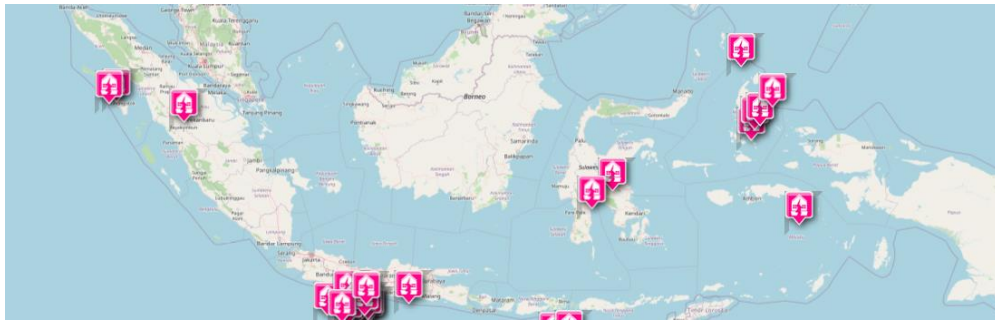
This research was using descriptive research method with a quantitative approach. The population in this research was the head of the family of 3,564 people with the Proportional Random Sampling technique and obtained 100 people from 10 communities areas as respondents.

The results showed that the community's preparedness in dealing with earthquake disasters was in the moderate to low category with a score of 6,240 out of a total score of 12,400. In Conclusion, the community at Pasirlangu Village as a Disaster-Prone Areas are barely prepared to face the earthquake disaster. The program proposed to solve the problem is "*Program Pasirlangu Siap Siaga, Cisarua Tanggap Bencana (Pasaga Cinta)*" or the Pasirlangu Ready-Alert Program, Cisarua Disaster-Response which aims to improve community preparedness in dealing with earthquake disasters. The method used is the Community Organization/Community Development methods by applying the collaboration techniques, Technology of Participation techniques, and campaigns.

### 1. Introduction

As a country located between four tectonic plates and consisting of islands located in a series of volcanic belts in the south and east, Indonesia has been named one of the countries that has a high level of seismicity, up to ten times the level of seismicity in the United States. Throughout 2020, there have been twenty-eight earthquakes that hit various regions in Indonesia ([dibi.bnpb.go.id](http://dibi.bnpb.go.id)). The earthquake disaster occurred in several provinces, including North Sumatra, Central Java, North Sulawesi, Central Sulawesi, West Sulawesi, Maluku and Papua Provinces with the number of intensities from each province as much as once, West Nusa Tenggara Province with an intensity of twice, Nanggroe Aceh Darussalam Province and North Maluku Province with four incident intensity, and West Java Province with the highest earthquake disaster intensity throughout 2020, which was eleven times.





**Figure 1.** The earthquake disaster occurred in several provinces

West Java Province has a topography of lowlands in the north, highlands and mountains in the middle and hills and beaches in the south. West Java Province is also located on the Circum Pacific and Mediterranean routes, so it has an unstable area, characterized by many active volcanoes and a high frequency of earthquakes. Tangkuban Perahu Active Mountain and Lembang Fault are two of the many potential earthquakes in West Java Province, located in the northern part of Bandung City. The Lembang fault, which extends for twenty-nine kilometers, shifts by 3 millimeters per year and has the potential to cause earthquakes with a magnitude of up to 7 Richter scale.

Indonesia as a country that has a high intensity of earthquakes has a great influence on the social conditions of its people. The earthquake disaster which claimed many lives, created enormous losses, which prompted the Indonesian people to always be ready if at any time they had to deal with an earthquake disaster. Since 2004 after the earthquake and tsunami in Aceh, Indonesian Government has adopted various policies and programs for disaster prevention and management, for example the policy for building and designing earthquake-resistant houses. This policy is very important considering the high percentage of the death toll due to the destruction of houses and buildings, which reached sixty-two percent. In addition to the policy aspect, the knowledge aspect is also an important aspect that must be considered. The rate of self-inflicted safety is 35%, according to a study in Japan [1].

