

## Research Article

# Pentahelix Collaboration Management in Natural Disaster Mitigation in West Sulawesi Province

Fadlan\*, Muhammad Akmal Ibrahim, Muhammad Yunus, and Gita Susanti

Department of Public Administration, Hasanuddin University, Indonesia

## Abstract.

Prevention and management of natural disasters cannot be done by one party alone, it requires the participation of all parties. Indonesian society needs to work together to collaborate with each other. This concept is called pentahelix or multi-stakeholder collaboration. Pentahelix combines government, community, media, academia, and business as an effort to address problems and develop programs by involving cross-sectors to share roles. To achieve this goal, policies and frameworks are needed that involve all parties in building a disaster-safe culture in West Sulawesi Province.

The purpose of this research is to examine existing collaboration in disaster mitigation management in West Sulawesi Province by considering how elements of the disaster Pentahelix are involved. The pentahelix collaboration theory, according to Schottle, Haghsheeno, and Gehbauer, divides several factors that influence collaboration into communication, commitment, and information exchange. This research used a descriptive qualitative approach and collected data through interviews, observations, and document reviews.

The researcher conducted direct interviews with 10 people who were considered to be able to provide information about the implementation of pentahelix collaboration. The informants in this study represent each element of pentahelix, namely government, business, academia, community, and media.

**Keywords:** management, collaboration, pentahelix, disaster, West Sulawesi Province

## 1. Introduction

Disasters are events or series of events that threaten and disrupt people's lives and livelihoods caused by natural, non-natural or human factors. These events can cause loss of life, environmental damage, property loss, and psychological consequences. Many natural disasters occur in various parts of Indonesia, with various types and frequencies. Natural disasters cause direct and indirect losses, including loss of life, damage or loss of property, damage to infrastructure, damage to the environment, and trauma for survivors. Natural disasters can be categorized into two types: those caused by nature, such as earthquakes, volcanic eruptions, tsunamis, and wind; and those caused by humans, such as slope cutting, logging, forest burning, littering, oil

Corresponding Author: Fadlan;  
email: fadlansaeni10@gmail.com

**Published:** 2 September 2025

Publishing services provided by  
Knowledge E

© Fadlan et al. This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

Selection and Peer-review under the responsibility of the 2nd Doctoral International Conference Committee.



drilling, and many more. Other disasters are caused by conflicts in human relationships or activities with each other, such as disputes between tribes or groups [1].

All parts of Indonesia have a tropical climate, with two seasons: hot and rainy. Weather, temperature and wind direction can change rapidly. These climatic conditions, combined with a physically and chemically diverse surface topography and rocks, produce fertile soil conditions. Conversely, these conditions can lead to hydrometeorological disasters such as floods, landslides, forest fires and droughts. Environmental degradation tends to worsen with time and increased human activity. This triggers an increase in the number and intensity of hydrometeorological disasters (floods, landslides and droughts) that occur one after another in many regions in Indonesia.

On the other hand, the pace of development has increased people's access to science and technology. However, due to inaccurate technology application policies, there are often fatal technological failures such as transportation and industrial accidents and the occurrence of disease outbreaks due to higher human mobilization. Another potential disaster that is no less serious is the demographic diversity in Indonesia. Indonesia's population in 2004 reached 220 million people consisting of various ethnicities, groups, religions and customs. This diversity is the wealth of Indonesia that no other nation has. However, because high population growth is not matched by equitable and adequate economic, social and infrastructure policies and development, there are gaps in some aspects and sometimes social jealousy arises. This condition has the potential to cause conflicts in society that can develop into national disasters.

Natural disasters are a phenomenon that cannot be denied or eliminated. This is no exception in the country whose natural conditions are prone to disasters, including West Sulawesi Province. As explained in Law Number 27 of 2007 concerning Disaster Management that the territory of the Unitary State of the Republic of Indonesia has geographical, biological, hydrological and demographic conditions that allow disasters to occur, both caused by natural factors, non-natural factors, and human factors that cause human casualties, environmental damage, property losses, and psychological impacts which in certain circumstances can hamper national development.

