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Review

Collaboration and leadership for effective disaster governance: Evidence from Cianjur earthquake, West Java, Indonesia

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Abstract: This article aims to elucidate governance primarily from the perspective of collaboration and leadership in managing disasters. This article studies the case of Indonesia, a country with frequent and complex nature of disasters, located on the Pacific Ring of Fire to analyze its disaster management system and draw out implications from its experience. The method used is a qualitative comprehensive and systematic review from national and international earthquake occurrences. The finding is that Indonesia is simultaneously carrying out disaster management which is not contradictory but complementary. The importance of collaboration is imposed and recommendations are offered on rectifying collaborative activities' value. Modern leadership strategies suggest that acquire their power from effective strategies and transformational power rather than standard operating procedures. This paper provides lessons on how to organize earthquake management through aspects of collaboration and leadership effectively. The author suggests optimizing the potential of the community by providing special assistance to increase disaster management efforts.

Keywords: collaboration; disaster; governance; Indonesia; leadership; policy

1. Introduction

Over the past 20 years, many natural disasters have occurred in Indonesia, such as floods, landslides, earthquakes, and tsunamis. In 2004 there was an earthquake and tsunami in Banda Aceh, a terrible earthquake in Yogyakarta (2006), an earthquake in West Sumatra (2009), an eruption of Mount Merapi in Central Java (2010), an eruption of Mount Kelud (2014), an earthquake, and tsunami in Palu (2018), which resulted in many human and animal deaths, infrastructure destruction, and economic losses for the country and society (Amri and Giyarsih, 2021; Bakkour et al., 2015; Games and Mardiah, 2022; Gunanda et al., 2018; Maeno et al., 2019; Syamsidik et al., 2019). This condition shows that consciously or unconsciously we live in an area with a large potential for natural disasters. Indonesia has a high risk of disaster because it is located at the confluence of four main tectonic plates, namely the Eurasian, Indo-Australian, Philippine and Pacific Ocean, making Indonesia prone to earthquakes, tsunamis, and volcanic eruptions (BNPB, 2021).

The potential for natural disasters to occur is also caused by several other problems which trigger an increase in disaster vulnerability and the resulting danger. The relatively high population growth impacts the increasing need for these new residential areas. The addition of new and developing and spreading residential areas can eventually reach marginal areas that are not safe for the people living in these areas. Many settlements built in areas with steep slopes have exacerbated the vulnerability to landslides, resulting in increased potential losses in the event of a landslide (Firdaus

and Yuliani, 2022). The risk of disasters is growing due to the increasing concentration of people and valuable resources in vulnerable areas (UNISDR, 2012). Erroneous development of areas in land use, namely through conversion of land into built-up land, results in environmental damage such as landslides in residential areas (Dewi and Rudiarto, 2014). Human activities in the form of inappropriate land use patterns such as cutting slopes for residential settlements and road use can result in loss of slope reinforcement which triggers landslides on the slopes (Nurjanah and Mursalin, 2021).

This study focuses on overcoming these challenges through integrated earthquake disaster governance through an effective disaster governance system. In addition, it is important to implement government policies in accordance with the conditions in the field after the earthquake response, recovery and reconstruction) and pre-disaster (mitigation and preparedness). In managing earthquake problems, a strong leadership role and awareness of their role are needed so that they are able to give orders and tasks so that post-disaster handling can be completed properly.

2. Methodology

The method used in this research study is library research where the research data is taken mainly from the literature (books, documents, articles, reports, newspapers). Library research aims to assess, criticize, and synthesize literature related to research topics so as to enable new perspectives to emerge. The review process goes through several phases: 1) design; 2) analysis; and 3) compile and write reviews (Snyder, 2019). In phase 1: Design, focus on why this review is needed and how it can contribute. At this stage a practical plan for selecting articles and how the search and selection process will be documented, including how the search and selection process will be assessed. In phase 2: Analysis, we focus on analyzing the types of information appropriate to the research objectives, including what types of information are needed to carry out the specific analysis and how this process will be discussed and reported on. Finally, in phase 3: Organizing and writing the discussion, focusing on what reporting standards are appropriate for this particular review, what information needs to be presented, and then the results are presented. In this study, the earthquake disaster in Cianjur Regency, West Java Province, was reviewed purposively. Published and related earthquake literature was searched from library sources online.