Referring to various information in the previous section, it is known that community preparedness in dealing with disasters, especially earthquakes, is very important. This research was conducted with the aim of knowing the preparedness of the people of Pasirlangu Village, Cisarua District, West Bandung Regency in dealing with earthquake disasters. The research location was chosen based on the geographical location of Pasirlangu Village, which is right on the West Bank of the Lembang Fault. The research was conducted with the aim of measuring the preparedness of the Pasirlangu Village community, with reference to six critical factors, including respondent characteristics, aspects of knowledge, policies, emergency response plans, early warning systems and mobilization of source systems aspects to 100 respondents spread over 10 areas in the village. The research is also carried out based on the concept of Social Work research, in accordance with the field of Research, namely Social Worker in the field of Disaster Management.

## **2. Literature Review**

### *2.1. Earthquake Disaster*

Earthquake is a type of disaster that is caused by sudden ground movements and has a certain duration of time. Indonesian National Board for Disaster Management (BNPB) defines an earthquake as an “energy release event caused by a sudden shift/movement of the earth's interior (crust). Earthquakes are caused by the release of pressure from moving plates, getting bigger and bigger and finally reaching a state where the pressure cannot be resisted by the edges of the plates [2]. The pressures that cannot be resisted by the edges of the slab are released in the form of vibrational energy, causing catastrophic earthquakes to occur. Earthquake disaster is one of the natural disasters that is difficult to predict because earthquakes occur very quickly and have a large impact in a wide area.

## 2.2. Preparedness

Preparedness is a series of activities carried out to anticipate disasters through appropriate and efficient organization and steps. The Big Indonesian Dictionary defines preparedness as "a state of readiness". Thus, preparedness can also be defined as a state of readiness carried out to anticipate disasters in an effective and efficient manner. Furthermore, according to Judah Carter (in LIPI UNESCO/ISDR 2006: 5) explains, that "preparedness is actions that enable governments, organizations, communities and individuals to be able to respond to a disaster situation appropriately, quickly and effectively. Included in preparedness actions are the preparation of disaster management plans, maintenance of resources and training of personnel".

This research was carried out by adopting the UNESCO-LIPI framework (2006:13-14) which was compiled to determine the level of community preparedness in anticipating the earthquake and tsunami disaster, with the following details:

- a. Knowledge, as the beginning of an action and one's awareness, so that with the capacity of knowledge it is hoped that it can be the basis of action of someone.
- b. Policies, environmental management, building structures, facilities and infrastructure as well as disaster management systems are factors that directly or indirectly affect the level of preparedness in dealing with disasters as regulated in a policy.
- c. Plans for Emergencies, relating to the process of evacuation, aid and rescue efforts in order to minimize casualties during and after a disaster event occurs.
- d. Early Warning System, as a series of systems that function to notify an impending disaster
- e. Resource Mobilization, aims to facilitate access to basic needs, clothing, food, security and strengthen the sources of life.

## 2.3. Community

Community is defined as "Unity of human life that interacts according to a certain system of customs that is continuous and bound by a sense of shared identity" [4]. From this definition, it can be explained that the community is a group of people who have a mutually supportive relationship and live in a certain geographical area such as villages, hamlets and urban villages. The term community is defined by Koentjaraningrat (2002:143-144), is a term that comes from the Arabic root "syarakat" which means to participate. So that it can be interpreted that Community is indeed a group of humans who "get along" with each other or in scientific terms, "interact". Thus, Community is the organization of social activities or activities that are able to provide access and ability to its members to get the fulfillment of needs for daily life.

## 2.4. Social Work in Disaster Settings

Max Siporin (1975:27) defines Social Work as "...an institutional method of helping people to enhance their social functioning and to resolve their social problems". Furthermore, Zastrow H.C (2002:12) defines social work as "...the professional activity of helping individuals, groups, or communities to enhance or restore their capacity for social functioning and to create societal conditions favorable to their goal" [7,9]. Referring to the two definitions, it can be concluded that social work is a profession that can provide assistance, both to individuals, groups, and communities in solving their problems and improving and enhancing their social functioning so that they are able to carry out their social functions and roles. Prevention and management of earthquake victims is one of the fields of social work practice. Adjustment and improvement of social conditions are important in efforts to improve and heal for earthquake victims. The definition in principle has 3 main elements, including:

- a. Social work is a professional service
- b. The practice is based on knowledge and skills
- c. Its purpose is to help individuals, groups and communities achieve personal and social satisfaction and freedom.