Badan Nasional Penanggulangan Bencana (BNPB) Republik Indonesia was released the latest data related to disaster events in Indonesia during 2024. From the data released, there were 624 disaster events with floods as the most dominating event. Based on data from the Data and Information Center of the Badan Penanggulangan Bencana Daerah (BPBD) of West Sulawesi Province, during the period January to

April 2024, 11 disaster events were recorded. Floods were the most frequent with five incidents, followed by landslides, strong winds and residential fires. Unstable climate and weather conditions in West Sulawesi are the main causes of frequent floods. Other influencing factors are the geographical conditions that tend to be hilly and the geological conditions of the West Sulawesi region.

Facing this situation, the West Sulawesi Provincial Government through the Regional Disaster Management Agency continues to make preventive efforts through structural and non-structural disaster mitigation efforts to the community and this is very important. The government and the community are expected to increase awareness of disaster risks and the importance of following established disaster management procedures. West Sulawesi Province is the province with the highest disaster risk index in Indonesia based on the National Disaster Management Agency (BNPB) (Figure 1) disaster risk assessment. West Sulawesi has a disaster risk value in Indonesia with a score of 164.85. This was assessed by BNPB by calculating the components of hazard, vulnerability and capacity in each province and regency/city in Indonesia. Of the six regencies in West Sulawesi Province, five are considered high risk and one is medium risk.

BNPB and BPBD West Sulawesi continue to urge the public to always be vigilant and ready to face disasters by following established disaster management procedures. In addition, disaster prevention and mitigation efforts also need to be improved to reduce the risk of future disasters. Nevertheless, the symptoms of natural disasters can certainly be recognized. Anticipatory steps can also be taken as a form of preventive effort. The recognition of the signs of natural disasters is the result of people's observations, experiences and studies of the phenomena that occur. This then creates a habit in the community in understanding pre-disaster symptoms. Some people in disaster-prone areas are familiar with sophisticated technology that functions to recognize pre-disaster symptoms.

Thus, good disaster mitigation management is needed to minimize the negative excesses arising from disasters. The main agency responsible for disaster mitigation is the National Disaster Management Agency (BNPB), a non-ministerial government agency headed by a ministerial-level official. The agency is tasked with formulating and setting disaster mitigation policies as well as dealing promptly with refugees in an effective and efficient manner.

Nevertheless, the symptoms of natural disasters can certainly be recognized. Anticipatory steps can also be taken as a form of preventive effort. The recognition of the signs



**Figure 1:** Disaster Risk Index of West Sulawesi Province Year 2015-2023. Source : <https://inarisk.bnpb.go.id/IRBI-2023>

of natural disasters is the result of people's observations, experiences and studies of the phenomena that occur. This then creates a habit in the community in understanding pre-disaster symptoms. Some people in disaster-prone areas are familiar with sophisticated technology that functions to recognize pre-disaster symptoms.

Thus, good disaster mitigation management is needed to minimize the negative excesses arising from disasters. The main agency responsible for disaster mitigation is the National Disaster Management Agency (BNPB), a non-ministerial government agency headed by a ministerial-level official. The agency is tasked with formulating and setting disaster mitigation policies as well as dealing promptly with refugees in an effective and efficient manner.

Disaster management by the government to reduce the risk of the impact of natural disasters has been regulated, which has brought about a paradigm shift in disaster management in Indonesia. The paradigm that used to be more responsive or emergency response in dealing with disasters is now transformed into a preventive activity, so that the risks can be minimized (mitigation) through Collaborative Governance.

Collaborative governance is an arrangement in government that involves non-state (community, private, NGO) in the process of making and implementing public policies [2]. This paradigm makes the implementation of programs carried out by the Government truly in accordance with the wishes and expectations of the community, thus the benefits are in accordance with the expectations of the community [3]. Collaborative governance emphasizes mutual agreement.

