

Implementation of Triple Helix Innovation in Encouraging Synergy at Geopark Dieng

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Abstract—This research focuses on the development of Triple Helix synergy involving the government, private sector, and academia in the management of the Dieng Geopark to achieve Sustainable Development Goals (SDGs) related to environmental conservation. Currently, the geopark's status has not been recognized as a national geopark, despite being proposed by the government since 2021. This study employs a descriptive qualitative methodology, collecting primary data through observations and supporting documents. Initial results indicate that the Banjarnegara and Wonosobo Regency Governments act as managers in synergy with the Central Java Provincial Government, connected with PT Geo Dipa Energi as a facilitator and Gadjah Mada University as an innovator in developing the potential of the Dieng Geopark. The main findings of this research highlight significant collaborative efforts to elevate the Dieng Geopark's status to national recognition. The synergy between the government, private sector, and academia is expected to strengthen geopark management, increase public awareness, and promote sustainable local economic development. This study provides important insights into the roles of each actor in achieving common goals and the contribution of the Dieng Geopark to the achievement of the SDGs. Additionally, the research examines the dominant roles played by each actor as key players in implementing the Triple Helix synergy innovation.

Keywords—triple helix, synergy, Geopark Dieng

I. INTRODUCTION

Dieng is an area with significant geological potential for development into a geopark, as it encompasses three highland regions and possesses a rich diversity of geological, biological, and cultural resources. However, the limited knowledge of the community regarding the utilization of geological conditions often leads to misuse for personal or group interests, resulting in the degradation of various geological sites due to competing interests. Therefore, geoparks emerge as a form of environmental preservation supported by three key elements: geodiversity, biodiversity, and cultural diversity [1]. The proposal of Dieng as a world-class geopark area has been proposed by the Government of Wonosobo Regency and Banjarnegara Regency with the central government since 2016 [2]. This was addressed by the Central Java Provincial Government in 2023 by establishing a Geopark Management Agency that involves various stakeholders, including representatives from the government, academia, local communities, and the private sector, to expedite the national geopark accreditation assessment.

The current vision for the development of the Dieng Geopark aims to support the Sustainable Development Goals (SDGs), specifically targeting 10 out of the 16 goals to enhance community welfare. This necessitates an innovative

approach to managing the Geopark to help reduce disparities in the Dieng area. Presently, efforts to develop the Geopark are propelled by a synergy that involves multiple stakeholders, including Gadjah Mada University in the academic sphere, PT. Geodipa Energi in the private sector, and the governments of Wonosobo and Banjarnegara Regencies [3]. However, there is currently no policy framework that governs the synergy among stakeholders, highlighting the need for innovative development and effective management of geopark tourism to ensure that the Dieng Geopark remains a well-preserved geological conservation area.

There is a need for policies and innovative synergies that unify the relationships among stakeholders. The Triple Helix innovation model enhances interactions involving three main actors [4]. This innovation can serve as a proposal for the management of the Dieng Geopark. The actors involved in the implementation of this innovation include the government as the regulator, academics as innovators, and the private sector as facilitators or investors [5]. Furthermore, the implementation of the Triple Helix model, when supported by appropriate policies, will clarify the roles of each stakeholder in the management of the Geopark [6]. The primary aim of this study is to examine the roles of the Central Java Provincial Government, the Wonosobo Regency Government, the Banjarnegara Regency Government, Gadjah Mada University, and PT. Geodipa Energi in the development and management of the Dieng Geopark, which is currently being promoted to achieve national geopark status. This research will concentrate on efforts to introduce Triple Helix innovation to enhance synergy among stakeholders in Geopark management, thereby supporting the realization of the Geopark's vision in implementing the Sustainable Development Goals (SDGs).

II. LITERATURE REVIEW

Currently, geoparks have become one of the popular tourist attractions for both Indonesian citizens and international visitors. The Indonesian government has recorded ten internationally recognized geoparks, namely: Batur, Merangin, Raja Ampat, Rinjani, Sewu, Maris Pangkep, Ijen, Belitung, Ciletuh, and Kaldera Toba, which were acknowledged by UNESCO in 2023 [7]. Additionally, there are nine geoparks that currently hold national status, namely: Ranah Minang Silokek, Ngarai Sianok Maninjau, Ujung Kulon, Pongkor, Kebumen, Banjarnegara, Tambora, Natuna, and Meratus [8]. And there are four aspiring Geoparks, namely: Gorontalo, Jogja, Bayahbome, and including Dieng so that currently it is still a candidate for national

geoparks [9].