3. Collaboration

The nature of disasters is dynamic, so disaster risks always need to be re-evaluated. Evidence of existing socio-economic conditions needs to be a solid basis for re-evaluating disaster risks in the region and as material for studies in other regions. The establishment of a national disaster inventory system is crucial for effectively documenting and assessing the impacts and losses caused by disasters, which in turn contributes to the development of a robust socio-economic foundation (ESCAP, 2012). Disaster governance typically involves collaborative efforts or activities that involve multiple organizations working together to address challenges that surpass the capabilities of any individual organization (Généreux et al., 2019; Tierney, 2012).

The concept of disaster phases, or hazard cycles, is closely related to governance. Disaster vulnerability can be minimized through a series of processes, namely initial

conditions, such as hazards that occur and vulnerability assessments; land use regulations; rule enforcement; warning system; and empowerment programs. When a disaster occurs, the negative impacts can be reduced through appropriate disaster response measures, for example, prioritizing lifesaving, providing shelter and health and emergency food consumption, and decision support for emergency response so that the rescue process can be optimized. Existing literature has highlighted the important role of local governments in implementing effective disaster management, as they generally have a better understanding of their assets and local needs compared to higher levels of government. Local governments are also the first to react to disasters affecting their areas. There may be parties outside the local government who have an important role in disaster management, but the local government is more effective because it has the authority to make decisions related to disasters that occur in their area.

Even though disaster risk management has been said to be effective at the local level, there is a question whether local government actors are capable of taking effective disaster management actions on their own. While the importance of local knowledge is acknowledged, the availability of necessary human, material, or technical resources for the required tasks may be limited (ESCAP, 2012). This question is not meant to corner the role of local government but as a consideration that the role of local government alone is insufficient to overcome disaster problems. In this case, collaboration between various parties, such as local government and other strong organizations or groups, is needed to manage disasters effectively. The aim of collaboration is not to hamper the authority of the local government but to emphasize that disaster management by institutions formed by the regional government alone is not enough. It is crucial to emphasize the need for robust intergovernmental and interorganizational collaborations to ensure effective disaster management (Bae et al., 2016; Homsy et al., 2019; Hutter, 2016).

One of the important factors in the event of horizontal incompetence of local government in disaster governance is the need for collaboration with institutions such as universities and various civil society organizations. These institutions, which have adequate capacity and local networks, can be utilized by local governments during disaster response and recovery efforts as they are valuable assets. In fact, there is a tendency for support to build resilience at the local level through community participation. There is an urgent need to focus more deeply on the root causes of disasters, trying to address the problems that create disaster risks through risk reduction efforts and by building resilient communities after disaster (Benson, 2016).

The challenges mentioned can be effectively addressed through governance models that rely on networks of collaborating and diverse entities. Networks offer flexibility, adaptability, and the ability to mobilize diverse resources. For instance, in the case of large-scale disasters, response efforts are often carried out by emergent multiorganizational networks that operate without centralized coordination (Tierney, 2012). Collaborating with each other between parties involved with disaster issues makes it easier to deal with disaster problems because it is easier to mobilize various resources.

Meanwhile, collaborative governance according to Ansell and Gash (2007) is explained as: A governing arrangement refers to a formal and deliberative process in

which one or more public agencies directly involve non-state stakeholders. This collective decision-making process is consensus-oriented and aims to create or implement public policy, manage public programs, or oversee public assets. The arrangement emphasizes the active participation of both public agencies and non-state stakeholders, ensuring that decisions are made collectively and in a formal manner. This definition stresses six important criteria: 1) the forum is initiated by public agencies or institutions; 2) participants in the forum include nonstate actors; 3) participants engage directly in decision making and are not merely "consulted" by public agencies; 4) the forum is formally organized and meets collectively; 5) the forum aims to make decisions by consensus (even if consensus is not achieved in practice), and 6) the focus of collaboration is on public policy or public management. From this explanation, collaborative governance is a specific form of governance in which public and private actors work collectively through different forms and rules, applying particulars process, to establish laws and rules for the provision of public goods. Ansell and Gash (2007) explanation regarding collaborative governance is depicted in **Figure 1**.

