The Concept And Methodology Of Environmental Communication Strategies In UNESCO Global Geoparks To Support Sustainable Development Goals

Ade Kadarisman[1*], Iriana Bakti[2], Herliana Agustin[3], Henny Sri Mulyani[4]

[1,2,3,4] Department of Communication Science, Universitas Padjadjaran

***Corresponding Author-** Ade Kadarisman

[*]Department of Communication Science, Universitas Padjadjaran, Email: ade.kadarisman@unpad.ac.id

ESSENCE

This study intends to examine the concept and methodology of environmental communication strategies in the UNESCO Global Geopark to support Sustainable Development Goals. The environmental communication concept is focused and balanced between geological heritage conservation activities, and the welfare of the local community. Thus, in the conservation program, the Geopark concept protects geological heritage sites and encourages biodiversity and cultural heritage that must be preserved in an integrated manner. However, in practice, environmental conservation aspects are often neglected because they cannot compete with the economic aspects that develop along with the increase in tourist visits. This situation invites the concerns of a group of people who care about environmental sustainability. This condition needs environmental communication strategies, especially to support Sustainable Development Goals. The method used in this research is qualitative with a case study approach. In conclusion, this study provides a valuable contribution to the literature on environmental communication strategies and sustainable development in UNESCO Global Geoparks, by highlighting the challenges and opportunities associated with these strategies and methodologies.

Keywords: Environmental Communication, Communication Strategies, UNESCO Global Geopark

PRELIMINARY

A. Background

A geopark is an area that contains geological heritage sites and holds ecological, historical, and cultural value. Several criteria define an area as a geopark. Firstly, a geopark area must encompass a large area and clearly defined boundaries, facilitating the economic development of surrounding communities. Secondly, geopark areas must house geological sites that hold significance in educational and cultural aspects. Lastly, geoparks must exhibit synergy between geological, non-geological, biological, and environmental aspects, enabling a unity in sustainable development (Gordon et al., 2021; Gray, 2019; Halder & Sarda, 2021). For a Geopark, which is a region designated for environmental conservation, education, and geotourism, effective environmental and regional management is crucial. The active involvement of local communities, organizations, and stakeholders in policymaking is essential to foster sustainable development through socio-economic and cultural advancement in the Geopark area. It is imperative for the community to be committed to implementing policies aimed at protecting the environment and preserving the unique Geopark landscape (Gordon et al., 2021; Zheng et al., 2021).

The Geopark area boasts a diverse landscape featuring natural attractions that can significantly enhance its appeal to tourists. This presents an opportunity for the community to establish micro-enterprises, generate employment opportunities, and explore new sources of income (Ibrahim et al., 2021; Lee & Jayakumar, 2021; Rodrigues et al., 2021). A Geopark encompasses geological and non-geological sites, and must provide facilities and activities that enhance public awareness of geology and environmental concepts specific to the Geopark. Local

community involvement in research activities is crucial to facilitate knowledge transfer between researchers and community members. This can promote mutual learning and understanding between researchers and the community (Halder & Sarda, 2021; Kubalíková et al., 2021). The government of the country hosting a Geopark must establish policies that protect and preserve the Geopark while respecting the environmental management customs of the local community. Geoparks registered under the UNESCO Global Geopark Network (UGGN) are obligated to actively contribute to the exchange of information with other members on the preservation of geological sites and the environment. This can facilitate the exchange of knowledge and best practices among UGGN members. (Crofts, 2019; Kubalíková et al., 2021). Conservation efforts in UNESCO Global Geoparks typically comprise three main stages. The first stage involves establishing a clean, safe, and comfortable environment in the Geopark area. The second stage involves implementing Sustainable Tourism practices based on the Sustainable Development Goals (SDGs) within the Geopark area. Lastly, efforts are focused on improving the economic conditions of communities residing in and around the Geopark area (Hardiyono et al., 2015; Panji, 2018).

Table 1.1. Geopark In Indonesia

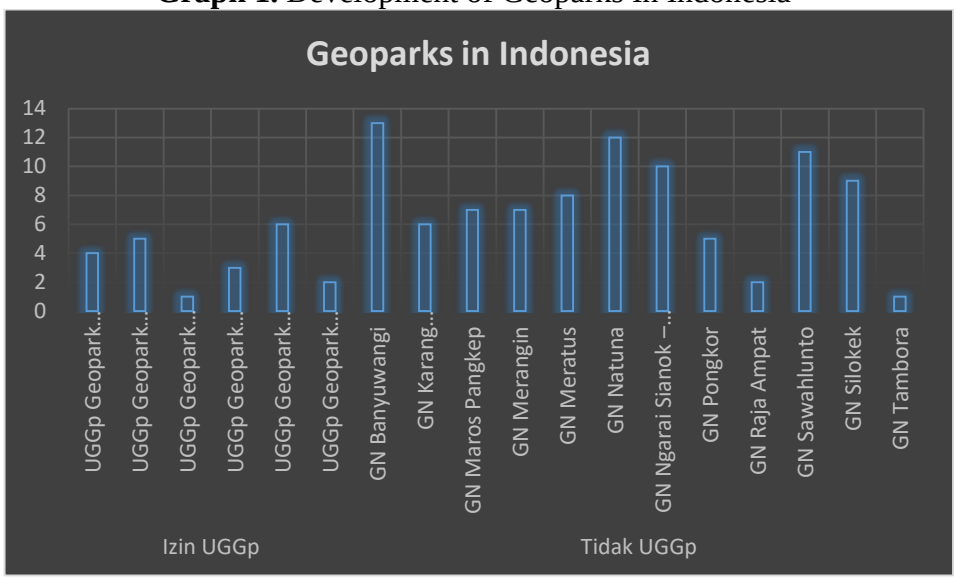
No.	Name	Province	Status
1	UGGp Geopark Ciletuh-Palabuhanratu	West Java	UGGp Permit
2	UGGp Geopark Rinjani	West Nusa Tengga	UGGp Permit
3	UGGp Geopark Gunungsewu	Yogyakarta and Central Java	UGGp Permit
4	Batur Geopark UGGp in Bali Province	Bali	UGGp Permit
5	UGGp Geopark Belitung in Bangka-Belitung Province	Bangka Belitung	UGGp Permit
6	Toba Caldera Geopark UGGp in North Sumatra Province	North Sumetera	UGGp Permit
7	GN Tambora	West Nusa Tenggara	No UGGp
8	GN Raja Ampat	Irian Jaya	No UGGp
9	GN Maros Pangkep	South Sulawesi	No UGGp
10	GN Maros Pangkep	South Sulawesi	No UGGp
11	GN Pongkor	West Java	No UGGp
12	GN Karang Sambung- Karangbolong	Central Java	No UGGp
13	GN Merangin	**Jambi**	No UGGp
14	GN Meratus	South Kalimantan	No UGGp
15	GN Silokek	West Sumatra	No UGGp
17	GN Sianok Gorge - Maninjau	West Sumatra	No UGGp
17	GN Sawahlunto	West Sumatra	No UGGp
18	GN Natuna	Riau Islands	No UGGp
19	GN Banyuwangi	East Java	No UGGp

Indonesia has great potential in Geopark development but Indonesia is still lagging behind in terms of numbers compared to other countries. Indonesia began pioneering Geopark development since 2009. Currently Indonesia has 6 UNESCO Global Geoparks/UGGp including: Batur UGGp, Sewu Mountain UGGp, Ciletuh- Palabuhanratu UGGp, Rinjani-Lombok UGGp, and Toba Caldera UGGp and Belitong UGGp, 13 National Geoparks / GN which are striving to become UNESCO Global Geoparks including GN Tambora, GN Raja Ampat, GN Maros Pangkep, GN Maros Pangkep, GN Pongkor, GN Karang Sambung- Karangbolong, GN Merangin, GN Meratus, GN Silokek, GN Ngarai Sianok - Maninjau, GN Sawahlunto, GN Natuna, GN Banyuwangi. Indonesia also has approximately 110 potential geological heritage locations that have the potential to be developed into Geoparks.

The Ciletuh-Palabuhanratu Geopark is among the UNESCO Global Geoparks (UGG) registered in Indonesia since 2018. As a UGG, the Ciletuh Geopark must fulfill seven obligations, including (1) preserving geological heritage for current and future generations; (2) providing education to society on geological science and its relationship to

environmental issues; (3) ensuring sustainable social, economic, and cultural development; (4) building multicultural bridges for heritage and conservation by managing geological and cultural diversity through participatory and collaborative partnerships; (5) encouraging research activities; (6) actively contributing to the UGG network through collaborative activities, such as communication, publication, information exchange, and participation in all UNESCO Global Geopark-hosted activities; and (7) contributing to the creation of articles for newsletters, books, and other publications (Ansori et al., 2022; Kharbish et al., 2020; Luo et al., 2020; Ríos et al., 2020).