Social work is a profession that has a responsibility to improve and develop interactions between people, so that people have the ability to overcome difficulties experienced and realize their aspirations and values. Social workers in carrying out their goals in addition to working with clients, also cooperate with other disciplines as well as with the physical and social environment. In dealing with earthquake victims, social workers work together with communities in the neighborhood of the earthquake victims, as well as related parties who can provide assistance and services to victims of natural disasters in disaster-prone areas.

Referring to Tuti Kartika (2014), regarding the roles of social workers, social workers in the field of disaster have an important role in overcoming problems regarding earthquake disasters. Some of the roles of social workers include [3]:

- a. Facilitator, to facilitate or enable individuals or groups to be able to make changes that have been mutually agreed upon.
- b. Educators, as educators in providing information, knowledge and understanding to the community about disasters.
- c. Broker, connecting individuals or groups who need assistance or services with resources, because the individual or group themselves do not know where the source is and how to reach it.
- d. Mediator, helps to mediate when there is a dispute between various groups in order to reach a compromise, reconciliation or reach a mutually beneficial agreement.
- e. Counselor (therapist). There is a tendency to view social workers more as therapists than as counselors. The counselor carries out counseling while the therapist does psychotherapy.
- f. Case Manager, plays a role in coordinating all assistance activities provided to individual clients that are provided to clients individually or in groups.
- g. Consultant, acting as a consultant for aspects of human relations (with training experience in the social psychology of individual behavior).
- h. Advocacy, defending the interests of clients to claim their rights and providing input in improving client service programs and policies, especially policies related to disaster to the local government.
- i. Planner, planning services needed by clients related to disaster problems based on the results of the assessment, including developing referrals.

### 3. Methods

The method used in this research uses a quantitative approach with a descriptive survey design. Moh. Nazir (2011: 56) states that the Descriptive Survey Research Method where "Descriptive survey method is an investigation conducted to obtain factors from existing symptoms and seek factual information, whether social, economic or political institutions from all groups or regions [6]." Sugiyono (2016:36) also suggests descriptive research, namely "Descriptive research method is a problem formulation relating to statements about the existence of variables, either only on one or more variables (stand-alone variables) [8]. So in content research the researcher does not make comparisons of that variable to other samples, and looks for the relationship of that variable to other variables.



**Figure 2.** Descriptive survey method

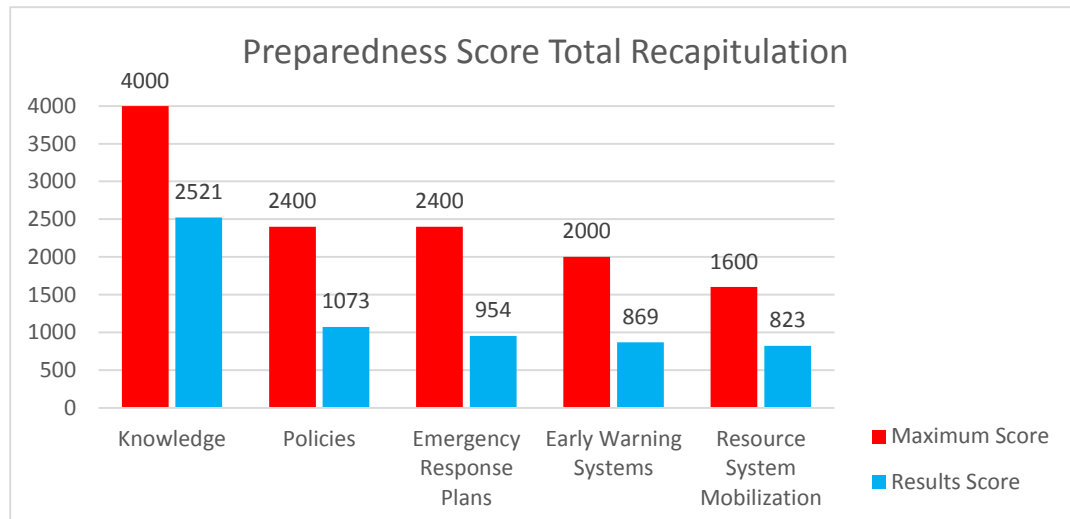
The source of data from this research is a self-administrated questionnaire containing 31 statements regarding aspects of preparedness, namely aspects of knowledge, policies, plans for emergencies, early warning systems, mobilization of sources, and respondent's personal data as complementary data. The population of this study was 3,567 families with a sample of 100 families spread over 10 areas in Pasirlangu Village.