Collaborative Governance in the process stakeholders sit together and make decisions as a collective agreement to be implemented. To achieve this requires participation, equality among stakeholders, and competence to be able to discuss. If a society

is developed and has maturity in democracy, this is an easy thing to do. However, it cannot be denied that if the community has a low level of participation, inequality and low competence and has a background of feudalism, then the collaborative will be difficult to implement, but it does not rule out the possibility that the collaborative will run with certain leadership roles [2].

Based on the results of research conducted by [4] which examines Collaborative Governance in natural resource management, here the researcher concludes that it is very important to maintain the quality of collaboration in the decision-making process especially regarding public orientation. Then research conducted [5], in this study saw that collaboration is needed to deal with the problem of poverty and poor women in Nepal, here it is necessary to have direct involvement from poor people in decision making about forest management in Nepal.

Collaborative Governance is a model that brings together public and private stakeholders in a collective forum with public institutions to engage in consensus-based decision making. In other words, Collaborative Governance is a controlling arrangement in which one or more public institutions and non-state stakeholders are directly involved in a formal, consensus-oriented, deliberative collective decision-making process and aim to make or implement public policies, manage public programs or assets [2].

In handling, managing and organizing a public problem, it is very necessary to involve other non-governmental institutions or institutions including local non-governmental organizations or customary institutions and indigenous communities that live in the midst of society because public problems are not sufficient to be handled only by units of government institutions either integrated or related.

Collaborative Governance is a model that is able to accommodate the various interests of stakeholders and non-governmental organizations so that in practice it is widely used to resolve disputes between stakeholders, communities, and governments [2]. This collaboration approach is believed to be a bridge to improve disaster mitigation in West Sulawesi Province.

As for the diverse focus of network approaches. Some approaches address complex decision-making or planning, while others address policy implementation processes or public service delivery [6] without detailing and reflecting on the implications of these differences [7]. A one-sided focus on the effectiveness of governance network processes, without regard to the other public values involved and more specifically to the democratic nature of the networks and the accountability issues involved [8].

There have been many network analysis studies conducted by previous scholars. However, the network approach has ignored substantive aspects of policy issues and debates. Furthermore, no network research has attempted to use analytical methods and analytical steps that can be used to bridge the differences between the institutional and interactionist traditions in the network approach.

Then, there are various studies that have explored the potential of the Governance Network with various contexts and different systems of approaches that have been carried out by previous researchers. For example, research conducted [9] used the perspective of governance networks in solving performance auditing problems in practice in Malaysia. Positioning the relationship between governance arrangements (strategy) and network typologies, namely coordinative, cooperative, and collaborative (structure and process). Another study conducted [10] analyzed the problem of the complexity of providing housing for migrants in Central and Eastern Europe in the Netherlands, using the perspective of governance networks through institutional dimensions (vertical, horizontal, and public-private accountability patterns) and strategic dimensions (economic interests, socio-political interests, and status quo interests). Then research [11] Participatory network mapping to investigate the perception of blue economy governance networks and their implications for equality in Bangladesh by mapping who they consider to be the actors involved and how the relationship between these actors.

Collaborative Governance is a model that is able to accommodate the various interests of stakeholders and non-governmental organizations so that in practice it is widely used to resolve disputes between stakeholders, communities, and governments [2]. This collaborative approach is believed to be a bridge to improve disaster mitigation in West Sulawesi Province.

Thus, by presenting the steps and methods of analysis related to Disaster Mitigation in West Sulawesi Province, this research will later help map the complexity of the problems that occur and produce a design or network map that will provide important information, such as who are the stakeholders involved, their perceptions and positions, what kind of interaction process takes place, and how the Collaborative Governance structure is built. The existence of the network map can be used by stakeholders involved in joint efforts to deal with disaster mitigation issues in West Sulawesi Province more effectively.