As a geological site of concern to UNESCO through the World Heritage Series program, synergy is needed for geopark management to provide comfort, safety, and services with facilities that have standards for tourism [10]. Around the world, approaches in tourism vary, including in various geoparks. In Indonesia, one of the most proposed approaches by stakeholders and academics is the Triple Helix theory, which is the basis in the context of sustainable tourism [11]. The Triple Helix model emphasizes the strategic relationship between Academia, Industry, and Government, replacing the double helix model that focuses only on Industry and Government. In tourism management, this collaboration is important to create synergy [12]. Academics provide innovation, industry applies knowledge, and governments support with policies. This integrated approach results in effective tourism management and a quality and sustainable tourism experience [13].

As a candidate for Geopark Aspiring or National Geopark status, Geopark Dieng meets the necessary criteria by showcasing geoheritage, geodiversity, and geoculture, bolstered by the collaboration between the Banjarnegara Regency Government, the Wonosobo Regency Government, Gadjah Mada University, and PT. Geodipa Energy [14]. However, there is no scheme for the sustainability of synergy that has been formed through the implementation of appropriate policies and political formulations in order to accelerate the national status of Dieng Geopark.

III. MATERIALS AND METHODS

The research employs a qualitative methodology to investigate the relationships among stakeholders in accelerating the development and management of the Dieng Geopark. It utilizes a descriptive method with a case study approach and focuses on institutional relationships [15]. The research will conduct an in-depth exploration of a case, gathering comprehensive information, and observing events, activities, processes, and programs occurring in the field [16].

The focus of this research is on the institutions involved in the management and development of the Dieng Geopark, including the Wonosobo Regency Government, the Banjarnegara Regency Government, PT. Geodipa Energi, and Gadjah Mada University. The study utilizes primary data collected from interviews and direct observations in the field, while secondary data consists of information gathered from documents, regulations, journals, articles, and other pertinent sources. The analysis of the data involves reducing the data, presenting it, and interpreting or drawing conclusions regarding the degree to which synergy with the triple helix innovation is integrated into the management and development of the Dieng Geopark [17].

IV. RESULT AND DISCUSSION

A. Division of Roles to Promote the Creation of Synergy in Geopark Dieng Management

The advancement of the geopark sector will undoubtedly focus on the development of tourism centered around geoheritage, geobiodiversity, and geoculture. This effort is closely linked to the role of the primary actor, which is the government, acting as a policy facilitator that determines the

feasibility status of geoparks [18]. One of the key government interventions guiding the implementation and management of geoparks is the issuance of Law No. 26/2007 on Spatial Planning, Regulation of the Minister of Energy and Mineral Resources No. 7/2018 on Geoparks, and Government Regulation No. 32/2019 on Environmental Protection and Management. These regulations serve as a reference for the Central Java Provincial Government, which collaborates with the Banjarnegara and Wonosobo Regency Governments to establish joint regulations for geopark management. This collaboration is formalized in the Central Java Governor's Decree No. 661.2/29/2023, which pertains to the Dieng Earth Park (Geopark) Management Agency. The government's role encompasses advising, coaching, and overseeing the planning and implementation of all activities at the Dieng Geopark. This role is streamlined through vertical relationships that connect the central government to local governments, provinces, and districts, enhancing efficiency and fostering synergy among institutions, including the private sector and academia, to achieve the vision of sustainable development goals in the management of the Dieng Geopark.

In addition, academics play a crucial role in the management of the Dieng Geopark by focusing on research, innovation, and studies aimed at the development of Dieng, facilitated by the expert council. The academic institutions involved in the management and execution of the Dieng Geopark include Gadjah Mada University, which operates the Geothermal Research Center, as well as researchers from the Center for Tourism Studies. They collaborate with Jenderal Soedirman University, STIE Taman Siswa Banjarnegara, Banjarnegara Polytechnic, Bandung Energy and Mining Polytechnic, and Wonosobo University of Al-Qur'an Science. Gadjah Mada University acts as the main implementer of this initiative. This role highlights the importance of academics in conducting research that fosters innovation and development within the Dieng Geopark, ultimately leading to recommendations for the government based on their research outcomes [5].

