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**IMPLEMENTATION OF THE PENTAHHELIX SYNERGY MOVEMENT  
PROGRAM FOR THE OPTIMIZATION OF DISASTER MANAGEMENT  
IN NORTH SUMATRA PROVINCE (A CASE STUDY IN ASAHAN REGENCY)**

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**Abstract**

Asahan Regency is one of the regions in North Sumatra Province that has a relatively high level of disaster vulnerability, particularly hydrometeorological disasters such as floods, tornadoes, and landslides. The complexity of disaster risks requires a disaster management model that does not rely solely on the government but involves various actors in a collaborative manner. In line with the Pentahelix approach developed by Ranga and Etzkowitz (2013) and the concept of collaborative governance by Ansell and Gash (2008), the Government of North Sumatra Province has developed the Pentahelix Synergy Movement Program (SIGAP) as a cross-sectoral collaboration model in disaster management. This study aims to analyze the implementation of the SIGAP Program in Asahan Regency with a focus on collaboration between the local government and the business sector as the main actors in the initial stage of the application of the Pentahelix. This research uses a qualitative method with a descriptive approach through interview, observation, and documentation techniques. The results of the study show that collaboration between the government and the business sector in the SIGAP Program has made a tangible contribution to improving disaster management capacity, particularly in terms of funding, provision of logistics, and the acceleration of emergency response. The local government acts as the coordinator and controller of policy, while the business sector provides support through corporate social responsibility programs and operational partnerships. However, the implementation of SIGAP has not yet been optimal due to weak collaborative institutions, the absence of strong partnership regulations, limitations in the integrated disaster data system, and the low level of structured involvement of academics, communities, and the media.

**Keywords:** SIGAP, Pentahelix, Collaboration, Disaster Management, Asahan Regency

## INTRODUCTION

Asahan Regency is one of the regions in North Sumatra Province that has a relatively high level of disaster vulnerability, particularly hydrometeorological disasters such as floods, tornadoes, and landslides. Geographical conditions, the existence of river basins, and climate change make this area vulnerable to various disaster events that have a direct impact on the social and economic life of the community. Every disaster event not only causes damage to infrastructure and the environment but also reduces community welfare and increases the burden on local governments in providing public services.

In practice, disaster management has so far largely relied on the role of the government as the main actor. However, the increasing complexity and scale of disasters indicate that the government is no longer able to work alone in dealing with various disaster risks. Limitations in budget, human resources, and service coverage require the involvement of other parties outside the government. This condition is in line with the view of Rhodes (1996), who states that modern public governance is carried out through networks of actors (network governance), in which the government becomes one part of the network rather than the sole controller.

This collaborative approach is reinforced by the theory of collaborative governance proposed by Ansell and Gash (2008), which states that public policy will be more effective when it is formulated and implemented jointly by government and non-government actors through processes of dialogue, trust, and shared commitment. In the context of disaster management, the involvement of various parties is crucial because disaster risks and impacts cannot be addressed through a sectoral approach alone.

This cross-sectoral collaboration concept is further emphasized through the Pentahelix approach developed by Ranga and Etzkowitz (2013) as an extension of the Triple Helix model of Etzkowitz and Leydesdorff (1995). The Pentahelix model emphasizes the importance of synergy among five main actors, namely government, business, academia, society, and the media, in addressing complex public problems. In disaster management, each actor has a strategic role: the government as policy maker and coordinator, the business sector as a provider of resources and logistics, academia as a provider of risk studies and innovation, society as the main actor in disaster risk reduction, and the media as a disseminator of information and a driver of public awareness.

In line with this paradigm, the Government of North Sumatra Province has developed the Pentahelix Synergy Movement Program (SIGAP) as a cross-sectoral collaboration model in disaster management. This program is designed to integrate the roles of various Pentahelix actors in all stages of disaster management, namely mitigation, preparedness, emergency response, as well as rehabilitation and reconstruction, as stated by Coppola (2011) and adopted in national policy by BNPB (2020).

The implementation of SIGAP in Asahan Regency is based on the national regulatory framework, particularly Law Number 24 of 2007 on Disaster Management and Government Regulation Number 21 of 2008 on the Implementation of Disaster Management, which emphasize that disaster management is a shared responsibility of the government, the business sector, and society. These regulations provide legitimacy for local governments to build partnerships with non-government actors in disaster risk reduction and disaster response.

Several previous studies also show that cross-sectoral collaboration can improve the effectiveness of public policy. Ansell and Gash (2008) found that the success of collaboration is strongly influenced by communication, facilitative leadership, and trust among actors. Meanwhile, Ranga and Etzkowitz (2013) emphasize that the Pentahelix approach can strengthen innovation capacity and the responsiveness of governments to complex problems. These findings indicate that the involvement of the business sector and non-government actors in disaster management can accelerate emergency response and strengthen post-disaster recovery.

