Diversity of Geological and Non-Geological Sites in Spatial Planning of the North Geopark Karangsambung-Karangbolong Area

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Abstract: Geopark is a concept of sustainable regional development that has a function as a conservation area, education, and development of the local economy. The Karangsambung geological protected area in the north part and the Karst Gombong Landscape Area in the southern part, including 543,599 km^2 area, has been designated as the National Geopark. The determination of this area is based on the unique geological diversity accompanied by non-geological diversity. Both of these areas are geological protected areas, as stated in Government Regulation (*Peraturan Pemerintah*/PP) No. 26 of 2008 (*RTRWN*), Local Government Regulation (*Peraturan Daerah/*Perda) No 6 the Year 2010 (*RTRW* of Central Java Province) and Perda No. 23 of 2010 (RTRW of Kebumen Regency). The northern Geopark region is known for its diversity of rocks resulting from the process of plate subduction from 117 to 55 million years ago to produce complex and unique geological conditions that interact with environmental conditions to produce flora, fauna, and culture. In conducting spatial planning of the geopark area, consideration of the existence of geological and non-geological sites is considered. This study aims to do a description, to know the distribution of geological and non-geological sites, to conduct zoning and the formulation of policy patterns to support the preparation of detailed geopark spatial planning. It is expected that with the geopark zoning, the use of existing space and activities can be aligned and support the protected function of the area. Based on the distribution of geological and non-geological diversity, the northern geopark region is composed of 4 (four) zones with Luk Ulo River as the main zone of the geopark area. Zone-1 is around the district Karangsambung with a focus on geological heritage (geo-heritage), zone-2 with a focus on the development of geological-based agro-tourism (geo-agro) which is located around Sadang district. Zone-3 with the emphasis on developing geological - based water tourism (geo-water) around the Alian district. While zone-4 (geo-culture) with the focus of the development of geological-based cultural tourism in the district of Karaggayam.

Keywords: geological and non-geological site; North of Karangsambung-Karangbolong Geopark; spatial planning

1. Introduction

Geopark is a protected area with outstanding geological elements-including archaeological, ecological, and cultural values - where local communities are invited to participate in protecting and improving the function of natural heritage (Global Geoparks Network, 2017).

According to Indonesian geopark regulation *(Peraturan Presiden No 9/2019 tentang Penyelenggaraan Taman Bumi* (Geopark), 2019), the Geopark is a single or combined geographic area that has geosite and landscape heritage sites, related to aspects of geological heritage (geoheritage), geodiversity, biodiversity and cultural diversity managed for conservation, education and sustainable economic development of the community with active involvement of the community and local government so that it can be used to foster understanding and concern for the community towards the earth and the environment (Pemerintah Republik Indonesia, 2019). Geological diversity is a picture of the uniqueness of geological components such as minerals, rocks, fossils, geological structures, and landscapes that become the essential wealth of an area and its existence, wealth distribution, and its condition that can represent a picture of the geological evolution of the area. Geological heritage is a geological diversity that has more value as heritage because it is a record that has been or is happening on earth because of its high scientific value, rare, unique and beautiful, so that it can be used for

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research and earth education. Geosite is a geological heritage in a geopark with certain characteristics both individual and multi-object and is an integral part of the story of the geological evolution of the area. Biodiversity is diversity among living things from all sources including land, oceans and other aquatic ecosystems and ecological complexes that are part of diversity. Culture diversity is a culture of the past and present, both tangible and intangible.

To utilize the earth's heritage, it is necessary to develop the potential area to become a geopark. Geopark development is a geopark management system to realize the preservation of geological heritage, geological diversity, biodiversity and cultural diversity carried out jointly between regional, central and other stakeholders through conservation efforts, education and sustainable economic development of the community. National Geopark is an area that has outstanding geological elements which are of various national haritage based on certain criteria set. Geopark Initiation is an effort to integrate conservation efforts and save the important meaning of geological heritage in sustainable socio-economic and cultural development. With the existence of the Geopark, the Karangsambung Geological Reserve can provide benefits to the surrounding community in terms of improving welfare, as well as protecting the geological wealth in the area.