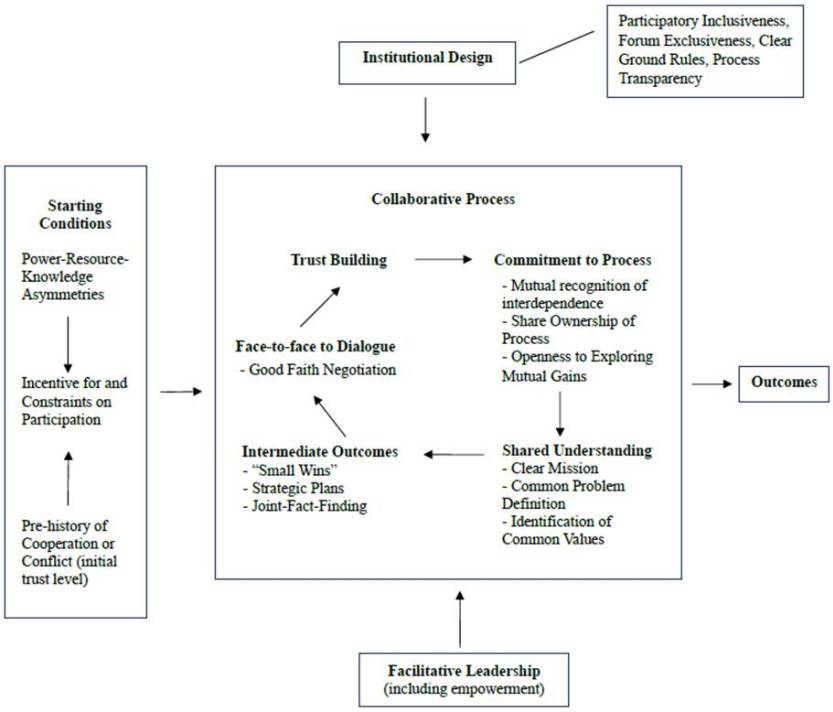

Figure 1. A model of collaborative governance.

The collaborative process variables started with starting conditions, institutional design, and leadership variables represented as important contributions or contexts to the collaborative process. Starting conditions include power-resource-knowledge asymmetries, incentives for and constraints on participation and prehistory of cooperation or conflict (initial trust level). Institutional design includes basic rules as a basis for collaboration. The leadership element includes mediation and facilitation essential for collaborative implementation. Regional government coordination regarding information dissemination is very necessary considering that Indonesia is vast (Fitriani et al., 2021).

4. Leadership

Leadership, in many instances, does not come from government officials holding formal positions, but rather from individuals who possess the capability to leverage unofficial avenues of influence (Bankoff, 2015). Our conception of disaster governance can only be that good basic ideas about these sociocultural and historical conditions understood and governance practices adapted to this particular situation in space and time (Sandoval and Voss, 2016). One important aspect of disaster collaboration is the role of appropriate and strong leadership because leadership has an important role in planning, organizing, implementing and supervising the implementation of activities. Leadership provides important mediation and facilitation for collaborative processes (Ansell and Gash, 2007; Garavaglia et al., 2021; Smucker et al., 2020).

Crises, including earthquakes as a form of crisis, in relation to leadership are symptoms that are interrelated or intertwined with one another. It is a natural tendency that in a difficult crisis they expect leaders to take action (Boin and Hart, 2003). In disaster governance, the role of the leader is very important in bringing order to chaotic and not conducive conditions. Leaders play a role in controlling groups, organizations, governments or certain situations and conditions. The level of the leader's role while on duty in a disaster situation can consist of various levels, such as the leader as an incident coordinator who is on duty at the disaster site, a government official who is responsible for managing the disaster as a whole or the leader of a country where a disaster occurs whose duties are formally supported by rules. In handling crises such as natural disasters, it is necessary for someone who can solve problems through coordination, communication, problem analysis and the ability to influence the actions of others. Leaders are individuals who utilize advanced abilities, including effective communication, organizational skills, problem-solving capabilities, analytical thinking, and strong interpersonal skills, to exert influence over the actions and decisions of others (Généreux et al., 2019; Grossman, 2020).