The sampling technique used is proportional random sampling and the Slovin formula is used to determine the sample with an error limit of 10%. Efforts to obtain samples encountered problems where some areas were inaccessible due to the implementation of regional quarantine as an effort to stop the spread of the Covid-19 outbreak.

The measuring instrument used by the researcher is a Rating Scale by dividing the answers to the questionnaire into four answers with graded scores (the highest meaning score is four to the lowest score is one). The validity test in this study uses face validity and the reliability test of the measuring instrument uses the Cronbach Alpha coefficient with the help of the Statistical Product and Service Solutions (SPSS) program. The results of testing the reliability of the measuring instrument show the number 0.965 to the answers of 10 respondents and it can be concluded that the instrument has met the reliable criteria for use in the data collection process.

#### 4. Result and Discussion

The results showed that the preparedness of the people of Pasirlangu Village as one of the villages located in disaster-prone areas was in the medium to low category. Referring to 100 respondents' answers to the 31 statements presented, regarding aspects of knowledge, policies, emergency response plans, early warning systems and aspects of resource system mobilization, a score of 6,240 points out of a maximum total score of 12,400 points was obtained. This is very concerning as it is known that Pasirlangu Village is right above the Lembang Fault which has a high risk of earthquake disasters.



**Figure 3.** Preparedness Score Total Recapitulation

Based on the diagram above, information is obtained that the knowledge aspect and the resource system mobilization aspect are in the middle category (2,521 points out of 4,000 points and 823 points out of 1,600 points maximum). This was made possible by the basic knowledge possessed by the people of Pasirlangu Village regarding the dangers, risks, signs, and policies regarding earthquake disasters, as well as the mobilization of source systems that have been carried out by some of the people of Pasirlangu Village in dealing with the earthquake disaster. The coordination that has been established, as well as the Karang Taruna which doubles as Disaster Preparedness Cadets have carried out various efforts in solving problems related to disaster issues.

Based on the same diagram above, it is also known that aspects of policy, emergency response plans, and aspects of the early warning system are in the low category (1,073 and 954 points out of 2,400 points and 869 points out of 2,000 points maximum). Referring to the research results, the three aspects are in the low category, caused by several factors. In the policy aspect, understanding and low implementation of central and regional policies have not been optimal in the Pasirlangu Village area. Policy is one of the important aspects where policy is the legal foundation for infrastructure development, as well as policies in order to regulate emergency response plans, evacuation routes and points, mitigation guidelines and the formation of a disaster preparedness team for the people of Pasirlangu Village.

Most of the people of Pasirlangu Village have not prepared an emergency response plan, contingency plan, evacuation routes and points as well as evacuation locations in the face of an earthquake disaster. Understanding factors that need to be improved, as well as collective action is needed, so that an effective and efficient emergency response plan can be implemented with the hope that the number of fatalities can be minimized. Similarly, aspects of the early warning system as one aspect of preparedness in dealing with disasters. Availability and easy access to an early warning system, as well as routine control over the early symptoms of an earthquake, are still very limited. The available early warning system is still conventional, and has never been used in training conditions or when an earthquake occurs.

#### *4.1. Discussion*

Preparedness in dealing with disasters is one of the important factors that must be considered for people living in disaster-prone areas. The results of the research indicate that the level of preparedness of the people of Pasirlangu Village is still and must be improved, so that they can be "prepared" in the face of an earthquake disaster. This can be done in several ways. Increasing public understanding and awareness of the risk of earthquake disasters in the vicinity is one of the important factors in increasing preparedness. Access to correct and easily accessible information is also necessary, considering that in general, humans act according to their knowledge. The Village digitization program also needs to be supported by all parties, considering that internet access in the Pasirlangu Village area, which is located right on the slopes of Mount Burangrang, is still quite limited.