The Karangsambung Geological Natural Preserve area is one of the areas in the northern Kebumen region, covering Karangsambung, Sadang, Karanggayam and Alian Subdistrict. The Karangsambung Geological Natural Preserve Area is appointed by Minister of Energy and Mineral Resources Decree No. 2817 K/40/ MEM /2006, it is consisting of 30 geodiversity. Karangsambung is a natural laboratory and geological monument because there are many variety of rocks and interesting geological structures in narrow areas. The importance of scientific value has increased after the emergence of plate tectonic theory. According to geologists this area was once a convergent plate boundary in the form of a subduction pathway in the Cretaceous that continued to the Meratus Mountains, Kalimantan (Prasetyadi et al., 2006). The rocks from the collision are now raised to the surface and can be observed in relatively fresh conditions. Karangsambung is evidence of plate tectonic theory and is a reference for world researcher and students (Asikin, Harsolumakso, Busono, & Gafoer, 1992).

The economic development in line with conservation and education is a geotourism activity. Geotourism is a special interest tourism by exploring the potential of natural resources of geology such as landscape, rocks, structure, and the history of the earth with the focus to enrich the insight and understanding the process of natural physical phenomena (Ansori, C., Yugo K., Hastria D., 2016). Geotourism activities run by communities in Geopark are important components that support the successful management of Geopark. The key to the successful development and management of Geopark is on the role and active participation of local communities and understand the geoparks themselves (Ansori, 2018).

Utilization of the Karangsambung Geological Preserve Area has been more likely to be a natural laboratory for students who want to learn about earth. Besides high tourism potential, however Karangsambung area holds several problems such as illegal mining activities and inequality perception in handling the region.

The World Commission on Environment and Development in our common future (1987) defines sustainable development aims to meet the needs of the present generation without having to reduce the ability of future generations to meet their own needs. One of the main objectives of building and developing geopark is to stimulate economic activity at the level of sustainable development. The function of promoting sustainable social, economic, cultural and environmental development will have a direct impact on the region in the form of improving the quality of human life and the environment in the region.

Specifically, related to the problems that exist in the Karangsambung Geological Reserve Area, natural resource-based development planning becomes urgent. Excessive exploitation of natural resources and indifferent attitude towards geoheritage wealth will affect the destruction of nature. So that a change in the mindset of the community is needed in the management of the environment from exploitation to conservation by taking benefits through the concept of Geopark.

The purpose of the study is inventorying the diversity of geology, culture and biology; it can be used for development planning Karangsambung area. The aim of the study was to make a zoning of Geopark development with a healthy, balanced management system in favor of conservation, as well as natural and earth education.

2 Research Method

This research includes an inventory and analysis of regional policies, geological, biological and cultural diversity. Field research was carried out through conditions and distribution of geological diversity, biological and cultural diversity. The distribution of observations was then depicted using GIS and then zoning the geopark development area. The results of this analysis are then used to develop the basic concepts of regional spatial planning for the development of Geopark.

3 Result and Analysis

3.1 Government Policy

The development of the Geopark area is not possible without the support of regulations/policies that shelter it. Some policies that encourage the development of the Karangsambung geopark explain in Table 1.