Based on the description of empirical facts and research sections that have not been studied before, the purpose of this research is to fill the shortcomings of previous research. In addition, this research also aims to explore the Collaborative Governance

study approach in Disaster Mitigation in West Sulawesi Province, which has never been studied before. Another goal is that this research is expected to contribute, both theoretically and methodologically as well as practically by presenting steps and methods of analysis regarding Collaborative Governance in Disaster Mitigation in West Sulawesi Province. This research then raises several research topics is how is Collaborative Governance in Disaster Mitigation in West Sulawesi Province and what are the problems that arise related to the stakeholders involved in Collaborative Governance in Disaster Mitigation in West Sulawesi Province, by looking at the role of each stakeholder and what are the substantive, strategic and institutional complexities in analyzing the stakeholders involved in Collaborative Governance in Disaster Mitigation in West Sulawesi Province, by looking at the role of each stakeholder.

## 2. Material and Methods

### 2.1. The concept of Collaborative Governance

Collaborative governance is a type of governance that involves stakeholders outside the government or state directly. This type of governance focuses on agreement and deliberation in a joint decision-making process with the aim of making or implementing public policies and public programs [2].

Public policies and issues are the focus of governance cooperation. Public institutions are highly influential in creating policies, goals and how best to work with stakeholders. Social justice is necessary for collaborative governance in the public interest. According to [2], collaborative governance is a set of procedures in which one or more public institutions engage “non-state” Stakeholders directly in a formal, consensus-oriented, deliberative policy-making process aimed at making or implementing public policies or managing public programs or assets.

Collaborative governance as a system that manages relationships beyond formal and informal organizational boundaries with clear organizational commitments and definitions of success. Furthermore [12], Agrawal and Lemos define collaborative governance [13]. They state that collaborative governance is not only limited to government and non-government stakeholders, but also consists of “multi-partner governance” that includes the private sector, public, community, and civil society. Collaborative governance is based on role synergy and “hybrid” plan-making, such as public-native cooperation.

Collaborative governance as a collective and egalitarian process in which each participant has the authority to make decisions and each stakeholder has an equal opportunity to reflect their wishes throughout the process. Bovaird defines public-private partnerships simply as work arrangements based on mutual commitments stipulated in any contract between organizations in the public sector and organizations outside the public sector [14]. Bovaird's definition clearly indicates that partnerships involve a type of cooperation that is more than just a cooperation contract. The cooperation described in the concept of partnership is the type of cooperation defined in the concept of partnership [14].

In contrast to other forms of cooperation, such as privatization, outsourcing, and employment contracts, partnerships between the government and the private sector are different. This type of cooperation is more similar to cooperation between business and government to solve the problems of one party than to solve the common problems of both parties.

The government collaborates with institutions outside the government in several arenas. These include collaboration between (internal) government institutions, collaboration between government institutions and business institutions, and collaboration between government and civil society institutions. The last area of partnership includes collaboration between government and local agencies, institutions, and work units as well as with external parties to solve problems. Therefore, both the government and local governments have resources, namely various organizations that focus on areas related to people's lives. These areas include health, education, public peace, and community protection, of which disaster management is one.

As per the research collected by the Researcher, the philosophy of collaboration between government agencies and business agencies was developed before partnerships between government agencies and community agencies. It is often considered that business institutions have better traditions and principles in terms of efficiency and innovation than government institutions. When businesses have a "positive image", governments often consider working with them. The partnership between the two not only serves as a policy instrument to improve government efficiency and responsiveness, but is also often used as a political symbol to show the government's concern for improving the efficiency of public service delivery and public protection.



## 2.2. Pentahelix Collaboration Concept

This concept is based on two previous models, the triple helix theory and the quadra helix theory. In the triple helix theory, there are stakeholders between government (government), business (business) and academia (academia). In the quadra helix theory, there is an additional stakeholder, namely civil society, and the pentahelix stakeholders are refined to 5 (five), that is, the potential of mass media is added. The pentahelix model, which involves the government, private sector, academia, civil society and media, in disaster mitigation has a number of shortcomings. One of them is the potential conflict of interest between the various parties involved, which can hinder decision-making and mitigation implementation. In addition, a lack of coordination and communication between parties can lead to duplication of efforts or even misunderstandings.

The following are the shortcomings of the pentahelix model in disaster mitigation:

### 1. Potential Conflict of Interest:

The private sector may focus more on economic benefits than disaster risk mitigation, while the government may emphasize efficiency and cost. Academics may have a more theoretical view, while civil society and the media may have different agendas.