An important aspect of successfully managing emergencies and crises is leadership. Leaders take action to solve crisis problems before, during, and after the crisis takes place. So, leaders need different leadership competencies and traits compared to other types of leadership. There is a need for a leadership style that is able to overcome natural disaster conditions that arise suddenly as well as disaster problems that arise every day. In disasters and emergencies, leaders who can manage sudden surprises are needed, so outstanding leadership qualities are also needed. Even though it is undeniable that routine aspects also appear in routine disaster and emergency management activities. The most crucial leadership traits include the ability to collaborate with other stakeholders, flexibility in decision making and operations, adaptability to changing disaster conditions, and effective communication with both stakeholders and the public (Demiroz and Kapucu, 2012).

Leaders can emerge from the informal or formal sector. An informal leader is those who are involved in the field of leadership even though they do not have formal authority or does not hold a formal position in the management of an organization. Apart from that, informal leaders have some power to influence the people around them. For example, informal leaders in society are community leaders or traditional

leaders. In formal leadership such as a regional head, disaster management is one of the responsibilities of the central and regional governments and the community to realize maximum protection for the community and its social, economic, and environmental assets from possible disasters (Sadisun, 2004). According to Carter (2008), there are several factors that can impact leadership during disaster conditions:

1) Loss of designated leaders: Some leaders may be incapacitated or unable to perform their roles due to the direct effects of the disaster.
2) Inability of designated leaders to cope: Leaders may struggle to effectively navigate and manage the traumatic conditions they are not accustomed to.
3) Reduced effectiveness of subordinates: Subordinates may experience decreased effectiveness due to various crisis-related factors.
4) Lack of information and inadequate facilities: Leaders may face challenges in accessing timely and accurate information to make informed decisions. Inadequate facilities for presenting information to leaders and decision-makers can also hinder effective decision-making.
5) Communication disruptions: Disruptions in communication systems can inhibit leaders' ability to consult with key individuals, as well as convey instructions in a rapid and clear manner.
6) Severity of post-impact conditions: The severity of conditions following the disaster can make it difficult for leaders to determine appropriate courses of action and establish priorities.
7) Loss or delayed availability of resources: Leaders may face challenges due to the loss or delayed availability of essential resources, such as personnel, equipment, transportation, and relief supplies.

5. Results and discussion

Cianjur earthquake was part of the West Java earthquake on September 2, 2009, at 14.55 WIB. Cianjur region is crossed by the Cimandiri Fault segment of the Rajamandala which has a left-lateral strike-slip fault mechanism, making this area prone to earthquake hazards (Supendi et al., 2022). This earthquake is classified as a shallow crustal tectonic earthquake caused by active land-based fault shifting activity. This type of earthquake is included in mainshock-aftershocks where there is a main earthquake and after that it is followed by more aftershocks. The effect caused by the earthquake was quite large, even though it was not classified as a very strong earthquake, its shallow depth resulted in strong shaking, causing this area to be destroyed (Bahri, 2022). This earthquake has resulted in more than 79 people are declared missing. The effects of the earthquake vibrations could be felt in areas around Bandung, Sukabumi, Tasikmalaya and Jakarta. Earthquake location of 7.778°S and 107.328°E. There were 10 victims from Cianjur Regency, West Java, who died, 21 were injured, 45 were missing, and 17,555 were displaced (Meilano et al., 2016).

On 21 November 2022, there was another earthquake in Cianjur Regency, West Java, which was more intense and felt in a number of surrounding areas. The earthquake resulted in approximately 600 people died, 58 thousand houses were damaged, around 114,683 residents were evacuating, and thousands were injured (Azis, 2022). As a result of the earthquake in Cianjur, it is difficult for the community

to meet their daily needs for clean water because there is a shortage of water sources for the needs of the people in the area (BPBD Bogor, 2022). Affected residents evacuated at 110 points spread across 15 sub-districts, thus requiring a strategy of extra manpower and strength in logistics distribution (Taufiqurrahman, 2022).

Communication network breakdown, difficult transportation access, and main road access closed due to aftershocks (CNBC Indonesia, 2022). Another consequence of the Cianjur earthquake was the collapse of school buildings which were no longer suitable but were still used for teaching and learning activities, making them dangerous for school children (Homsy et al., 2019; Pancawati, 2022). The earthquake that occurred in Cianjur Regency had a major impact on almost all aspects of human life such as social, economic, psychological, trade, educational aspects which required comprehensive handling so that the settlement of the impact of the earthquake could also be completed. Within the framework of these problems, earthquake disaster management must be considered in a long-term perspective because the occurrence of earthquakes is difficult to anticipate and predict with certainty.