Table 1: Regulation and policy analysis of Karangsambung Region

No	Regulation	Content Analysis
1	Law Number 11 of 2010 concerning Cultural Heritage	Action to preserve the nation's cultural heritage and the heritage of mankind, it means that we strive to improve the nation's dignity, strengthen the personality of the nation and aim to improve people's welfare;
2	Republic of Indonesia Government Regulation Number 50/2011 concerning the Master Plan for National Tourism Development 2010 - 2025	In its development, Karangsambung Region is part of national development in the form of National Tourism Development Zone KPPN as Karst Kebumen and Surroundings. So that it has implications for development, planning of tourism activities that lead to karst/earth regions.
3	Government Regulation Number 26/ 2008 concerning National Regional Spatial Planning	Karangsambung Region has been designated as a National Protected Area of Karangsambung Geological Reserve. So that the programs and activities that exist in the Karangsambung area can be through central / national authority.
4	Minister Regulation No. 32/ 2016, concerning Guidelines for Determining Geological Reserve Areas (KCAG)	a. It is expected to be a reference in arranging regional spatial plans, so that there is legal certainty in protecting the diversity and uniqueness of geology at the national, provincial, district / city and surrounding communities. b. The existence of geological protection efforts is expected to improve the quality and quantity of geology scholars in Indonesia as well as by protecting the diversity and uniqueness of geology that is expected to encourage the emergence of new geographic tourism locations in Indonesia. c. Karangsambung has fulfilled the main requirements, namely having a conservation function
5	Minister of Energy and Mineral Resources Decree No. 2817 K / 40 / MEM / 2006, Determination of the Karangsambung Geological Reserve Area	Through this ministerial decree, the boundaries that are clearly included in the Karangsambung Geological Reserve area, so that the activities / utilization of space in this area must be in accordance with its designation as a conservation area.
6	Regional Regulation of Central Java Province Number 6/ 2010, about Central Java Province Spatial Planning for 2009 - 2029	Determination of the geological heritage area is located in Karangsambung Kebumen Regency as a Geological Protected Area in Central Java
7	Regional Regulation of Kebumen No. 23/ 2012 Kebumen Regional Spatial Planning	a. Karangsambung area is defined as a National Strategic Area From the point of view of the function and carrying capacity of the environment as the Karangsambung Geology area; b. Reinforced in the Provincial Strategic Area, the Karangsambung Geological Reserve Area as a strategic area from the perspective of the utilization of natural resources and / or high technology.

3.2 Geodiversity

Geological diversity includes the diversity of rocks, minerals, fossils, geological structures and landscapes that are part of the evolution of an area. The geological diversity found in the karangsambung area can be seen in Table 2. Spatial distribution of geodiversity in Karangsambung area can be seen in Figure 1.

Table 2: Geodiversity at Karangsambung Area

No	Name of Geodiversity	Location	Coordinate		Discription
			X	Y	
Geodiversity Location is not Protected					
1	G. Indrakila	Pujotirto, Karangsambung	361985	9161579	Halang Formation of volcanic breccia, amphitheater morphology, Wadaslintang Dam
2	Embung Cangkring	Cangkring, sadang	363597	9170185	Differences between tertiary morphology (Waturanda, Penosogan) and pratersier melange complex, utilization of embung
3	Curug Cinta	Pandansari, Sruweng	347502	9156894	Waterfall which is above tuffaceous sandstone Halang Fm, no water during the dry season