Graph 1. Development of Geoparks In Indonesia



Geoparks, with their diverse potential, particularly in natural resources and the environment, have a crucial role in regional development. The environmental aspect forms an integral part of the socio-economic development of communities surrounding the Geopark area. According to UNESCO, the Geopark concept encompasses areas that offer several advantages, such as recognizing, developing, and safeguarding geological sites on a global scale, providing opportunities for sustainable economic growth, and enabling the development of local knowledge and culture. (Du & Girault, 2018; Hawkins, 2022; Wang et al., 2019). The designation of Ciletuh as a UNESCO Global Geopark brings numerous benefits in terms of tourism, economy, culture, and community. The tourism industry can be boosted by attracting more visitors to the Ciletuh Geopark, thus increasing the welfare of the surrounding community. However, careful planning and communication among stakeholders are essential to ensure the sustainability of these impacts. The key stakeholders involved in the Ciletuh Geopark are the government and local communities, and fostering harmony among them is crucial. (Arrasyid et al., 2021; Kadarisman et al., 2018; Yanuar, Anna, Rosana, et al., 2018).

In the context of Geopark development and its impact on community welfare, environmental communication plays a significant role. This phenomenon has led to the emergence of new business activities that have the potential to improve the economy of communities around Geopark areas. However, it is important to note that not all Geoparks or communities benefit equally. There are various factors that affect the welfare of the community around a Geopark area. It is essential to understand that the main purpose of establishing a Geopark as UGG is not solely focused on tourism but also on the conservation and preservation of geological and cultural heritage (Yanuar, Anna, Hindayani, et al., 2018). Conservation refers to the sustainable management of the environment and its resources. It encompasses the protection and preservation of natural resources to maintain biological diversity and

ensure a balanced ecosystem. (Gray, 2019; Kubalíková et al., 2021; Mustikaningsih et al., 2019; Wang et al., 2019). According to Law No. 5 of 1990, conservation of biological resources involves the prudent management of living natural resources to ensure their continued supply while preserving and enhancing their diversity and value. The aim of conserving biological resources is to achieve sustainability and balance in ecosystems, which in turn support the improvement of human life (Andriany et al., 2016; Hardiyono et al., 2015; Putri Hardini et al., 2019).

The number of visitors to geoprak tourism objects in the last 7 years has shown an increase, although in 2017-2023 it fluctuated due to damaged road conditions.

Figure 1. Graph of the number of visitors to Geopark ciletuh tourism object

The high number of tourist visits directly or indirectly results in disturbance of the environmental ecosystem, and can even damage the environment. Likewise, educational tourism activities can affect the condition of the ecosystem because the organization of this activity will be more effective if carried out in groups and guided by a tour guide (Woo, 2014).

When the Ciletuh geopark was declared in 2013, the primary narrative that emerged was centered around the concept of environmental conservation. The initial regulations put forth by the government were focused on concepts such as conservation, nature reserves, and mitigation. Development, on the other hand, is a social process that involves societal engagement towards achieving social and material progress, including increased justice and truth, for all individuals through greater control and influence over their environment. It is also a process that results in the acquisition of new skills and knowledge, increasing insight, awareness, humanity, and self-confidence. Based on these definitions, it can be inferred that development is a process that ultimately leads to progress in society. (Astuti, 2019; Criado & O.de Zarate-Alcarazo, 2022; Sapat et al., 2022).

The current development in the Ciletuh Geopark area is remarkable, with sufficient infrastructure to support its recognition as a UNESCO Global Geopark. The accessibility of the area, both the access roads and transportation within, is excellent and caters to various types of vehicles. In addition, the number of lodgings available has increased, not only in the famous tourist attraction of Palabuhanratu, but also in the eight sub-districts within the Ciletuh area. These lodgings offer a range of unique experiences, from rural settings to waterfalls, cliffs, and beaches. The tourist attractions in the area have also been improved by adding photo spots and information boards to enrich visitors' experiences. (Harini, 2021; Saraswati & Afifi, 2022).

Environmental communication strategies can have an impact on various aspects of managing

nature and the environment, and ultimately affect community welfare through community empowerment activities that aim to sustainably manage the environment. Therefore, effective communication is essential for the success of Ciletuh Geopark. According to a key informant, communication in community empowerment is important to maintain the Geopark. The policymakers need to sharpen their communication skills and focus on the UGG concept to ensure that the community's implementation is in line with the plan. Open communication is also required between various components, including local communities, universities, corporations, and the media, to ensure the success of environmental policies related to Ciletuh geopark. Furthermore, the development of the Ciletuh Palabuhanratu geopark area requires the involvement of all these components. (Hardiyono et al., 2015; Mihardja et al., 2020; Natarina & Sachari, 2021). The dynamic nature of environmental communication is affected by human perspectives on their relationship with the environment. The way in which humans view the environment - whether they see it as an active entity that can provide feedback on their behavior towards it or simply as a passive recipient of human actions - has an impact on environmental communication (Bakti et al., 2018).

The Ciletuh Geopark area has not fully achieved its development goals, as indicated by differences in priority scales between the government and local community. While the government prioritizes tourism to improve the economy, some individuals believe that environmental factors should be considered. Aspects of environmental sustainability must also be taken into account in the Geopark area's development to improve community welfare. The focus of Geopark development has shifted towards tourism and the economy, but conservation and nature preservation have received less attention from the government and the public. Therefore, research on environmental communication strategies is necessary to achieve the development goals of the Ciletuh Geopark area.

This study aims to identify and analyze the concept and methodology of environmental communication strategies for the development of the Ciletuh-Palabuhanratu Geopark area in Sukabumi Regency, West Java Province. Environmental communication strategies include promotion, policy, and community participation in conservation activities, as well as community empowerment based on Sustainable Development Goals (SDGs). Effective environmental communication strategies provide opportunities for stakeholder interaction in policy making and community empowerment in addressing environmental issues.

B. Formulation of the problem

To find out and analyze the dynamic factors of environmental communication in the development of the Ciletuh-Palabuhanratu Geopark area, Sukabumi Regency, West Java Province, the research focus is directed at the conservation aspect.

From the point of view of environmental communication, the dynamics of communication that occur include promotional efforts, policies, and community participation in environmental conservation activities. Environmental communication also looks at efforts to empower communities in accordance with the concept of Sustainable Development Goals (SDGs) that have been proclaimed so that they can be achieved by 2030. The dynamics of environmental communication in the Geopark development process provide an opportunity for good interaction between stakeholders in policy making and community empowerment in overcoming environmental problems.

Research on the dynamics of environmental communication in Geopark areas has not been done much in Indonesia or in the world. This research is expected to produce a model for the development of environmental communication in Geopark Areas in Indonesia and contribute to enriching the scientific treasures of the field of environmental communication.

C. Research purposes

The objectives of this research are to:

1. Explaining the process of environmental communication dynamics in the Ciletuh Palabuhanratu Geopark area.
2. Explaining the dynamics of environmental communication in the Ciletuh Palabuhanratu Geopark area.
3. Formulating follow-up on the dynamics of environmental communication in the Ciletuh Palabuhanratu Geopark area, Sukabumi Regency.

D. Benefits of research

This research is expected to have 2 (two) aspects of benefits, namely theoretical benefits and practical benefits. Theoretical benefits regarding the usefulness of this research in the theoretical realm which can later be useful for further research academically and can be used as a reference for further research. Practical benefits are intended as a study that can provide recommendations / input that is useful for the object of research.

1. Theoretical Benefits

The theoretical benefits of this research are expected to produce a communication model carried out by the Ciletuh Geopark community in regional development that prioritizes conservation in every activity. So that patterns that are able to maintain environmental sustainability, biodiversity, and are ecological in nature can be applied and implemented in other geoparks.

This research is also expected to provide solutions and information about the dynamics of environmental communication, communication strategies related to the development of the Ciletuh Palabuhanratu Geopark area. Furthermore, the benefits of this research can provide information about the role of *stakeholders* in the development of the Ciletuh Palabuhanratu Geopark area in particular and generally various areas that have been designated as UNESCO Global Geopark areas.