Furthermore, the private sector's contribution to the management of the Dieng Geopark is currently facilitated by PT. Geodipa Energi (GDE), which aids the community by conducting outreach and educational initiatives on the use of geothermal energy [19]. PT. GDE also plays a vital role in ensuring and providing support, coordinating with the government to fulfil the development needs of the Dieng Geopark. Through its Corporate Social Responsibility (CSR) program, PT. GDE is actively engaged in important activities such as waste management, energy utilization, water conservation, the use of sustainable materials, and offering education and training for the management and development of the Dieng Geopark.

B. Implementation of Triple Helix Innovation in Forming Synergy in the Management and Implementation of Dieng Geopark

To promote the elevation of Dieng Geopark to National Geopark status, the Central Java Regional Government has responded by fostering collaboration among various stakeholders through the establishment of the Dieng Geopark Management Agency Team. To expedite this status enhancement, it is essential to implement effective methods and innovations in management that encourage collective

action and align with the shared vision of the triple helix innovation model.

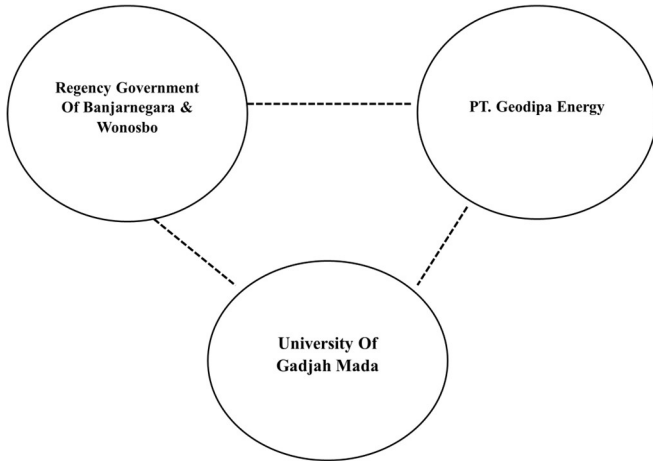


Fig. 1. Triple helix innovation model in the management of Geopark Dieng.

Fig. 1 illustrates the Triple Helix model, highlighting the collaboration between government, academia, and the private sector in managing the Dieng Geopark. The government acts as a regulator by formulating policies and providing legal support, academia (led by Gadjah Mada University) contributes research and innovation, while the private sector (such as PT. Geodipa Energi) facilitates implementation through CSR programs. This synergy promotes sustainable development and supports the Geopark's advancement toward national recognition.

The implementation of triple helix synergy can see the role and limitations of each actor involved in the management and development process of Dieng Geopark [20]. Role dominance of government plays a key role in the development of this innovation because basically the government also needs synergy between institutions, which then forms cooperation between regions and can transform power through vertical and horizontal relationships. The main result of the government's role is issuing policies for the management of geoparks that are legal entities, development planning through regional strategic programs, financing, tax levy management, and even choosing who will synergize for the implementation and management of the Dieng geopark. Through a policy made by the Central Java Provincial Government No. 661.2/29/2023 involving elements of regional heads at the district level, provincial-level service institutions, and elements of district-level service agencies. The limitation of authority also causes delimitation in the Banjarnegara and Wonosobo Regency governments in handling the implementation and management of the Dieng Geopark. The energy authority currently managed by the central government restricts the movement of the District Government in the diffusion of power.

The policies implemented by PT. Geodipa Energi have been formalized through Corporate Social Responsibility (CSR) programs. In addition to providing support to the Dieng community, Geodipa Energi also promotes the use of geothermal energy to advance the aspects of the Sustainable Development Goals (SDGs) related to poverty reduction (goal one), quality education (goal four), decent work and economic growth (goal eight), and responsible consumption and production (goal twelve) in the development of the Dieng Geopark. Furthermore, a significant aspect of PT. Geodipa

Energi's role is the management of geothermal energy, which has a substantial impact on the community.

The implementation of mentoring and the development of innovation and research at the Dieng Geopark are currently led by Gadjah Mada University, which possesses high-quality research facilities and a diverse range of scientific disciplines. This environment encourages collaboration among various stakeholders. The research and innovation outcomes from the university serve as a reference for the development and management of the Dieng Geopark. This approach aims to minimize the negative impacts of land use change associated with geopark development and to ensure that geothermal energy can coexist with the local community, ultimately enhancing the community's economy through tourism.