The 2020–2024 National Agency for Disaster Management (BNPB) Strategy is directed at Strengthening Disaster Systems, Regulations and Management and National Priority Projects, Integration of Policy Cooperation and Disaster Risk-Based Spatial Planning. The 2020–2024 BNPB policy directions and strategies are implemented in line with the 2020–2024 National Medium-Term Development Plan (RPJMN). The 2020–2024 BNPB policy directions are as follows:

1) Improving reliable, innovative, collaborative, and implementable Disaster Management systems and strategies.
2) Increased preparedness of the government/regional government, business institutions, communities, universities and coordinated media in dealing with disasters.
3) Improving disaster emergency services that are fast, precise, effective, and coordinated.
4) Improving post-disaster rehabilitation and reconstruction assistance services to support the attainment of quality life and livelihoods of people in disaster-affected areas.
5) Provision of logistics and equipment for disaster management and network development per minimum requirements standards and regional characteristics.
6) Strengthening professional and inclusive governance of disaster governance.

In achieving BNPB performance accountability, the strategic objectives that have been determined in **Table 1** are:

Table 1. Strategic target of disaster management.

Number	Strategic target
Strategic target 1	Reducing disaster risk in disaster prone areas
Strategic target 2	Save as many lives as possible during disaster emergencies
Strategic target 3	Recovery of better, safer and sustainable lives and livelihoods in post-disaster areas
Strategic target 4	Improving the quality of professional, accountable and transparent disaster governance

Source: BNPB performance report 2021.

5.1. Collaboration in disaster governance

The government and all stakeholders have an important role in disaster mitigation efforts (Homsy et al., 2019; Muksin et al., 2023; Smucker et al., 2020). It is mandated in Law Number 24 of 2007 Article 5, that "The Central Government and Regional Governments are responsible for implementing disaster management". This article clearly shows that disaster management is not only handled by regional governments, but the central government must also be responsible for dealing with these disasters. The role of the central government is also very important when local governments lack funds to deal with the aftermath of the disaster. Disaster governance is an activity that is the responsibility of the government both before, during and after a disaster occurs.

Earthquakes provide important lessons for all parties, but the party most responsible for handling disasters in their area is the government, both the central government and local governments. The main concern is with the government and local government, there needs to be an effort to understand that the area has the potential for an earthquake. Spatial planning and development rules that are carried out in each area must be adjusted to the geological structure and the distance from the earthquake source. In addition, the community must also be literate and knowledgeable that they live in earthquake-prone areas so that mitigation can be carried out.

As a result of the earthquake, it is necessary to meet the adequate needs of the people affected by the earthquake. Lack of food and poor housing have an impact on the daily life of victims who experience disasters so that it can affect the fulfillment of the needs of disaster victims. Meanwhile, the condition of infrastructure and health facilities damaged by the earthquake hampered the provision of community services in the health sector due to several obstacles in facing earthquake survivors. Collaboration between agencies involved in handling the earthquake disaster is very important to fulfill equitable fulfillment of community needs where the percentage is only 53 percent and there is no scrambling among residents affected by the disaster when aid arrives for fear of not getting it (Bahri, 2022). In broad terms, there is a need for greater communication and consistency among disaster risk reduction, adaptive governance, and sustainable development to prevent redundant work and establish more comprehensive and specific frameworks for enhancing resilience (Walch, 2019).

Collaboration from various parties in terms of voluntary assistance that is carried out by volunteers from higher education institutions requires attention. Supporting factors in volunteering activities are apart from community participation so that the implementation of volunteer programs to help with disaster management also involves good cooperation between various parties. There is also a need for collaboration between study programs from universities and also from institutions with authority for disaster management. The volunteer team needs adequate information so that the implementation of aid does not violate disaster management (Abdurrasyid et al., 2023; Garavaglia et al., 2021).

Particularly in handling disaster relief, it is necessary to organize optimal aid logistics. The purpose of organizing logistics is to ensure that the management of aid in the logistics warehouse is well maintained and that there are no problems during the distribution process (Murtado and Yani, 2023). Logistical arrangements that

earthquake relief volunteers have provided require good collaboration between various parties.