In addition, the theoretical benefit of this research is as research in the field of communication science studies that is multidisciplinary in nature so that it is expected to contribute to other research related to Ciletuh Palabuhanratu Geopark, environmental communication, tourism, public policy, and related to communication science. Another theoretical benefit is as a reference for academics related to the study of the dynamics of environmental communication, *Sustainable Development Goals* (SDGs), geoparks and communication science.

2. Practical Benefits

The practical benefit of this research is to be taken into consideration by the government for the development and development policies of the Ciletuh Palabuhanratu geopark in line with the UNESCO Global Geopark concept.

RESEARCH METHODOLOGY

This research uses constructivism paradigm to emphasizes the importance of subjective interpretations of reality and the role of human consciousness in shaping perceptions and knowledge (Creswell, 2009; Creswell & Creswell, 2018). In the context of this study, the constructivism paradigm is well-suited for exploring the diverse perspectives, experiences, and meanings of environmental communication strategies in UNESCO Global Geoparks. By adopting a constructivist approach, this study recognizes the importance of subjective perspectives and the role of context and culture in shaping environmental communication practices in geoparks.

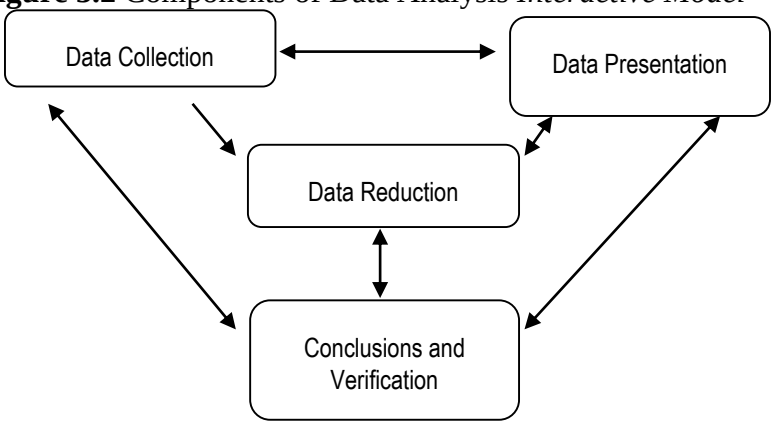
A qualitative approach is appropriate for this study, as it seeks to explore the complex and nuanced experiences, perspectives, and practices of environmental communication in UNESCO Global Geoparks. Qualitative research methods allow for the collection of rich, in-depth data that can provide insights into the underlying meanings, values, and motivations that shape environmental communication practices in geoparks (Creswell, 2009; Creswell & Creswell, 2018). The use of a qualitative approach will also allow for the exploration of diverse and often conflicting perspectives, which can be particularly valuable in promoting greater understanding and collaboration among stakeholders.

This study uses a case study research method, which is particularly well-suited for exploring

complex phenomena in real-world contexts (Yin, 2012). The case study approach will enable this study to examine environmental communication strategies in UNESCO Global Geoparks in a holistic and in-depth manner, by focusing on one or more specific geoparks and exploring the experiences and perspectives of various stakeholders involved in environmental communication practices. The case study approach will also allow for the exploration of how environmental communication strategies are influenced by local contexts, culture, and history, and how they contribute to achieving sustainable development goals in geoparks.

The interactive model can be depicted in the following scheme:

Figure 3.2 Components of Data Analysis *Interactive Model*



Source: Miles and Huberman (1992)

This study uses a range of qualitative data collection methods, including semi-structured interviews, focus group discussions, participant observation, and document analysis. These methods will enable the collection of rich, detailed data on the experiences, perspectives, and practices of environmental communication in geoparks, and will allow for the exploration of diverse stakeholder perspectives. Overall, the methodology of this study combines a constructivism paradigm, a qualitative approach, and a case study research method to explore the concept and methodology of environmental communication strategies in UNESCO Global Geoparks in supporting sustainable development goals. The use of multiple data collection methods will enable a comprehensive and nuanced exploration of the complex and diverse experiences, perspectives, and practices of environmental communication in geoparks.

RESULT AND DISCUSSION

The recognition of the Ciletuh Geopark as a world protected area cannot be separated from the role of the people who live in it. The government of course must have more attention, so that the Ciletuh area can improve the standard of living of the people living around it. There are many things that can be built and mobilized by the government, such as empowering tourism-aware communities, creating fostered villages, training in local crafts, and others. Without support from the government in the form of sustainable activities, the recognition of Geopark Ciletuh would be meaningless. Ciletuh Geopark has been recognized by the UNESCO Global Geopark based on three elements, including geodiversity, biodiversity, and culture diversity. All of these elements are considered very supportive of making the Ciletuh Palabuhanratu Geopark tourist area to be preserved and the community can also benefit from this recognition.

In line with UNESCO's global goals, Geopark Ciletuh can also be seen as a means to be used as a tool to improve the economy of the local community. Local communities are residents who live in 8 (eight) sub-districts located in the Ciletuh Geopark Area. Geopark Ciletuh is one of the sustainable tourism products because

UNWTO defines sustainable tourism as a tourism business activity that aims to manage all resources in such a way that economic, aesthetic and social needs can be met while maintaining cultural integrity, biodiversity, processes and life support systems. (Abdelkhalek et al., 1989; Farsani et al., 2014; Gordon et al., 2021; Gray, 2019).

Based on the results of the Focus Group Discussion in April 2022, several findings were obtained regarding the phenomenon of environmental communication that occurred in the Ciletuh Geopark area. The communication process at the beginning of the formation of the Ciletuh Geopark occurred between the government and the community in 2 (two) sub-districts which became the initial location of the Ciletuh Geopark, namely Ciracap District and Ciemas District. The communication that occurs is dominated by government communication between the Central Government, West Java Provincial Government and the Sukabumi Regency Government. Based on the results of the author's research at the end of 2018, most local communities have not directly benefited from the determination of the Ciletuh Geopark as a UNESCO Global Geopark network in early 2018. In addition, they also do not know clearly about the concept of SDGs which is the basis for the development of the Ciletuh Geopark. One thing that they directly benefited from was the existence of a provincial road that made it easier for them to sell their produce to the city. (Kadarisman, 2018).

Table 4.1. Timeline for Determination of Ciletuh-Palabuhanratu Geopark

Date/Year	Description
2002	Issuance of Regional Regulation Prov. West Java No. 2 Year 2002 on Geological Environment Protection
2005-2006	Delineation of Geological Reserve Area by Dinas ESDM Prov Jabar and Unpad
2007	Research and Presentation by Unpad
2011-Present	Start of PT Biofarma's CSR activities
May 2013	Geology Agency Team Field Visit (Combined)
July 2013	Socialization at Bappeda Prov. West Java
November 2013	Socialization at Pendopo Kabupaten Sukabumi
September 2014	Ciletuh presentation at the 6th International GGN Seminar in Canada
November 17, 2014	Issuance of Sukabumi Regent Request No. 004.1/2580-Ekon/2014 to the Dean of the Faculty of Geological Engineering, Padjajaran University, Bandung, regarding the request for assistance in the Delineation Study of the Sukabumi District. Ciletuh Geopark
October 24, 2014	Issuance of Sukabumi Regent Decree No.556/Kep.684 Disparbudpora/2014 Dated October 24, 2014 Regarding the Establishment of Ciletuh Geopark Area of Sukabumi Regency
October 24, 2014	Issuance of Sukabumi Regent Decree No. 556.05/Kep.685- Disparbudpora/2014, Dated October 24, 2014 on the Establishment of the Coordination Team and Secretariat for the Development of the Ciletuh Geopark Area of Sukabumi Regency
December 13, 2014	Socialization of Ciletuh Geopark Development to Community Elements
December 2014	Publication of the book "Geological Diversity of Ciletuh-Jampang" (Geological Agency)
December 24, 2014	APGN advisory field visit (prof. Ibrahim komo)
February 2015	Geodiversity, Biodiversity, Culturediversity Assessment by Joint Team of West Java Provincial Government, Sukabumi Regency Government, Unpad, PT Biofarma for 2 Sub-districts
March 26, 2015	Visit of the Deputy Governor of West Java to the GNCP Area
June 29, 2015	Issuance of the Regent's Request Letter to the Minister of Energy and Mineral Resources Cq. Geological Agency No. 522-51/1673-ekom/2015 regarding the Request for Determination of Ciletuh as KCAG.
July 2015	Issuance of the Regent's Request Letter to BBKSDA No. IX. 556.31/1819-Disparbudpora/2015 concerning Application for Cooperation in Banteng Re-Instroduction in Cikepuh Wildlife Reserve Area
August 27, 2015	Issuance of Sukabumi Regent Decree No.556/Kep.559- Disparbudpora/2015, Dated August 27, 2015 on the Ciletuh Geopark Management Agency of Sukabumi Regency
August 27, 2015	Decree of the Chairperson of the Ciletuh Geopark Development Acceleration