The existence of local policies that regulate various aspects in the field of disaster can be immediately compiled and included in the agenda for discussing village regulations. Thus, the emergency response plan and early warning system established by the community and the Village Government can be realized. Furthermore, good coordination between the community, the Village Government, the Regional Disaster Management Agency (BPBD) of West Bandung Regency, as well as other multidisciplinary in helping the community of Pasirlangu Village to be ready to face the earthquake disaster.

Social Workers with Disasters and Refugees have the capacity to provide assistance, both before and after an earthquake disaster occurs. Social Workers as experts, have various roles to improve community preparedness in dealing with earthquake disasters through various methods and techniques they have. Community Development is a social work intervention method, and can be combined with collaboration techniques (social workers collaborate with local communities in providing assistance), participatory technology techniques as an effort to solve problems and find the best solutions, and campaign techniques.

In addition, several specific roles of Social Workers with Disasters and Refugees that can be applied are the role of Educators, to increase awareness and understanding of the community. Social workers can also act as advocates, by advocating for the necessary policy designs to local governments, as well as planners in formulating the direction of change so that they can achieve the expected results. Thus, social workers comprehensively act as agents of change. These various roles and activities were proposed in the "*Program Pasirlangu Siap Siaga, Cisarua Tanggap Bencana (Pasaga Cinta)*" or the Pasirlangu Ready-Alert Program, Cisarua Disaster-Response Program as a form of research contribution, including community consultations, disaster counseling, village policy

formulation and the establishment of an information system based on Whatsapp messages for the people of Pasirlangu Village.

## 5. Conclusion

Indonesia as a country that has abundant natural resources also has a high risk of disasters, especially earthquakes. “An ounce of prevention is worth a pound of cure” is a saying that is often touted, not least when it comes to dealing with a disaster situation. Although there are no specific efforts to prevent the occurrence of earthquake disasters, there are still various efforts to reduce and even prevent the loss of life through a series of activities within the framework of disaster preparedness.

Various efforts and participation from all parties are needed considering that disaster issues are not the responsibility of only a few parties. Central and Regional Government, Central and Regional Disaster Management Agency, Health Institutions, Education, Security Institutions, business world, and various other parties, including Social Workers with Disasters and Refugees. Reflecting on past catastrophic events, the magnitude of the loss of life and total damage can be greatly reduced by taking appropriate precautions and preparedness.

At the end of this paper, the author hopes that a better synergy will be created from various parties regarding disaster mitigation and management efforts. Togetherness is a unique value that is owned by the Indonesian people, has been passed down from generation to generation, and it is the responsibility of all of us to maintain it. The author also hopes that the results of this research can be useful in various sectors and various scientific fields.

## Acknowledgements

I would like to thank the Director and Head of the Research Center of Bandung Polytechnic of Social Welfare, who have allowed this research.

## References

- [1] BNPB. 2011. *Indeks Rawan Bencana*. Jakarta: Direktorat Pengurangan Risiko Bencana, Deputi Bidang Pencegahan dan Kesiapsiagaan
- [2] Ella and Usman. 2008. *Mencerdasi Bencana*. Jakarta: Grasindo
- [3] Kartika, Tuti. 2011. *Anak Jalanan dan Model Penanganannya: Studi kualitatif tentang Anak Jalanan yang dibina oleh Yayasan Dian Mitra, YKAI dan Yayasan Amalia di Jakarta*. Jakarta.
- [4] Koentjaningrat. 2002. *Pengantar Ilmu Antropologi*. Jakarta: Rineka Cipta
- [5] LIPI. 2006. *Kesiapsiagaan Masyarakat dalam Mengantisipasi Bencana Gempa Bumi dan Tsunami*. Jakarta. LIPI-UNESCO/ISDR
- [6] Nazir, Mohammad Ph.D. 2011. *Metode Penelitian*. Jakarta: Ghalia Indonesia
- [7] Siporin, Max. 1975. *Introduction to Social Work Practice*. New York: Macmillan Publishing Co, inc.
- [8] Sugiyono. 2016. *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.
- [9] Zastrow, H.C. 2000. *Introduction to Social Work dan Social Welfare*. USA: Thomson Books/Cole