### 2. Lack of Coordination and Communication:

Lack of effective communication and coordination between the government, private sector, academia, civil society and the media can lead to duplication of efforts or even misunderstandings. The absence of clear standard operating procedures (SOPs) for disaster management can also worsen coordination.

### 3. Resource Dependency:

Many regions do not have sufficient budgets to implement comprehensive mitigation measures. Comprehensive mitigation often requires substantial financial support, and not all parties can provide the necessary resources.

### 4. Complacency:

Staff involved in disaster mitigation may become too familiar or comfortable with mitigation exercises, losing their sense of urgency or attention to hazards.

### 5. Lack of Awareness and Education:

Many people still do not understand the importance of disaster mitigation and do not have the awareness to actively participate in mitigation efforts.

### 6. Unplanned Development:

Development that is not planned with disaster risk in mind can exacerbate disaster impacts and make mitigation efforts less effective.

#### 7. Community Attitude and Culture

Community attitudes and culture that are insensitive to disaster hazards can be a barrier to mitigation efforts.

To overcome this shortcoming, efforts need to be made to improve coordination, communication and cooperation between parties. Increasing public awareness and education on disaster mitigation is also very important. In addition, there needs to be adequate financial support from the government and private sector to support the implementation of comprehensive mitigation.

### 2.3. Methods

This research uses a qualitative descriptive approach. Qualitative research aims to understand what the subjects or research participants experience, such as behavior, perception, motivation, and actions, among others. Descriptive qualitative research is a method that focuses more on the actual problems that occur. This study will explain how the West Sulawesi Provincial Disaster Management Agency (BPBD) collaborates with Pentahelix elements in the implementation of disaster management in West Sulawesi. Interview transcripts, field notes, photos, and other supporting documents can serve as data sources.

Data collection techniques are the most strategic step in research and are very important. If researchers do not understand data collection methods, they will not obtain data that meets the established data standards. Primary and secondary data are used in this research. Primary data can be obtained through the process of collaborative optimization observation and interviews. The primary data of this research will be assisted and supplemented by secondary data. The informants in this study include the head of the agency, former head of the BPBD agency, Head of the Emergency and Logistics Division, Emergency Sub-Coordinator, academics, community elements, business elements, and elements of print and electronic media. Secondary data includes books, government policies, and newspapers. Qualitative data analysis is conducted interactively and continuously until the data is collected and becomes saturated. The

researcher used the interactive data analysis model [17] is an approach used in qualitative research. This approach allows data analysis to be carried out in an continuous and interactive. Here are the three main steps in this model:

1. Data Condensation

At this stage, the qualitative data that has been collected is simplified and organized. The researcher identifies themes main themes, categorize information, and reduce complexity. Complexity data. Condensation helped to gain an initial understanding of emerging patterns and issues.

2. Presenting the Data (Data Display)

This step involves presenting the data in the form of tables, matrices, diagrams, or narratives. The researcher draws connections between themes, identifying differences and similarities, and visualizing findings. visualize the findings. Data display helps clarify patterns and facilitate interpretation.

3. Conclusion Drawing and Verification)

At this stage, the researcher draws conclusions based on data analysis. Conclusions can be in the form of findings, patterns, or relationships between variables. relationship between variables. Furthermore, researchers verify conclusions by referring to the original data, re-examining findings, and ensuring their validity. This model allows the researcher to be actively involved in the process of analysis process, gain in-depth insights, and ensure the quality of findings. With an interactive approach, data analysis can take place throughout the research, from the field to the final stage

### 3. Results and Discussion

The term collaborative governance refers to a method of government management that directly involves stakeholders outside of the government or state, oriented towards consensus and deliberation in the process of collective decision-making, aimed at creating or implementing public policies and public programs [2].