	Coordination Team No. 001/2015, Dated August 27, 2015 About the Ciletuh Geopark Dosier Compilation Team of Sukabumi Regency
September 3, 2015	A Coordination Meeting was held in order to establish Ciletuh as KCAG at the Center for Groundwater Resources and Environmental Geology of the Geological Agency Jalan Diponegoro No. 57 Bandung.
September 2015	Delineation of Ciletuh Geopark Area by Dinas ESDM Prov. West Java (2 sub-districts)
September 2015	Social Mapping Study by PT Biofarma
September 2015	Ciletuh presentation at the 4th APGN Seminar in Japan
September 2015	Compilation of National Geopark Dossier
November 04, 2015	Issuance of Letter of Request from the Regent of Sukabumi to the Task Force Team for the Revitalization of the Geological Museum of the Ministry of Energy and Mineral Resources and Optimization of Geopark Development Number 556/2525-Disparbudpora regarding Request for Determination of Ciletuh as a National Geopark Area.
November 10, 2015	Submission of Ciletuh National Geopark Dosier to the Geological Museum and Geopark Revitalization Task Force Team of the Ministry of Energy and Mineral Resources (RMGG Task Force Team) and the Indonesian National Committee for Unesco (KNIU).
November 2015	National Geopark Verification and Validation
November 12, 2015	Issuance of West Java Governor Decree No. 556.05/Kep.1288- Rek/2015 Dated November 12, 2015 Regarding the Ciletuh Geopark Area Coordination Team in the Sukabumi Regency Area
November 13, 2015	Issuance of West Java Governor Decree No. 556.05/Kep.1289- Rek/2015 Dated November 12, 2015 Regarding the Operational Team to Accelerate the Development of the Ciletuh Area in the Sukabumi Regency Area to Become a Geopark Area
November 14-15, 2015	Implementation of Ciletuh Geopark Festifal I Event at Palangpang Beach, Ciemas Sub-district, Sukabumi District
December 18-22, 2015	UGG Advisory Mission Field Visit (Prof. Guy Martini)
December 22, 2015	Determination and Submission of Ciletuh National Geopark Certificate (2 Districts)
December 22, 2015	The signing of a joint agreement between the West Java Provincial Government, Sukabumi District Government, West Java BBKSDA, Padjajaran University and PT. Biofarma in support the development of the Ciletuh Geopark
December 31, 2015	Issuance of Regional Regulation Prov. West Java No. 15 of 2015 concerning the Master Plan for Tourism Development in West Java Province
January-April 2016	Preparation of Dosier for name change based on Prof. Guy Martini's recommendation from 2 sub-districts to 8 sub-districts
May 2, 2016	Issuance of West Java Governor Regulation No. 20 Year 2016 Dated May 2, 2016 Regarding the Management Agency of Ciletuh National Geopark Area in Sukabumi District
May 3, 2016	Issuance of West Java Governor Decree No. 556/Kep.456- Rek/2016 Dated May 3, 2016 Regarding the Personnel Composition of the Ciletuh National Geopark Management Agency in Sukabumi Regency Area
May 7, 2016	West Java Governor's Personal Visit to GNCP Area
May 19, 2016	The GNCP team went to Paris to meet the Indonesian Ambassador to France as well as submitting exposure and requests for support
May 2016	Submission of the Ciletuh-Palabuhanratu National Geopark Dosier to the Geological Museum and Geopark Revitalization Task Force Team of the Ministry of Energy and Mineral Resources (RMGG Task Force Team) and the Indonesian National Committee for Unesco (KNIU).
June 21, 2016	Determination and Submission of Ciletuh-Palabuhanratu National Geopark Certificate (8 Districts)
August 2016	Submission of the Lettero fIntern Geopark National Ciletuh- Palabuhanratu to the UGG by the Indonesian National Committee for the
September 13, 2016	Issuance of West Java Governor Decree No. 556/Kep.941- Rek/2016 Dated September 13, 2016 Regarding the Establishment of the Ciletuh-Palabuhanratu National Geopark Area in Sukabumi Regency.
September 2016	Ciletuh presentation at the 7th International GGN Seminar in the English Riviera
November 2016	Ciletuh-Palabuhanratu National Geopark dossier submission to UGG

November 25-26, 2016	RMGG team Pre-Assessment
February 9, 2017	Issuance of Sukabumi Regent Decree No. 050/Kep.143- Bappeda/2017, Dated February 9, 2017 Regarding Recommendations for Revisions to the Sukabumi Regency Spatial Plan 2012-2032
February 16, 2017	The submission of the revised Dossier based on the UGG request was submitted directly to UNESCO Headquarters, Paris, France by a team led by Prof. Ir. Mega Fatimah Rosana, M.Sc., PhD.
April 10-13, 2017	Pre-Assessment conducted by the Geological Agency Team
May 4, 2017	Issuance of a Letter of Reply to the assessment plan by UGG assessors signed by Patrick J Mc. Keever (Secretary, International Geosciences and Geoparks Program Chief, Earth Science and Geohazard Risk Reduction) about the name of the assessment team.
May 15, 2017	Issuance of a revised letter of UGG assessor names signed by Patrick J Mc. Keever (Secretary, International Geosciences and Geoparks Program Chief, Earth Science and Geohazard Risk Reduction).
August 1-4, 2017	Assessment by UGG Assessor (Mr. Alexandre Andrasanu and Mr. Soo Jae Lee)
September 2017	Ciletuh presentation at the 5th APGN Seminar in China
January 9, 2018	Letter from The Assistant Director-General for External Relationship and Public Information UNESCO Mr. Eric Falt that GNCP is eligible to be submitted as a member of the Unesco Global Geopark (UGG) at the Excutiveboard session in April 2018 with 13 recommendations on issues that must be resolved within 4 years.
April 12, 2018	Approved for designation as a UGG member at the UNESCO commission meeting
April 17, 2018	Designated as a member of the UGG Network

Figure 4.1 Ciletuh-Palabuhanratu Geopark Map

Source: CiletuhPalabuhanratugeopark.org

Since the Ciletuh Geopark was designated as a UNESCO Global Geopark, the number of domestic and foreign tourist visits increased significantly, especially visits to certain tourist destinations that were viral on social media, such as Bukit Panenjoan or the Ciletuh Amphitheater, Palapah Beach and Curug Cimarinjung. During the 2018 Eid al-Fitr holiday, all homestays in the Ciletuh-Palabuhanratu Geopark Area are fully filled, so tourists have to stay overnight by setting up tents on Palapah Beach. Likewise, tourists who visit Curug Cimarinjung reach more than 50 thousand people who are willing to flock to see the spilled water from a height of 50 meters. On weekdays the number of tourist visits to Curug Cimarinjung is around 3,000 people, even on weekends it can reach 10 thousand visitors. To enter the Cimarinjung waterfall area, visitors are only asked for an entrance fee of 10 thousand rupiah, including insurance which is entirely managed by the Ciwaru village government, which places eight officers in the Cimarinjung waterfall area. The village government manages the retribution used for accident insurance, officers' salaries, construction and maintenance costs for tourist facilities, cleaning funds and the rest goes to the village treasury. The management of the Ciletuh-Palabuhanratu Geopark Area has

placed management officers scattered in mainstay tourist destinations, such as Cimarinjung Waterfall, Palangpang Beach, Cikadal Beach, Kunti Island, and so on. In addition to being tasked with maintaining order for visitors, these officers also have a duty to guide tourists to get to know and educate visitors about the history and uniqueness of the Ciletuh-Palabuhanratu Geopark area.

In every opportunity, the community always tries to socialize the three aspects of diversity that exist in each geopark, namely geodiversity (geological diversity), biodiversity (biodiversity), and cultural diversity (cultural diversity) both to local communities and to tourists visiting the geopark area. Moreover, tourists are also invited to be directly involved in conservation activities by directly practicing coral reef planting activities when traveling to Kunti Island which is indeed very rich in geological and biological diversity. Through massive information dissemination activities since 2018, visitors are now starting to understand the concept of the three foundations of diversity in Geoparks, so that they are more concerned with cleanliness and environmental sustainability by not littering or carrying out vandalism activities on geological sites that located in the Ciletuh-Palabuhanratu Geopark area. Efforts to utilize natural resources and conservation are the responsibility of all parties while still paying attention to aspects of sustainability, especially the wealth of geological resources in Indonesia. Geological conservation is absolutely necessary so that geoheritage (geological heritage) remains intact and is not damaged by tourism activities.