No	Name of Geodiversity	Location	Coordinate		Discription
			X	Y	
4	Watugede	Penusupan, Sruweng	347078	9160078	Block of volcanic breccia on tufaaceous sandstone Halang Formation
5	Curug Silangit	Sidoagung, Sruweng	345903	9157441	waterfall that is above the tuffaceous sandstone Halang Fm, no water at dry season
6	Bukit Pranji	Pengaringan, Pejagoan	349106	9160594	Camping ground, sun rise, Halang Fm
7	Pesona Kayangan	Karanggayam, karanggyam	342189	9160092	Morphology of structural mountain Penosogan Fm, good view, sun rise above the clouds, meet facilities
8	Gunung Tumpeng	Karanggayam, karanggyam	343907	9159310	The morphology structural mountain of Penosogan Fm, Tayuban the cultural attraction of Suran, a mountain like a cone
9	Curug Sikebut	Ginandong, Karanggayam	343064	9165665	The waterfall that is above the sandstone of Waturanda Fm, access road is difficult, no water at dry season
10	Curug Botak	Gunungsari, karanggayam	346089	9166073	The waterfall which is above the volcanic breccia of Waturanda Fm, no infra structure, no water at dry season
11	Kalianget	Wadasmalang, Krsambung	359201	9163022	Non volcanic warm water, neutral, on sandstone of Waturanda Fm, which borders of Penosogan Fm, discharge around 3 l/ sec, 38 ^{0}C
12	Curug Sindaro	Wadasmalang, Krsambung	359449	9164217	The 4 levels waterfall, about 17 m height, in Waturanda Fm. breccia
13	PAP Krakal	Klakal, Alian	356557	9158067	sodium chloride hot water, base, found in the plain morphology, sandstone of Penosogan Fm, built in 1905
14	Gua Jlarang	Peniron, Pejagoan	349842	9161450	Fracture cave, contact between volcanik breccia and clay stone of Penosogan Fm
15	Brujul Adventure Park	Peniron, Pejagoan	352449	9162229	Amphitheater morphology and old volcanic rocks
16	Curug Gupit	Kebakalan, Karanggayam	351092	9163543	stepped waterfall, untapped, the road to the location is difficult
17	Pentulu Indah	Karangsambung			Differences between tertiary and pre-tertiary morphology with G. Sindoro - G. Sumbing background, sun rise above the clouds
18	Gua Sikempul & Silodong	Langse, Krsambung	355332	9163184	Cave on limestone, with a tunnel length about 100 m
19	Gua langse	Langse, Karangsambung	354706	9163317	The protected location, cave on the numulites limestone
Protected Geodiversity					
3	Mica schist	S. Loning, sadang Wetan	109º 44' 29"	7º 29' 58"	Foliation of metamorphic rocks, contain mica, Upper Cretaceous. Change of sedimentary rocks on the edge of the continental plate
3A	Red Chert	Sadang Wetan	109º 44' 16.8"	7º 29' 45"	Oceanic sea floor sediment, at 4000 m depth, radiolaria fossil, Lower Cretaceous.
4	Claystone	Cangkring, Sadang	109º 44' 24"	7º 30' 42"	chaotic sediment structure due to repeated gravity forces (olistostrome) from the Totogan Formation
5	Mica schist	S. Brengkok, Sadang Kulon	109º 43' 28"	7º 30' 59"	the basement of Java, radioactive dating (K-Ar) 117 million years ago (Ketner et al., 1976)
6	Chert and Pillow lava	Kali Muncar, Seboro, Sadang	109º 42' 27.9"	7º 30' 36.2"	Crash of rocks, Radiolaria fossils are Upper Cretaceous (Wakita, 1991). Lava pillow, formed at MOR
6A	Granulit Schist	Kali Muncar, Seboro, Sadang	109º 42' 21"	7º 30' 03"	Metamorphic rocks, containing garnet and bluish colored minerals. High degree of metamorphosis in subduction zone, depth of more than 35 km

No	Name of Geodiversity	Location	Coordinate		Discription
			X	Y	
7	Serpentinite	Pucangan, Karangsambung	109º 41' 30"	7º 31' 16"	ultra-basic rocks metamorphic, freezing of magma in the oceanic crust, the original magma is thought from the Earth's mantle. The change process itself occurs in 2 phases, the Cretaceous era
8	Green Schist	Totogan, Karangsambung	109º 40' 53"	7º 31' 00"	low-grade metamorphic rocks that formed above the subduction zone in the mélange complex (Ansori C, 2004)
9	Gabro and Basalt	S. Lokidang	109º 39' 51"	7º 30' 25"	Basalt and Gabro, black and grayish in color, shows a gradation structure forming the gabro layer, formed in the middle of the ocean ridge / MOR (Ansori C, 2004)
10	Marble	Totogan	109º 40' 26"	7º 31' 28"	Metamorphic limestone due to tectonic influences on continental crust. Associated with talc and mica schist and indications of fracture (Ansori C, 2004)
11	Phyllite	Gunung Sipako	109º 39' 56"	7º 32' 14"	Low-grade metamorphosis. micro folded and scratch line structures (slicken side) are formed (Ansori C, 2004)
12	Basaltic breccia	S. Mandala	109º 40' 02"	7º 32' 25"	the pillow lava is contracted, sinistral faut. The boundary between tectonic melange in the north with sedimentary melange in the south (Ansori C, 2004)
13	Diabase and claystone	Dakah	109º 40' 08"	7º 32' 28"	Diabas intrusion at Karangsambung clay rock formation, 38 million years ago (Soriaatmaja, 1991). There is a columnar joint, which describes the flow of magma and the position of the cooling field (Ansori C, 2004)
14	Nummulites Limestone	Kampus	109º 40' 18"	7º 32' 43"	Limestone contains fossils of large foraminifera numulites, alveolina, flosculina, pellatispira, assilina and quinqueloculina, Eocene Era (55 million) (Ansori C, 2004)
15	Conglomerate	Pesanggrahan	109º 40' 04"	7º 32' 48"	gradation and flute cast structure, old river deposits. There are intersections of sandstones and claystones, containing young coal (Ansori C, 2004)
16	Spring	Dakah	109º 40' 35"	7º 32' 08"	
17	Claystone and conglomerate	Karangsambung	109º 40' 23"	7º 32' 55"	Scaly clay as easily broken claystone, characterizes of Karangsambung Fm. There are iron nodules and fragments of quartz conglomerates
18	Diabase	Bujil 1	109º 41' 14"	7º 32' 58"	diabas intrusion that cuts the clay stone of Karangsambung Fm. This outcrop forms the isolated hill, due to the erosion process.
19	Diabase	Bujil 2	109º 41' 08"	7º 33' 02"	Diabas dike, which cuts claystone of Karangsambung Fm
20	Claystone	Krajan	109º 40' 49"	7º 33' 15"	Scaly clay, the character of the Karangsambung Formation. There are iron nodules and fragments of quartz conglomerates.
21	Basaltic lava	Langse	109º 40' 36"	7º 34' 02"	Pillow structure and amigdaloidal lava, reddish-colored silica. Fine crystals, olistolith lava product of sub water slumping
22	Reef limestone	Jatibungkus	109º 40' 56"	7º 34' 03"	foraminiferal packstone, talus breccia rudstone, algae packstone and sandy conglomeratic packstone rock. Large foraminifera fossils, red algae, green algae and milliodides, fragment of quartz and metamorphic rocks
23	Andesite breccia	Waturanda	109º 40' 37"	7º 34' 27"	the intersection of sandstones with breccias, the layers are very good and suitable to explain the sequence of rock formation