In collaboration, stakeholder involvement is needed according to the role of each party. Stakeholders are all parties within society, whether individually, as community groups, or as communities, who have relationships and interests in issues or problems within the organization or environment. Stakeholders can be defined as stakeholders or parties with an interest. There are several models of collaborative governance that involve stakeholders, namely: a. Triple Helix, consisting of three stakeholders:

government, business, and academia; b. Quadra Helix, consisting of government, business, academia, and civil society; c. Penta Helix, consisting of government, business, academia, civil society, and mass media.

Communication for the implementation of effective and optimal disaster management is communication that is carried out not only during the emergency response but also during the pre-disaster or preparedness phase and after the disaster or the rehabilitation and reconstruction phase.

These communication activities can be carried out in various forms, such as establishing a media center during the emergency response phase, holding press conferences during the emergency response phase or regular press conferences to explain disaster management policies, conducting disaster socialization for the community even at the elementary school level, using traditional media for communities that are not IT literate, and enhancing local wisdom in the regions.

The issue of communication in disaster management as described by Shaw and Gupta [15]. Shaw and Gupta focus more on highlighting the aspect of communication, but there are actually more implications when we connect the communication management cycle with the aspect of communication, namely the dimension of information transfer or the clarity of the message conveyed, then the establishment of coordination with feedback responses, and how the environment can collaborate in that communication process. The stage before a disaster occurs, the communication aspect will encompass accurate information, coordination, and cooperation, especially towards communities vulnerable to disaster events [15].

The results of this study indicate that, in general, the aspect of communication still has deficiencies in terms of information delivery because communication in disaster management is very much needed during a disaster situation, from pre-disaster, during the disaster, and post-disaster. Communication is the best way to achieve success in the disaster management process, such as disaster mitigation, preparedness, response, and recovery during a disaster. The ability to communicate various messages about disasters to the public, including the government, media, and society, can reduce disaster risks, save lives, and mitigate the impact of such disasters.

The disaster management process in Indonesia involves several stakeholders, including the government, the community, the media, and the private sector. These parties have their respective roles in disaster management, particularly the media as the conveyer of information from disaster locations to the public. In addition, communication

becomes a very important element in the process, so disaster communication can be made a disaster management system in Indonesia in general and West Sulawesi Province in particular.

Disaster management is a very comprehensive and multi-dimensional discussion. Addressing disasters, which are increasing in frequency every year, requires that disaster management be understood and implemented by all parties so that these disasters become a collective responsibility that needs commitment from every element of the Disaster Pentahelix.

Commitment is a preventive, mitigation, preparedness, and disaster risk reduction effort, as well as strengthening law enforcement, which essentially involves all related parties. In this study, there are 3 (three) elements that need to be considered regarding Commitment in the disaster management sector, namely the Interconnection between each element related to disasters, Motivation in disaster response implementation, and lastly, Actions taken during emergencies.

The research results show that the commitment from each element of the Pentahelix is already present, but there is still a slight visible sectoral ego. The Head of the West Sulawesi BPBD acknowledged this, stating that in carrying out humanitarian tasks, especially those related to disaster management, the ego of each element is set aside to achieve integration in disaster handling.

Disaster management is not done individually. Coordination with many parties is needed to avoid mistakes in handling it. commitment plays an important role in disaster management in West Sulawesi, thereby creating communication links among stakeholders.

Disaster management must be supported by various approaches, both soft power and hard power, to reduce the risk of disasters. The soft power approach is to prepare community readiness through socialization and information exchange about disasters. Meanwhile, hard power is the effort to face disasters through physical construction such as building communication facilities, constructing embankments, erecting concrete walls, dredging rivers, etc. In the law, these two things are referred to as disaster mitigation. In these two approaches, disaster communication is greatly needed.

In this study, it shows that the process of information exchange has been running well even though there are still differences in data among the stakeholders involved in disaster information dissemination. However, all the parties involved contribute to

disaster management, providing important inputs and mutually supporting each other in terms of ideas or material support.