The Ciletuh-Palabuhanratu UNESCO Global Geopark (CP-UGG) has faced some challenges to support Sustainable Development Goals: (1) Cultural and Linguistic Diversity: One of the key challenges facing environmental communication strategies in UNESCO Global Geoparks is the cultural and linguistic diversity of the communities and stakeholders involved. Effective communication requires an understanding of the cultural and linguistic context of the target audience, which can be challenging in geoparks that encompass a wide range of cultural and linguistic backgrounds. (2) Stakeholder Engagement: Another challenge is engaging stakeholders in the development and implementation of environmental communication strategies. This requires a participatory and collaborative approach that involves building trust, fostering dialogue, and creating opportunities for stakeholders to have their voices heard. (3) Limited Resources: UNESCO Global Geoparks often have limited resources, which can make it difficult to develop and implement effective environmental communication strategies. This includes limited budgets, staff, and technical expertise, which can constrain the development of communication materials and activities. (4) Communication Channels: Another challenge is selecting the most effective communication channels to reach target audiences. Different groups may prefer different channels, and it can be difficult to reach remote or marginalized communities with limited access to technology. (5) Multiple Stakeholder Perspectives: With so many different stakeholders involved in UNESCO Global Geoparks, it can be challenging to balance their diverse perspectives and interests. Effective communication strategies need to take into account the needs and priorities of all stakeholders involved. (6) Balancing Conservation and Development: Another challenge is balancing the need to promote sustainable development with the imperative to conserve natural and cultural resources. Effective environmental communication strategies need to address this tension and promote a holistic approach to conservation and development.

Beside the challenges, The Ciletuh-Palabuhanratu UNESCO Global Geopark (CP-UGG) has had some opportunities to support Sustainable Development Goals: (1) Unique Geological and Cultural Heritage: UNESCO Global Geoparks offer a unique opportunity to communicate the value of geological and cultural heritage to a wide range of audiences. Effective environmental communication strategies can help to promote awareness and understanding of the importance of geodiversity and cultural diversity, and the

need to protect and conserve them for future generations. (2) Tourism and Economic Development: Geoparks can also provide economic benefits to local communities through sustainable tourism development. Effective environmental communication strategies can help to promote geotourism and sustainable economic development, while also raising awareness of the need to protect and conserve natural and cultural resources. (3) Education and Capacity Building: Environmental communication strategies in UNESCO Global Geoparks can also play a key role in promoting education and capacity building for local communities and stakeholders. This includes developing educational materials, providing training and capacity building opportunities, and fostering a culture of environmental stewardship and sustainability. (4) Innovative Communication Technologies: With the increasing availability of digital technologies, there are more opportunities than ever to develop innovative communication strategies that can reach a wide range of audiences. This includes social media, mobile applications, and virtual reality tools that can help to engage and educate visitors. (5) Partnerships and Collaboration: Effective environmental communication strategies rely on partnerships and collaboration between different stakeholders, including local communities, government agencies, NGOs, and the private sector. Collaborative approaches can help to build trust and foster a shared commitment to sustainable development and conservation. (6) Evaluation and Continuous Improvement: Environmental communication strategies can benefit from ongoing evaluation and continuous improvement. By regularly assessing the effectiveness of communication strategies and adapting them to changing circumstances and stakeholder needs, it is possible to improve the impact and reach of environmental communication efforts.

The current environmental issues require multi-sectoral approach due to the varying complexities of each issue. Effective policies from the government and collaboration among all stakeholders involved are necessary for addressing these issues. These stakeholders are interconnected and their actions impact each other, which is crucial for survival. In the case of the Ciletuh Palabuhanratu Geopark, the geopark concept involves not only environmental conservation but also culture, development, and community welfare, thus necessitating support from different parties. This collaboration from various stakeholders is essential for successful implementation of the UGG concept (Maulana, 2017).

At present, various environmental issues have become the focus of attention for different stakeholders. This is because humans fundamentally depend on the environment for their survival, anywhere and anytime. However, the environment has limitations in providing for human needs, such as air, water, and soil, among other natural resources. If these resources are not used responsibly, their availability cannot be sustained. Hence, it is imperative to raise awareness among individuals and groups to conserve the environment. The current environmental degradation observed is a result of various factors (Kadarisman et al., 2018; Rosana et al., 2006).

Failure to consider the sustainability of the surrounding environment when exploiting nature can have a detrimental effect on the ecosystem. In the Ciemas area, gold mining carried out by the local community has not been accompanied by efforts to preserve the environment. Numerous un-reclaimed mining pits pose a danger to individuals passing through the area, while the ecological impact results in a decrease in green open space and a reduced ability to absorb rainwater, ultimately leading to floods and landslides (Yanuar, Anna, Hindayani, et al., 2018).

The importance of the environment and natural resources for human survival cannot be ignored. According to Article 1 of Law no. 23 of 1997, the environment is an interconnected system that includes humans and their behavior which affects the survival and well-being of humans and other organisms. The article further highlights that environmental management is a comprehensive approach to maintaining environmental functions, which

includes policies for planning, utilizing, developing, preserving, monitoring, and controlling the environment. (Andriany et al., 2016; Hardini et al., 2019; Hardiyono et al., 2015). According to Law number 32 of 2009 Article 3, environmental management aims to achieve balance and harmony in the environment while ensuring justice for present and future generations. However, environmental damage occurs due to the increasing human needs that are met by exploiting nature, causing irreversible harm. Humans rely on nature to improve their economic standards, but in doing so, they have exploited every inch of the earth's surface and caused environmental damage. This damage is apparent everywhere and can cause instability in the environment, leading to major disasters in the future (Ardiansyah et al., 2019; Dale et al., 2021; Nazaruddin, 2020). As part of the sustainable development goals, there exist environmental development pillars that aim to conserve the environment and serve as a barrier for humans to enhance their economic prospects by ensuring the availability of resources in the future. (Gordon, 2019; Gordon et al., 2021).

To support sustainable development, it is necessary to carry out sustainable environmental management. Article 3 of Law no. 23 of 1997 emphasizes the principle of state responsibility, sustainable principles, and the principle of benefit in environmental management, aiming to achieve environmentally sound sustainable development and the development of Indonesian society as a whole with faith and fear of God Almighty. Hence, it is crucial for management to emphasize the significance of environmental management in establishing a sustainable environment that supports sustainable development (Kadarisman et al., 2018; Putri Hardini et al., 2019).

The increasing demand for energy, coupled with its limited availability, is a growing environmental concern with the potential to trigger a global crisis. Renewable energy is increasingly recognized as a viable alternative source to tackle this issue. Wind and solar power, among other types of renewable energy, should be considered as options to meet future energy needs. Collaboration among various sectors of society is necessary to ensure the sustainability of the environment. This requires the cooperation of the government, academics, businesses, communities, and the media. Good communication between these groups is essential, especially given the shared environmental challenges they face (Eder & Patzak, 2004; Gordon et al., 2021; Halder & Sarda, 2021; Ikhram et al., 2019).

The concept and methodology of the Ciletuh-Palabuhanratu UNESCO Global Geopark environmental communication strategy play a critical role in supporting the achievement of the Sustainable Development Goals (SDGs). Here are some ways in which the strategy contributes to specific SDGs: (1) SDG 4 - Quality Education: This SDG aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The Geopark environmental communication strategy support this goal by developing educational programs that promote environmental literacy and awareness among the local community, tourists, and other stakeholders. This include developing educational materials, organizing educational events, and offering training programs to raise awareness about environmental issues and sustainable practices. (2) SDG 5 - Gender Equality: This SDG aims to achieve gender equality and empower all women and girls. While the Geopark environmental communication strategy may not directly relate to gender equality, it can indirectly contribute to this goal by promoting community-based tourism initiatives and educational programs that engage women and girls in conservation and sustainability efforts. (3) SDG 11 - Sustainable Cities and Communities: This SDG aims to make cities and human settlements inclusive, safe, resilient, and sustainable. The Geopark environmental communication strategy contribute to this goal by promoting sustainable tourism and community-based conservation efforts that support the development of sustainable cities and communities. This includes promoting

sustainable transportation options, green infrastructure, and waste management practices that reduce the environmental impact of tourism and promote sustainable development. (4) SDG 14 - Life Below Water: This SDG aims to conserve and sustainably use the oceans, seas, and marine resources for sustainable development. The Geopark environmental communication strategy contributes to this goal by promoting marine conservation efforts and raising awareness about the importance of protecting marine biodiversity and ecosystems. This can include developing educational materials, organizing awareness campaigns, and collaborating with local fishermen and marine conservation organizations to promote sustainable fishing practices. (5) SDG 15 - Life on Land: This SDG aims to protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt biodiversity loss. The Geopark environmental communication strategy contributes to this goal by promoting conservation of terrestrial ecosystems and biodiversity and raising awareness about the importance of protecting natural habitats and wildlife. This includes organizing nature walks, developing educational materials, and collaborating with local conservation organizations to promote sustainable land use practices and protect natural resources. Overall, the UNESCO Global Geopark environmental communication strategy contributes to the achievement of multiple SDGs, including those related to education, sustainable development, conservation, and environmental protection.