The form of assistance to the community as victims of the Cianjur earthquake in a collaborative manner is through increasing the capacity of community business groups so that they are able to restore and improve the economy, income and welfare of the people in the areas affected by the earthquake in Cianjur. Assistance in the form of cooking utensils is useful for increasing social ties between communities, togetherness, helping each other, especially when dealing with disasters which can save expenses and will create a more stable social bond (Mahanani, 2022). Collaborative assistance for disaster victims was carried out by Universitas Persada Indonesia (UPI YAI) with funding incentives from the Ministry of Education and Culture and collaboration with Suryakencana University, Cianjur.

Coordination from various parties in the context of collaborative disaster management is very important, especially in terms of distribution of donations. If coordination is not optimally carried out with volunteers in the field, it will cause several obstacles such as ignorance of the number of victims, the needs of victims and aid stocks that are considered to be overloaded. Assistance provided without coordination with volunteers in the field, both from the Regional Disaster Management Agency (BPBD) and volunteers from community organizations, will be uneven and may create social jealousy for disaster victims (Hadi et al., 2022).

Leadership support in the context of coordinating various assistance from various parties is useful in channeling Corporate Social Responsibility (CSR) which is carried out especially by companies. The assistance provided by under CSR in the form of food and logistics gives an opportunity to speed up the recovery period for disaster victims both physically and spiritually. Support for providing CSR assistance to community empowerment in Cianjur can be in the form of moral support, food support, and financial assistance (Alhamid and Mutaqi, 2023).

Natural disasters such as the earthquake in Cianjur frequently confuses data and information on victims and damage. In conditions like this, it is necessary to have an institution that becomes a disaster emergency command center according to the location and level of the disaster. The establishment of the unit will certainly make it easier to make emergency management policies. Collaboration from various parties or institutions aimed at helping the victims of the disaster can be coordinated so that they support one another. The distribution of aid and services can be faster, more equitable, and can be properly monitored so that progress on the results of disaster emergency response activities can be measured objectively (Warsono and Buchori, 2019).

5.2. Leadership in disaster governance

Extensive research over the years has demonstrated that disaster response is a complex process involving extensive networks of diverse public, private, and nonprofit organizations. These networks can consist of numerous nonprofit entities, often numbering in the thousands, that play a crucial role in providing essential resources, including leadership, during disaster responses (Alam and Ray-Bennett, 2021; Pratama and Nurmandi, 2020; Trainor and Velotti, 2013). Leaders in the regions,

especially regional heads, need to conduct socialization on earthquake disasters which can be carried out with the following activities (Zakaria et al., 2011):

1) Counseling to the community using the PRA (Participation Rural Appraisal) method by involving rural communities so they can participate. This method is used to study the active role of the community and local government.
2) Counseling about planning in regional development or regional expansion, which will eventually make an area develop with various public facilities, housing, and government offices. This counseling is especially for developers and related government officials.
3) Printing of brochures, posters, comic books regarding earthquake-prone areas, actions that must be taken immediately if there is an earthquake, and mitigation preparations.
4) Teaching to student teachers from kindergarten to elementary school, accompanied by an earthquake disaster simulation.
5) Seminars on the earthquake and tsunami aimed at junior and senior high school students, college students and the general public.
6) Seminars on earthquakes and tsunamis (especially in coastal areas) aimed at government officials, regional governments and disaster management agencies in the regions.

In addition, it is necessary to consider the role of local leaders in dealing with problems in their area. Traditional leaders serve as custodians of indigenous knowledge and their recognition is essential in order to validate any knowledge claimed to be indigenous (Zamisa and Mutereko, 2019).

Accurate information, especially spatial data regarding the condition of areas potentially or affected by earthquakes as well as anticipation and preparedness for disasters can reduce losses and can estimate the risks that may arise as a result of disasters. It is necessary to know the availability of community social and economic data prior to the occurrence of a disaster. In addition, it is necessary to map and analyze the risk of earthquake disasters in Cianjur Regency so that this will support decision-making regarding the condition of people who are in disaster-prone areas (Alam and Ray-Bennett, 2021; Kusmajaya and Wulandari, 2019a).

Making the right decisions made by a leader in crisis situations and disaster conditions can reduce the level of losses and restore the socio-economic conditions of the people affected by the disaster. If the role of the leader is not maximized then chaos can occur after a disaster occurs as stated by Walch (2019), due to the absence of leadership and direction from the state government in the aftermath of the 1999 cyclone, the relief and rehabilitation endeavors were often characterized by disorder and confusion.