In essence, communication is always present wherever and whenever humans are, including during disasters. Pre-disaster, disaster emergency, or post-disaster all involve communication. However, it is important to understand how the function of communication is present in each condition. In other words, in disaster management, communication can serve as a function of socialization and information dissemination, management and coordination, and counseling and rehabilitation. But it must be remembered, an abundance of information alone is not enough to make citizens aware of the impending disaster. The way information is conveyed must also be done correctly. Mistakes in communicating information can create uncertainty that worsens the situation.

The results showed that in general the communication aspect still has shortcomings in terms of delivering information because disaster communication is needed in disaster situations from pre-disaster, disaster occurs and post-disaster. Communication is the best way that can be done to achieve the success of disaster management processes such as disaster mitigation, preparation, response, and recovery of situations during disasters. The ability to communicate various kinds of messages about disasters to the public, including the government, the media and the community, can reduce disaster risk, save lives and the impact of the disaster.

The disaster management process in Indonesia involves several stakeholders including the government, the community, the business world, academics and the media. These parties have their respective roles in disaster management such as the Government as the Disaster Management Organizer, the Community must play a role in mitigating disasters and reporting if a disaster occurs, the business world as supporting the implementation of disaster management such as providing Corporate Social Responsibility (CSR) assistance to Disaster Victims, Academics play a role such as conducting studies on disaster management and especially the media as conveyors of information from the disaster site to the public. In addition, communication is a very important element in the process, so that disaster communication can be used as a disaster management system in Indonesia in general and West Sulawesi Province in particular.

In the processing of systems, information is ultimately produced; therefore, defining information is necessary to support the successful development of the system to be designed. The general definition of information in an information system according to

[16] is “data that can be processed to be more useful and meaningful for the recipient.” So, information is data that is processed for decision-making or policy-making, both now and in the future.

Communication is the process by which information is conveyed and received between two or more parties. This information can be facts, opinions, ideas or any message. Good communication allows for a smooth and accurate exchange of information, so that all parties clearly understand what is being conveyed. Commitment is a sense of belonging and attachment to something, such as an organization, a goal, or certain values. Commitment encourages individuals to work hard, be dedicated, and remain loyal to something they are committed to.

Effective Communication Builds Commitment, when communication is good, information exchange is smooth and transparent. This creates a stronger sense of trust and attachment, so individuals feel more engaged and have a greater commitment to the organization or cause they are pursuing. Commitment Improves the Quality of Information Exchange: Committed individuals tend to be more involved in the information exchange process. They will be more active in seeking information, sharing knowledge, and participating in discussions, thus improving the quality of information exchange.

Effective Information Exchange Supports Better Communication, Smooth and accurate information exchange is the foundation for effective communication. Clear and easy-to-understand information will facilitate the communication process, so that messages can be conveyed and received properly.

## 4. Conclusion

The Communication Aspect in depicting the Pentahelix collaboration in disaster management in West Sulawesi shows that, in general, the communication aspect still has deficiencies in terms of information delivery. Additionally, in interviews with informants, there was no clarity on valid data sources for accessing disaster information, as disaster communication is indeed crucial during disaster situations, from pre-disaster, during the disaster, to post-disaster.

The Commitment Aspect in illustrating the Pentahelix collaboration in disaster management in West Sulawesi shows that each element of the Pentahelix is already present, but there are still some visible sectoral egos. The Head of the West Sulawesi BPBD acknowledged this, stating that in carrying out humanitarian tasks, especially those

related to disasters, the egos of each element are set aside to achieve an integrated approach in disaster management.

The Aspect of Information Exchange in describing the Pentahelix collaboration in disaster management in West Sulawesi shows that information exchange has been ongoing, although there are still differences in data among the stakeholders involved in conveying disaster information. However, all the involved elements contribute to disaster management, providing important inputs and mutually supporting each other in terms of ideas or material.