Ciletuh-Palabuhanratu UNESCO Global Geopark Management Board faces the challenge of balancing economic development with environmental conservation, as both are important for the sustainable development of the Geopark. Management Board tries to balance these two aspects through appropriate environmental communication concepts and methodologies: (1) Develop and promote sustainable tourism: The Board uses environmental communication concepts and methodologies to promote sustainable tourism initiatives that generate economic benefits while minimizing negative environmental impacts. This includes promoting ecotourism, responsible tourism practices, and community-based tourism initiatives that support local businesses and provide economic benefits to the local community. (2) Encourage environmentally responsible business practices: The Board uses environmental communication concepts and methodologies to encourage businesses within the Geopark to adopt environmentally responsible practices. This includes providing incentives and resources to businesses that adopt sustainable practices, such as reducing waste, conserving energy, and using sustainable materials. (3) Engage and empower the local community: The Board uses environmental communication concepts and methodologies to engage and empower the local community to participate in conservation efforts and promote sustainable practices. This includes developing educational programs, organizing awareness campaigns, and involving local community members in decision-making processes related to the Geopark's management and development. (4) Monitor and evaluate the impacts of development: The Board uses environmental communication concepts and methodologies to monitor and evaluate the impacts of economic development within the Geopark, and to adjust management strategies accordingly. This includes using indicators to measure the economic, social, and environmental impacts of development, and regularly assessing and reporting on these impacts. By using environmental communication concepts and methodologies to balance economic development with environmental conservation, the Ciletuh-Palabuhanratu UNESCO Global Geopark Management Board can create a sustainable and prosperous Geopark that benefits both the local community and the natural environment.

The Pentahelix collaboration concept provides a framework for addressing challenges and taking advantage of opportunities in the context of UNESCO Global Geoparks. This framework involves collaboration between five key stakeholders: government, academia, industry, civil society, and the local community. By working together, these

stakeholders can address complex environmental issues, promote sustainable development, and foster a culture of environmental stewardship. Here are some ways in which the Pentahelix collaboration concept be used to overcome challenges and take advantage of opportunities in the context of environmental communication strategies in UNESCO Global Geoparks: (1) Building Trust and Collaboration: The Pentahelix collaboration concept provides a framework for building trust and collaboration among different stakeholders. By engaging with government, academia, industry, civil society, and the local community, environmental communication strategies can be developed and implemented with the input and support of a wide range of stakeholders. (2) Tailoring Communication to Different Audiences: Effective environmental communication requires tailoring messages to different audiences with varying levels of knowledge and interest. By engaging with stakeholders from different sectors and backgrounds, the Pentahelix collaboration concept helps to ensure that communication strategies are developed with a deep understanding of the cultural norms and practices of different communities. (3) Promoting Education and Capacity Building: The Pentahelix collaboration concept can be used to promote education and capacity building among stakeholders. By engaging with academia and civil society, environmental communication strategies can be developed that promote learning and build capacity among local communities and stakeholders. (4) Leveraging Industry Partnerships: Industry partnerships can be leveraged to support environmental communication strategies in UNESCO Global Geoparks. By working with businesses and industries that operate within the Geopark, communication strategies can be developed that promote sustainable practices and engage with visitors and tourists. (5) Demonstrating Impact: The Pentahelix collaboration concept can be used to demonstrate the impact of environmental communication strategies in UNESCO Global Geoparks. By engaging with government, academia, industry, civil society, and the local community, the impact of communication efforts can be measured and evaluated, providing evidence of the positive outcomes of conservation and sustainability initiatives. Overall, the Pentahelix collaboration concept provides a framework for overcoming challenges and taking advantage of opportunities in the context of environmental communication strategies in UNESCO Global Geoparks. By engaging with stakeholders from different sectors and backgrounds, communication strategies can be developed that build trust, promote education and capacity building, leverage industry partnerships, and demonstrate impact.

Conclusion

Based on the analysis and discussion presented in this study, it is clear that effective environmental communication strategies and methodologies are crucial for supporting sustainable development goals in UNESCO Global Geoparks. By adopting a constructivist paradigm, qualitative approach, and case study research method, this study was able to explore the challenges and opportunities associated with environmental communication strategies in the Geopark context, and how these strategies can be leveraged to achieve sustainable development goals.

This study identified several challenges facing the Geopark Management Board, including the need to balance economic development with environmental conservation, address conflicting stakeholder interests, and overcome communication barriers. However, this study also highlighted numerous opportunities for the Board to use environmental communication theories and concepts to promote sustainable practices, engage the local community, and support the achievement of sustainable development goals.

One approach to addressing these challenges and taking advantage of these opportunities is through the Pentahelix collaboration concept, which involves bringing together stakeholders from government, industry, academia, civil society, and the local community to work towards common goals. By collaborating across these sectors and using environmental

communication concepts and methodologies, the Geopark Management Board can develop effective strategies for balancing economic development with environmental conservation, promoting sustainable practices, and achieving sustainable development goals.

In conclusion, this study provides a valuable contribution to the literature on environmental communication strategies and sustainable development in UNESCO Global Geoparks. By highlighting the challenges and opportunities associated with these strategies and methodologies, this study has provided insights and recommendations for Ciletuh-Palabuhanratu UNESCO Global Geopark Management Boards, stakeholders, and researchers working in this field. Ultimately, by using effective environmental communication strategies and methodologies, this study can ensure the sustainability of UNESCO Global Geoparks for future generations.

BIBLIOGRAPHY

1. Abdelkhalek, M. L., El Sharkawi, M. A., Darwish, M., Hagras, M., & Sehim, A. (1989). Structural history of Abu Roash district, Western Desert, Egypt. *Journal of African Earth Sciences (and the Middle East)*, *9*(3–4), 435–443. https://doi.org/10.1016/0899-5362(89)90027-4
2. Andriany, S. S., Rosana, M. F., & Hardiyono, A. (2016). Geotourism Geopark Ciletuh: Geotrek Surrounds the Beauty of the Mega Amphitheater Ciletuh (The Magical Of Ciletuh Amphitheater). *Bulletin of Scientific Contribution*, *14*(1), 75–88. https://doi.org/https://doi.org/10.24198/BSC
3. Ansori, C., Setiawan, N. I., Warmada, I. W., & Yogaswara, H. (2022). Identification of geodiversity and evaluation of geosites to determine geopark themes of the Karangsambung-Karangbolong National Geopark, Kebumen, Indonesia. *International Journal of Geoheritage and Parks*, *10*(1), 1–15. https://doi.org/10.1016/j.ijgeop.2022.01.001
4. Ardiansyah, N., Nugraha, K. S. A., & Ikhram, R. (2019). Geodiversity of Ciletuh-Palabuhanratu UNESCO Global Geopark, Sukabumi, West Java. *Indonesian Journal of Sedimentary Geology*, *44*(1), 11–18. https://doi.org/https://doi.org/10.51835/bsed.2019.44.1.66
5. Arrasyid, R., Urfan, F., Darsiharjo, Ruhimat, M., Setiawan, I., & Logayah, D. S. (2021). Edutourism development model in unesco global geopark ciletuh palabuhanratu sukabumi district. *IOP Conference Series: Earth and Environmental Science*, *683*(1), 012120. https://doi.org/10.1088/1755-1315/683/1/012120
6. Astuti, K. R. (2019). Infrastruktur Dan Teknologi Dorong Kemajuan UMKM. *Jurnal Forum Manajemen*, *17*(2), 71–86. https://ojs.stimihandayani.ac.id/index.php/FM/article/view/333
7. Bakti, I., Sumartias, S., Damayanti, T., & Nugraha, A. R. (2018). Development of a Tourism Communication Model Based on Local Wisdom in the Pangandaran Geopark Area. *Journal of Communication Studies*, *6*(2), 217. https://doi.org/10.24198/jkk.v6i2.18459
8. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa
9. Creswell, J. W. (2009). *Research Design : Qualitative, Quantitative, and Mixed Method Approaches*. SAGE.
10. Creswell, J. W., & Creswell, J. D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications, Inc. https://edge.sagepub.com/creswellrd5e
11. Criado, J. I., & O.de Zarate-Alcarazo, L. (2022). Technological frames, CIOs, and Artificial Intelligence in public administration: A socio-cognitive exploratory study in Spanish local governments. *Government Information Quarterly*, 101688. https://doi.org/10.1016/j.giq.2022.101688