Based on these conditions, this study aims to analyze the implementation of the SIGAP Program in disaster management in Asahan Regency, with a focus on collaboration between the government and the business sector as the two main actors in the initial stage of the application of the Pentahelix. This analysis is expected to provide an overview of the extent to which this collaborative model has been implemented and to identify the factors that influence its success in building a more resilient and sustainable disaster management system.

## **REVIEW OF LITERATURE**

### **Disaster Management**

Disaster management is a series of efforts carried out to reduce disaster risk, handle the impacts that arise, and restore community conditions after a disaster. According to Coppola (2011), disaster management includes four main stages, namely mitigation, preparedness, emergency response, and recovery (rehabilitation and reconstruction). These four stages are interrelated and must be implemented in an integrated manner so that disaster risks and impacts can be minimized.

In the Indonesian context, this concept is adopted in Law Number 24 of 2007 on Disaster Management, which states that disaster management is a shared responsibility of the government, regional governments, the business sector, and society. This shows that the state has normatively recognized the importance of the involvement of non-government actors in the disaster management system.

BNPB (2020) also emphasizes that modern disaster management must be oriented toward disaster risk reduction and not merely toward emergency response, thus requiring cross-sectoral collaboration in the planning, financing, and implementation of disaster-related activities.

### **The Pentahelix Concept**

The Pentahelix concept is an extension of the Triple Helix model introduced by Etzkowitz and Leydesdorff (1995), which initially involved three main actors, namely the government, the business sector, and academia. This model was later expanded into the Quadruple Helix by including society and eventually evolved into the Pentahelix by adding the role of the media as an important actor in the system of development and public policy.

According to Ranga and Etzkowitz (2013), the Pentahelix model places five actors—government, business, academia, society, and the media—as strategic partners who interact with each other in addressing complex public problems. Each actor has different resources and roles, but they must be synergized to produce effective and sustainable policies.

In the context of disaster management, the Pentahelix approach enables the integration of the government's regulatory power, the financial and logistical capacity of the business sector, the expertise of academia in risk assessment, community participation in disaster risk reduction, and the role of the media in information dissemination and early warning.

### **The Concept of Collaborative Governance**

The concept of collaborative governance was systematically formulated by Ansell and Gash (2008). They define collaborative governance as a process of public decision-making that involves government and non-government actors working together in formal forums and oriented toward consensus to formulate and implement public policy.

According to Ansell and Gash (2008), the success of collaboration is influenced by several key factors, namely intensive communication, facilitative leadership, trust among actors, and commitment to shared goals. In the context of disaster management, collaborative governance enables more effective coordination among various parties in situations that are emergency-based and uncertain.

This approach is also in line with the theory of network governance proposed by Rhodes (1996), which states that modern governments operate within networks of interdependent actors rather than as single controllers of policy.

### **Policy Implementation Theory**

The policy implementation theory used in this study refers to the model proposed by Van Meter and Van Horn (1975). They state that the success of policy implementation is determined by six main variables: policy standards and objectives, resources, inter-organizational communication, the characteristics of implementing agencies, social, economic, and political conditions, and the disposition or attitudes of the implementers.

This model is relevant for analyzing the implementation of the SIGAP Program in Asahan Regency because the program involves various cross-sectoral actors who must work within a coordinated system. The clarity of program objectives, the availability of resources, and the quality of communication between the government and the business sector will greatly determine the success of the Pentahelix collaboration.

## **RESEARCH METHOD**

This study uses a qualitative approach with a descriptive method, which aims to gain an in-depth understanding of how the implementation of the Pentahelix Synergy Movement Program (SIGAP) in disaster management in Asahan Regency is carried out. The qualitative approach was chosen because this research focuses on processes, meanings, and interactions among actors in the collaboration between the local government and the business sector.

The research location was set in Asahan Regency, North Sumatra Province, with the consideration that this region is one of the areas that has implemented the SIGAP Program as a Pentahelix collaboration model in disaster management. The research subjects include parties directly involved in the implementation of SIGAP, particularly officials of the Regional Disaster Management Agency (BPBD) of Asahan Regency and representatives of the business sector involved in disaster management activities.

Data collection techniques were carried out through in-depth interviews, observation, and documentation. Data analysis was conducted using the interactive analysis

technique as proposed by Miles and Huberman (2014), which includes three main stages, namely data reduction, data display, and conclusion drawing. Data obtained from various sources were first selected and summarized, then presented in the form of narratives and matrices to facilitate understanding, and finally conclusions were drawn based on patterns that emerged from the analysis results. To ensure data validity, this study used triangulation techniques, including both source triangulation and method triangulation.