The task of a leader in dealing with an earthquake disaster is to provide calm and comfort to the community after the disaster and to encourage the community not to be influenced by issues whose truth is unclear. On the other hand, leaders are responsible for checking and ensuring that the houses affected by the earthquake are safe and habitable before being reused by the residents (Supendi et al., 2022).

Decision makers need to pay attention to the disaster management cycle which consists of three phases (Suara et al., 2023), namely the pre-disaster phase, the phase when a disaster occurs, and the post-disaster phase.

1) Pre-disaster phase. This phase includes prevention, mitigation, early warning and preparedness activities. In this aspect, all efforts are made by various parties related to disasters so that disaster victims can be minimized and the risk of disasters can be reduced as low as possible.
2) The phase when the disaster occurred. In this phase the activities carried out are disaster emergency response where the goal is "save more lives". Disaster emergency response activities include search or search and rescue (SAR), emergency assistance and evacuation of victims and those affected.
3) Post-disaster phase. The post-disaster phase includes providing assistance, rehabilitation, and overlapping reconstruction. Recovery activities are carried out to rehabilitate and rebuild (reconstruct) people's livelihoods to make them better.

5.3. The cascading effect of earthquakes

The critical problem with earthquakes is that they can potentially cause significant losses. They are natural events that cannot be calculated and predicted accurately, both when and where they occur, and their magnitude and earthquakes cannot be prevented (Daniell et al., 2017). Because it cannot be prevented or predicted accurately, the usual efforts are to avoid areas with faults and the possibility of tsunamis and landslides, and civil buildings must be planned and built to be earthquake resistant.

Even though Cianjur, as the district capital, has a low and medium level of danger, because the condition of the area tends to be congested, the risk level in the area is high (Kusmajaya & Wulandari, 2019b). Local governments need to assess potential problems and risks that may occur by implementing appropriate policies and strategies so that they can minimize losses caused by the earthquake.

The earthquake that hit Cianjur caused subsequent disasters, such as landslides and the collapse of residential buildings (Ramdani et al., 2023). The earthquake caused severe damage to buildings and infrastructure in the area and several injuries and fatalities. In addition, the earthquake resulted in significant land deformation in the area, with land lifting and land subsidence occurring. Various damage occurred due to the devastating earthquake that hit Cianjur, resulting in at least 321 deaths, damage to 47,000 buildings, and economic losses of up to 7.7 trillion Rupiah (~US $546 million). There was likely a slip on the conjugate fault (Supendi et al., 2023).

Compared with the Cianjur earthquake, the earthquake that occurred in Palu-Donggala showed extensive earthquake environmental impacts (EEEs) around the Palu-Donggala area, Central Sulawesi, Indonesia. The earthquake's impact included a tsunami, coastal landslides, liquefaction, ground cracks and more than 7300 landslides in hilly areas (Naik et al., 2023). The earthquake in Padang in 2009 resulted in landslides and power outages. The earthquake caused casualties in several villages in the interior of Pariaman Padang because they were buried by landslides (Bothara et al., 2010).

6. Conclusion and future prospect

The earthquake in Cianjur, West Java Province is one of the major natural disasters that has occurred in Indonesia. In accordance with BNPB's 2020–2024

strategy, one of the policies pursued is aimed at strengthening professionalism in managing disasters which Pratama and Nurmandi (2020) the findings suggest that collaborative governance plays a significant role in disaster management, particularly in terms of providing mandates and facilitating information sharing. Therefore, it is very important in enhancing the role of leadership and collaboration in effective disaster governance. By emphasizing collaboration and leadership, current governance systems are more likely to reorganize their structures to position themselves for resilience (Asadzadeh et al., 2023).

An important aspect of disaster management is the need for collaboration between related parties so that good coordination and cooperation can be established, reducing community conflict and injustice. Committed political leadership is an important factor in implementing adaptive government. Adaptive government is a model that prioritizes the interests of society by providing a quick response to changes that occur (Walch, 2019). Various problems in the field regarding disaster mitigation both before, during and after the disaster need to be addressed by leaders and decision makers so that it will reduce the impact caused by the disaster.

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