12. Crofts, R. (2019). Linking geoconservation with biodiversity conservation in protected areas. *International Journal of Geoheritage and Parks*, *7*(4), 211–217. https://doi.org/10.1016/j.ijgeop.2019.12.002
13. Dale, L. C., Rawlinson, A. A., Bridgland, D. R., & White, M. J. (2021). The value of English geoconservation sites in understanding historical collections of lower and middle palaeolithic artefacts. *Proceedings of the Geologists' Association*. https://doi.org/10.1016/j.pgeola.2021.06.008
14. Deng, Z., Kang, J., & Fan, H. (2020). Environmental Regulation and Development Transformation in the Tropical and Subtropical Cities of China: A Big Data Analysis. *Tropical Conservation Science*, *13*, 194008292096149. https://doi.org/10.1177/1940082920961491
15. Du, Y., & Girault, Y. (2018). A Genealogy of UNESCO Global Geopark: Emergence and Evolution. *International Journal of Geoheritage and Parks*, *6*(2), 1–17. https://doi.org/10.17149/ijgp.j.issn.2577.4441.2018.02.001
16. Eder, F. W., & Patzak, M. (2004). Geoparks—geological attractions: A tool for public education, recreation and sustainable economic development. *Episodes*, *27*(3), 162–164. https://doi.org/10.18814/epiiugs/2004/v27i3/001
17. Farsani, N. T., Coelho, C. O. A., Costa, C. M. M., & Amrikazemi, A. (2014). Geo-knowledge Management and Geoconservation via Geoparks and Geotourism. *Geoheritage*, *6*(3), 185–192. https://doi.org/10.1007/s12371-014-0099-7
18. González-Salamanca, J. C., Agudelo, O. L., & Salinas, J. (2020). Key Competences, Education for Sustainable Development and Strategies for the Development of 21st Century Skills. A Systematic Literature Review. *Sustainability*, *12*(24), 10366. https://doi.org/10.3390/su122410366
19. Gordon, J. E. (2019). Geoconservation principles and protected area management. *International Journal of Geoheritage and Parks*, *7*(4), 199–210. https://doi.org/10.1016/j.ijgeop.2019.12.005
20. Gordon, J. E., Crofts, R., Gray, M., & Tormey, D. (2021). Including geoconservation in the management of protected and conserved areas matters for all of nature and people. *International Journal of Geoheritage and Parks*, *9*(3), 323–334. https://doi.org/10.1016/j.ijgeop.2021.05.003
21. Gray, M. (2019). Geodiversity, geoheritage and geoconservation for society. *International Journal of Geoheritage and Parks*, *7*(4), 226–236. https://doi.org/10.1016/j.ijgeop.2019.11.001
22. Gustafson, A., Ballew, M. T., Goldberg, M. H., Cutler, M. J., Rosenthal, S. A., & Leiserowitz, A. (2020). Personal Stories Can Shift Climate Change Beliefs and Risk Perceptions: The Mediating Role of Emotion. *Communication Reports*, *33*(3), 121–135. https://doi.org/10.1080/08934215.2020.1799049
23. Halder, S., & Sarda, R. (2021). Promoting intangible cultural heritage (ICH) tourism: Strategy for socioeconomic development of snake charmers (India) through geoeducation, geotourism and geoconservation. *International Journal of Geoheritage and Parks*, *9*(2), 212–232. https://doi.org/10.1016/j.ijgeop.2021.02.008
24. Hall, C. M., Gossling, S., & Scott, D. (Eds.). (2015). *The Routledge Handbook of Tourism and Sustainability*. Routledge. https://doi.org/10.4324/9780203072332
25. Hardini, A. S. P., Makalew, A. D. N., & Munandar, A. (2019). *Perencanaan Geo-area Ciletuh Berbasis Mitigasi Bencana dan Karakter Lanskap di Geopark Ciletuh-Palabuhanratu Kabupaten Sukabumi* [Institut Pertanian Bogor].

https://repository.ipb.ac.id/handle/123456789/100198

26. Hardiyono, A., Syafri, I., Rosana, M. F., Yuningsih, E. Y., Herry, & Andriany, S. S. (2015). Potensi Geowisata di Kawasan Teluk Ciletuh Sukabumi Jawa Barat. *Bulletin of Scientific Contribution*, *15*(2), 119–127. https://doi.org/https://doi.org/10.24198/bsc%20geology.v13i2.8396
27. Harini, R. (2021). *Valuasi Ekonomi Di Kawasan Geopark: Sebuah Kajian Untuk Mitigasi Bencana Lingkungan* (1st ed.). UGM Press. https://ugmpress.ugm.ac.id/en/product/geografi/valuasi-ekonomi-di-kawasan-geopark-sebuah-kajian-untuk-mitigasi-bencana-lingkungan
28. Hawkins, D. S. (2022). Global Youth Engagement in Promoting Community Empowerment in Indonesian Geoparks Development: Prospects and Challenges for Indonesia Geopark Youth Forum. *Journal of Social Development Studies*, *3*(1), 29–40. https://doi.org/10.22146/jsds.3737
29. Ibrahim, M. S. N., Abdul-Halim, S., Ishak, M. Y., & Hassan, S. (2021). The local community awareness on Langkawi UNESCO Global Geopark status: Case of Kampung Padang Puteh, Langkawi, Malaysia. *International Journal of Geoheritage and Parks*, *9*(2), 233–241. https://doi.org/10.1016/j.ijgeop.2021.02.009
30. Ikhram, R., Syafri, I., & Rosana, M. F. (2019). Petrological Characteristic and Whole Rock Geochemistry of Metamorphic Rocks in Melangè Complex of Ciletuh Area, West Java, Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, *9*(6), 1798–1806. https://doi.org/10.18517/ijaseit.9.6.8735
31. Kadarisman, A., Gemiharto, I., & Nugraha, A. R. (2018). Pelatihan Strategi Komunikasi Berbasis Ekonomi Kreatif, Lingkungan dan Pariwisata di Kawasan Geopark Ciletuh-Palabuhanratu Kabupaten Sukabumi Propinsi Jawa Barat. *Jurnal Pengabdian Kepada Masyarakat Universitas Padjadjaran*, *2*(11), 1–9. https://jurnal.unpad.ac.id/pkm/article/view/20389
32. Kharbish, S., Henaish, A., & Zamzam, S. (2020). Geodiversity and geotourism in Greater Cairo area, Egypt: implications for geoheritage revival and sustainable development. *Arabian Journal of Geosciences*, *13*(12), 451. https://doi.org/10.1007/s12517-020-05457-w
33. Kubalíková, L., Drápela, E., Kirchner, K., Bajer, A., Balková, M., & Kuda, F. (2021). Urban geotourism development and geoconservation: Is it possible to find a balance? *Environmental Science & Policy*, *121*, 1–10. https://doi.org/10.1016/j.envsci.2021.03.016
34. Lee, Y., & Jayakumar, R. (2021). Economic impact of UNESCO Global Geoparks on local communities: Comparative analysis of three UNESCO Global Geoparks in Asia. *International Journal of Geoheritage and Parks*, *9*(2), 189–198. https://doi.org/10.1016/j.ijgeop.2021.02.002
35. Liu, C., Li, W., Xu, J., Zhou, H., Li, C., & Wang, W. (2022). Global trends and characteristics of ecological security research in the early 21st century: A literature review and bibliometric analysis. *Ecological Indicators*, *137*, 108734. https://doi.org/10.1016/j.ecolind.2022.108734
36. Luo, P., Sun, Y., Wang, S., Wang, S., Lyu, J., Zhou, M., Nakagami, K., Takara, K., & Nover, D. (2020). Historical assessment and future sustainability challenges of Egyptian water resources management. *Journal of Cleaner Production*, *263*, 121154. https://doi.org/10.1016/j.jclepro.2020.121154
37. Maibach, E. W., Nisbet, M., Baldwin, P., Akerlof, K., & Diao, G. (2010). Reframing climate change as a public health issue: an exploratory study of public reactions. *BMC Public Health*, *10*(1), 299. https://doi.org/10.1186/1471-2458-10-299
38. Maulana, A. (2017). *Prof. Mega Fatimah*