## **RESULTS AND DISCUSSION**

### **Implementation of the Pentahelix Synergy Movement Program for the Optimization Of Disaster Management In North Sumatra Province**

#### **Implementation of SIGAP Based on Pentahelix Elements**

The implementation of the Pentahelix Synergy Movement Program (SIGAP) in Asahan Regency represents an effort to build a disaster management governance system that involves various development actors. Based on the Pentahelix concept proposed by Ranga and Etzkowitz (2013), the success of collaboration is determined by the synergy among the elements of government, business, academia, society, and the media. The results of the study indicate that the implementation of SIGAP in Asahan Regency has not yet involved all of these elements in a balanced manner. The government and the business sector are the most dominant actors, while community involvement remains limited and unstructured, and the academic and media elements have not yet been systematically integrated into the SIGAP mechanism.

#### **The Role of Government Elements in the Implementation of SIGAP**

Within the framework of collaborative governance, the government plays the role of director, coordinator, and controller of policy implementation (Ansell & Gash, 2008). In Asahan Regency, this role is carried out by the Regional Disaster Management Agency (BPBD) as the leading sector in the implementation of SIGAP.

The results of the study show that SIGAP has been integrated into regional government policies and programs, among others through disaster planning coordination forums and emergency response mechanisms. However, this integration still faces obstacles in the form of the complexity of cross-sectoral coordination and differences in priorities among agencies. The government acknowledges that the regulatory mechanism governing the involvement of the business sector still needs to be improved in order to be more adaptive to field conditions.

#### **The Role of the Business Sector in the Implementation of SIGAP**

In the Pentahelix model, the business sector functions as a provider of resources and as a strategic partner of the government. This role is manifested through financial contributions, logistics, and operational support derived from corporate social responsibility programs.

The results of the study indicate that the business sector faces several constraints, including limited resources, complex cross-party coordination, and challenges in maintaining the continuity of participation so that it does not remain merely incidental. The business sector expects clearer guidelines, program transparency, and joint evaluation mechanisms so that the contributions provided can be more optimal and sustainable.

## **The Role of Community Elements in the Implementation of SIGAP**

In the Pentahelix approach, the community is the main actor in disaster risk reduction because they are the most affected and also the first to respond to disasters. Community participation includes preparedness, incident reporting, and involvement in disaster management activities.

The results of the study show that the community in Asahan Regency has been involved in SIGAP mainly during the emergency response phase, such as in evacuation and aid distribution. However, community participation is still spontaneous and has not yet been organized within a structured SIGAP system, so its role in the mitigation and preparedness stages remains limited.

## **The SIGAP Collaboration Mechanism in the Stages of Disaster Management**

At the pre-disaster stage, collaboration is still limited to socialization and preparedness activities dominated by the government, while the involvement of the business sector and the community has not yet been implemented systematically. During the emergency response stage, collaboration between the government and the business sector becomes more intensive, especially in the provision of logistics and humanitarian assistance. Meanwhile, in the post-disaster stage, cooperation focuses more on basic recovery, and the strengthening of post-disaster mechanisms becomes important so that SIGAP does not only stop at emergency response but is also able to promote community resilience and the sustainability of regional development.

## **Supporting And Inhibiting Factors In The Implementation Of Sigap**

### **Supporting Factors**

Several factors that support the implementation of SIGAP in Asahan Regency include the commitment and active role of the local government, the availability of the business sector to participate, as well as communication and trust among actors. These factors encourage the establishment of cooperation between the government and the business sector in emergency situations.

As a result, SIGAP has been able to improve regional emergency response capacity, particularly in terms of the speed of aid distribution and the availability of logistics.

### **Inhibiting Factors**

The inhibiting factors in the implementation of SIGAP include limitations in regulations and collaborative institutions, the complexity of cross-sectoral coordination, limited resources, and the sustainability of participation. These obstacles cause collaboration to not yet operate optimally and to remain dependent on the initiatives of each actor.

## **CONCLUSION**

The implementation of the Pentahelix Synergy Movement Program (SIGAP) in disaster management in Asahan Regency shows that a collaborative approach between the government and non-government actors has begun to be established, particularly through partnerships between the local government and the business sector. The government, through the Regional Disaster Management Agency (BPBD) of Asahan Regency, acts as the main coordinator in the planning, control, and implementation of disaster management activities, while the business sector contributes through financial support, logistics, and operational assistance that strengthen the region's emergency response capacity.

However, the application of SIGAP as a Pentahelix model has not yet been fully implemented because the involvement of academia, the community, and the media remains limited and has not been integrated into a structured collaborative system. Cooperation mechanisms are also still situational and more prominent at the emergency response stage, while collaboration in the pre-disaster and post-disaster stages has not yet developed optimally.

The main supporting factors for the implementation of SIGAP in Asahan Regency include the commitment of the local government, the availability of resources from the business sector, and the high demand from the community for fast and effective disaster response. On the other hand, the inhibiting factors are weak partnership regulations, the lack of strong Pentahelix institutionalization, limitations in disaster data and information systems, and the low involvement of academia and the media. Therefore, strengthening collaborative governance through regional regulations, joint planning, and the expansion of participation from all Pentahelix elements is key to improving the effectiveness and sustainability of the SIGAP Program in Asahan Regency.

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