The suggestions and recommendations offered to optimize the collaboration of the pentahelix elements in disaster management are for the West Sulawesi BPBD, as the leading disaster sector, to socialize that valid disaster information comes from public organizations that technically handle disasters, thereby minimizing data inaccuracies. To establish a communication forum involving the Pentahelix Disaster Management elements in West Sulawesi, the West Sulawesi BPBD should initiate collaborations among disaster-related parties in an effort to reduce disaster risk. The Pentahelix elements, including the Government, Business Sector, Academics, Community, and Media, should play a more active role in coordinating with one another to produce disaster-responsive policies. Building a multi-hazard early warning system by integrating all existing early warning platforms within ministries or agencies and coordinated by BNPB, Creating a disaster information system that can be widely accessed by the public so that through this media, the public can see real-time updated disaster information.

## Acknowledgements

The author expresses gratitude to the Governor of West Sulawesi Province, the Head of the West Sulawesi Province BPBD, the Chair of the Doctoral Program in Public Administration at the Faculty of Social and Political Sciences, Hasanuddin University, for the support given to the author thus far. And also the Promoter and Co-Promoter of the author's Dissertation and the author's classmates for the encouragement and motivation given all this time.

## References

- [1] Astris S. Pengantar Sosiologi Dan Perubahan Sosial. Bandung: Bina Cipta; 2006.



- [2] Ansell C, Gash A. 2008, *Journal of Public Administration Research & Theory*. Collaborative Governance in Theory and Practice. 2007 Sep;18(4):543–71.
- [3] Cheng, Antony, et al, 2015, Examining the adaptability of collaborative governance associated with publicly managed ecosystems over time: insights from the Front Range Roundtable, Colorado, USA, *Resilience Alliance, Ecology and Society* 20(1): 35 <http://www.ecologyandsociety.org/vol20/iss1/art35/>
- [4] Richie, Lauren, et. All, 2012, *Social process in grizzly bear management: lessons for collaborative governance and natural resource policy*, Springer Science+Business Media, LLC
- [5] McDougall Cynthia L., et. All, 2012 *Engaging women and the poor: adaptive collaborative governance of community forests in Nepal*, Springer Science Business Media Dordrecht.
- [6] Kooiman J. 1993. *Social Political Governance Introduction*, dalam Jan Kooiman, ed, *Modern Governance: New Government-Society Interaction*, SAGE Publication, London
- [7] Huxham C, Siv V. 2006, *Achieving collaborative advantage: understanding the challenge and making it happen*, Q Emerald Group Publishing Limited, VOL. 22 NO. 2 2006, pp. 3-5, ISSN 0258-0543
- [8] Weber EP, et al. *Collaboration Enforcement and Endangered Species; A Framework for Assesing Collaborative Problem Solving Capacity*. *Journal Society and Natural Resources*; 2005.
- [9] O'Brien M. *Review of Collaborative Governance: factors crucial to the internal workings of the collaborative process*. Published by the Ministry for the Environment, Publication Number. CR (East Lansing Mich). 2012;:135.
- [10] Booher DE. *Collaborative governance practices and democracy*. *Natl Civ Rev*. 2004;93(4):32–46.
- [11] Alam A, Hoque MM. *Local level collaborative governance for pandemic responses: unpacking a case in Bangladesh*. *Policy & Governance Review*. 2022;6(3):207–28.
- [12] Bryson JM, Crosby BC, Stone MM. *The design and implementation of cross-sector collaborations: propositions from the Literature*. *Public Adm Rev*. 2006;66(Special Issue):44–55.
- [13] Choi T. 2014, *Revisiting the Relevance of Collaborative Governance to Korean Public Administration*, *The Korean Journal of Policy Studies*, Vol. 29, No. 2 (2014), pp. 21-41. © 2014 by the GSPA, Seoul National University.
- [14] Robertson PJ, Choi T. *Ecological governance: organizing principles for an emerging era*. *Public Adm Rev*. 2010;70 s1:s89–99.

- [15] Budi HH S; HH. Komunikasi bencana: aspek sistem (koordinasi, informasi dan kerjasama). Jurnal Aspikom. 2012;1(4):362–72.
- [16] Bingham LB, O’Leary R. Big Ideas in collaborative management. New York: Sharpe; 2008.
- [17] Miles MB, Huberman AM, Salda na J. Qualitative Data Analysis: A Methods Sourcebook. 3rd ed. Sage Publications; 2014.