Rosana, "Puslit Geopark dan Kebencanaan Geologi Unpad Dapat Apresiasi dari Tim Asesor". Kantor Komunikasi Publik Universitas Padjadjaran. https://www.unpad.ac.id/2017/08/prof-mega-fatimah-rosana-puslit-geopark-dan-kebencanaan-geologi-unpad-dapat-apresiasi-dari-tim-asesor-unesco/

39. Mihardja, E. J., Agustini, P. M., & Kuntarto, G. P. (2020). Knowledge Configuration about Ciletuh UNESCO Global Geopark in Mass Media. *Jurnal Komunikasi Ikatan Sarjana Komunikasi Indonesia*, *5*(2). https://doi.org/10.25008/jkiski.v5i2.428
40. Mitter, H., Larcher, M., Schönhart, M., Stöttinger, M., & Schmid, E. (2019). Exploring Farmers' Climate Change Perceptions and Adaptation Intentions: Empirical Evidence from Austria. *Environmental Management*, *63*(6), 804–821. https://doi.org/10.1007/s00267-019-01158-7
41. Mustikaningsih, M., Novianti, E., & Sjoraida, D. F. (2019). Destination Branding Kawasan Wisata Ciletuh-Palabuhanratu Sukabumi Melalui Geopark. *Bulletin of Scientific Contribution*, *17*(2), 77–84. https://doi.org/https://doi.org/10.24198/bsc%20geology.v17i2.21779
42. Natarina, D., & Sachari, A. (2021). Multi Media untuk Menunjang Edukasi Upaya Pengurangan Resiko Bencana di Kawasan Geopark Ciletuh. *Prosiding Balai Arkeologi Jawa Barat*, 363–373. https://doi.org/10.24164/prosiding.v4i1.32
43. Nazaruddin, D. A. (2020). Granite landforms of Samui Island (southern Thailand) from geoheritage, geoconservation and geotourism perspectives. *International Journal of Geoheritage and Parks*, *8*(2), 75–86. https://doi.org/10.1016/j.ijgeop.2020.05.003
44. Panji, I. (2018). *Geopark Ciletuh dari Kacamata Prof.Ir.Mega Fatimah Rosana .M.Sc,Ph.d*. Tatarsukabumi.Id. https://www.tatarsukabumi.id/read/3771/Geopark-Ciletuh-dari-Kacamata-ProfIrMega-Fatimah-Rosana-MScPhd
45. Putri Hardini, A. S., Makalew, A. D., & Munandar, A. (2019). Pemetaan Zona Ekologis dan Identifikasi Geomorfologi Lanskap Geo-Area Ciletuh di Kabupaten Sukabumi. *Jurnal Lanskap Indonesia*, *10*(2), 81–90. https://doi.org/10.29244/jli.2018.10.2.81-90
46. Ramírez, A. S., Ramondt, S., Van Bogart, K., & Perez-Zuniga, R. (2019). Public Awareness of Air Pollution and Health Threats: Challenges and Opportunities for Communication Strategies To Improve Environmental Health Literacy. *Journal of Health Communication*, *24*(1), 75–83. https://doi.org/10.1080/10810730.2019.1574320
47. Ríos, C. A., Amorocho, R., Villarreal, C. A., Mantilla, W., Velandia, F. A., Castellanos, O. M., Muñoz, S. I., Atuesta, D. A., Jerez, J. H., Acevedo, O., Vargas, M., Caballero, V. M., Goso, C. A., & Briggs, A. (2020). Chicamocha Canyon Geopark project: A novel strategy for the socio-economic development of Santander (Colombia) through geoeducation, geotourism and geoconservation. *International Journal of Geoheritage and Parks*, *8*(2), 96–122. https://doi.org/10.1016/j.ijgeop.2020.05.002
48. Rodrigues, J., Neto de Carvalho, C., Ramos, M., Ramos, R., Vinagre, A., & Vinagre, H. (2021). Geoproducts – Innovative development strategies in UNESCO Geoparks: Concept, implementation methodology, and case studies from Naturtejo Global Geopark, Portugal. *International Journal of Geoheritage and Parks*, *9*(1), 108–128. https://doi.org/10.1016/j.ijgeop.2020.12.003
49. Rosana, M. F., Mardiana, U., Syafri, I., Sulaksana, N., & Haryanto, I. (2006). Geologi Kawasan Ciletuh, Sukabumi : Karakteristik, Keunikan Dan Implikasinya. *Lokakarya Penelitian Unggulan Dan Pengembangan Program Pascasarjana FMIPA UNPAD*, 1–14.

https://pustaka.unpad.ac.id/archives/127437

50. Sánchez-Cañizares, S., Castillo-Canalejo, A., & Cabeza-Ramírez, L. (2018). Sustainable Tourism in Sensitive Areas: Bibliometric Characterisation and Content Analysis of Specialised Literature. *Sustainability*, *10*(5), 1525. https://doi.org/10.3390/su10051525
51. Sapat, A., Lofaro, R. J., & Trautman, B. (2022). Policy responsiveness and institutions in a federal system: Analyzing variations in state-level data transparency and equity issues during the COVID-19 pandemic. *International Journal of Disaster Risk Reduction*, *77*, 103066. https://doi.org/10.1016/j.ijdrr.2022.103066
52. Saraswati, H. D., & Afifi, S. (2022). Strategi Komunikasi Pemasaran Pariwisata di Masa Pandemi Covid-19. *CoverAge: Journal of Strategic Communication*, *12*(2), 138–155. https://doi.org/10.35814/coverage.v12i2.2743
53. Servaes, J., & Lie, R. (2015). New challenges for communication for sustainable development and social change: a review essay. *Journal of Multicultural Discourses*, *10*(1), 124–148. https://doi.org/10.1080/17447143.2014.982655
54. Wang, Y., Wu, F., Li, X., & Chen, L. (2019). Geotourism, geoconservation, and geodiversity along the belt and road: A case study of Dunhuang UNESCO Global Geopark in China. *Proceedings of the Geologists' Association*, *130*(2), 232–241. https://doi.org/10.1016/j.pgeola.2019.01.004
55. Yanuar, Y., Anna, Z., Hindayani, P., Rosana, M. F., Sudrajat, A., & Zakaria, Z. (2018). Prospective Analysis of Sustainable Development Strategy of Geopark Tourism Of Ciletuh-Palabuhanratu West Java Indonesia. *International Journal of Current Innovation Research*, *4*(2), 1033–1039. https://doi.org/http://dx.doi.org/10.24327/IJCIR
56. Yanuar, Y., Anna, Z., Rosana, M. F., Rizal, A., Sudrajat, A., & Zakaria, Z. (2018). Keberlanjutan Pengembangan Geopark Ciletuh Palabuhanratu Dalam Perspektif Infrastruktur. *Jurnal Sosial Ekonomi Dan Pekerjaan Umum*, *10*(1), 64–76. https://www.researchgate.net/publication/327776648_KEBERLANJUTAN_PENGEMBANGAN_GEOPARK_NASIONAL_CILETUH-PALABUHAN_RATU_DALAM_PERSPEKTIF_INFRASTRUKTUR_SUSTAINABLE_DEVELOPMENT_OF_GEOPARK_NATIONAL_CILETUH-PALABUHANRATU_IN_THE_INFRASTRUCTURE_PERSPECTIVE
57. Yin, R. K. (2012). *Case Study Research. Design and Methods* (4th ed.). SAGE Publications, Inc. https://www.jstor.org/stable/23279888
58. Yorgey, G. G., Hall, S. A., Allen, E. R., Whitefield, E. M., Embertson, N. M., Jones, V. P., Saari, B. R., Rajagopalan, K., Roesch-McNally, G. E., Van Horne, B., Abatzoglou, J. T., Collins, H. P., Houston, L. L., Ewing, T. W., & Kruger, C. E. (2017). Northwest U.S. Agriculture in a Changing Climate: Collaboratively Defined Research and Extension Priorities. *Frontiers in Environmental Science*, *5*. https://doi.org/10.3389/fenvs.2017.00052
59. Zheng, L., Wang, Y., & Li, J. (2021). How to achieve the ecological sustainability goal of UNESCO Global Geoparks? A multi-scenario simulation and ecological assessment approach using Dabieshan UGGp, China as a case study. *Journal of Cleaner Production*, *329*, 129779. https://doi.org/10.1016/j.jclepro.2021.129779