Synergy is evident at Gadjah Mada University in its efforts to develop the geopark through collaboration with the Center for Geothermal Studies and the Center for Tourism Studies. Additionally, there is teamwork among the Faculty of Engineering, the Faculty of Social and Political Sciences, and the Faculty of Economics and Business to explore potential opportunities in the development and management of the Dieng Geopark. The university also coordinates with the government to align local political visions and missions with the results of research, which serve as guidelines for implementing various activity programs.

The implementation of the Triple Helix model is not without its challenges, particularly in the context of Dieng Geopark. These complexities arise from ambiguities in role delineation as outlined by the Decree of the Governor of Central Java No. 661.2/29/2023. It is essential for the formation of this team to establish clarity in order to prevent dominant roles or disparities in fiscal management, as well as in the outcomes of geopark and community management. Currently, the management authority primarily resides with the Central Java Provincial Government, while the execution and funding processes are entrusted to the Wonosobo and Banjarnegara Regency Governments.

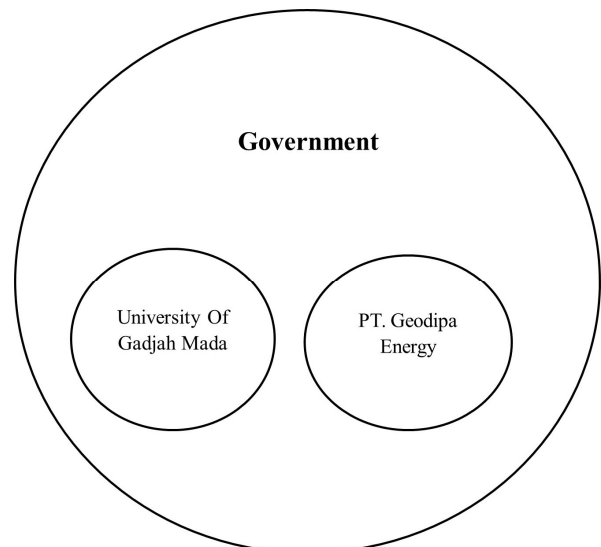


Fig. 2. Relationship of actors' roles in triple helix innovation [12].

Fig. 2 explains and shows the relational dynamics, authority boundaries, and the need for a clear MoU to prevent dominance and ensure balanced collaboration. This dominance is quasi-dominated by the government as the main actor who has control over policies and political activities.

The transfer of power is completely in the hands of the government and also has an impact on the flexibility of universities and the private sector in encouraging the implementation and management of the Dieng Geopark [21]. As an alternative solution to overcome the gap in the implementation of the triple helix to perpetuate, a clear scheme between actors is needed through the MoU, which is a guide and role limit for each actor as a follow-up to the policy of forming a Dieng geopark management team. In addition, it is necessary to strengthen the cooperation scheme between regions to equalize perceptions so that profits and losses and other handling matters can be equalized without harming one of the parties [22]. In addition, a collaborative governance scheme is needed to explore other actors in order to break the dominance of the role that is constantly being played [23]. With these two schemes, it is a solution to the sustainable innovation of the triple helix, which can even continue to develop along with the improvement of the quality and status of the Dieng Geopark.

V. CONCLUSION

The Dieng Geopark presents a significant opportunity to boost the economy, tourism, and job prospects, aligning with the Geopark Vision to promote community prosperity through the achievement of the Sustainable Development Goals (SDGs). Currently, Dieng's status as an Aspiring Geopark needs enhancement, which necessitates collaboration among various stakeholders, including government bodies, private enterprises, and academic institutions. To foster synergy in implementing a triple helix innovation approach, it's essential to establish a foundational collaboration for the development of the Dieng Geopark. This partnership involves the Central Java Provincial Government, the Banjarnegara and Wonosobo Regency Governments, PT. Geodipa Energi, and Gadjah Mada University, working together to accelerate the elevation of Dieng Geopark to national status.

Each stakeholder plays a crucial role in ensuring the sustainable management and implementation of the Dieng Geopark. The government is tasked with policy formulation, the private sector is responsible for facilitating, developing, and educating the community, while universities focus on research related to the utilization and advancement of the Geopark. However, there is a need for further innovation in the triple helix approach to prevent inequality. This can be achieved by enhancing cooperation among regions through improved policies and formal agreements (MoU). Additionally, collaborative governance management is essential to ensure no single entity dominates the development of the Dieng Geopark, allowing the vision and mission of the Geopark to be fully realized.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Said Khaidir: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, and Writing – review & editing; Abdan Syakura and Muhammad Ishak: Conceptualization and Writing – review

& editing; all authors had approved the final version.

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