No	Name of Geodiversity	Location	Coordinate		Discription
			X	Y	
24	Spring water	Kali Gending			
25	Calcarenite	Kali Kudu	109º 41' 40"	7º 35' 32"	The alternating between calcarenite, calcareous clay stones and tuffaceous sandstone, Penosogan Fm
26	Chert and red limestone	Wagirsambeng	109º 39' 09"	7º 32' 51"	The alternating between chert and red claystone. amphitheater morphology and complex melange
27	Greywacke	Wagirsentul	109º 39' 21"	7º 32' 21"	Boudinage in the melange complex with prismatic morphology
28	Basalt	Gunungsari	109º 36' 30"	7º 33' 02"	Basalt igneous rocks with sheeting joints
29	Conglomerate	Wagirtumpang	109º 37' 02"	7º 32' 28"	Composed of white quartz, sandstone, red chert, silt stone, black and metamorphic rocks, silicate cemented
30	Claystone	Wagirtumpang	109º 36' 58"	7º 32' 23"	the alternating between clay stone and sandstone that has been rotated from the Totogan Fm, the slumping structure indicates the presence of a gravity erosion process during the formation of the Totogan Formation

3.2.1 Diversity of non-geological site

a. Culture Diversity

Kebumen means Kebumian is the new name of Panjer district which means the initial milestone. Luk Ula River is the name of the river in Kebumen Regency which starts from Karangsambung sub-district to the South until into the Indian Ocean. Luk Ula is an antecedent river formed which cuts the fold structure of tertiary rocks around 15 million years ago. Around this river there is a wide variety of cultural heritage sites (Table 3).

Table 3: Culture Diversity at Karangsambung Area

No	Culture Site Name	Location	Coordinate		Information
			X	Y	
1	Punden berundak (Situs talangpati)	Pujotirto, Karangsambung	362795	9159926	Step place of worship, mataram era (Prehistoric Period and Hindu Buddhist period or Ancient Mataram period around VIII-X AD). Talangpati and Pipisan sites has a width of 190 cm, height of shoes 18 cm and height of structure above of shoes 15 cm
2	G. Indrakila	Pujotirto, Karangsambung	361985	9161579	The mountain event venue, assembled with the puppet character R. Arjuna when he became Begawan Ciptaning, there were ascetics and springs. This hill is the highest point in the region
3	Batu tulis	Sadang Wetan, sadang	362721	9170530	The former inscriptions on diabas rocks, the separator between the kingdoms of Majapahit, were covered with dirt
4	Sanggrahan Caplang	Penusupan, Sruweng	346790	9159900	A place of pray to God, known as Mbah Caplang
5	Petilasan Mbah Walisongo	Penusupan, Sruweng	346859	9159365	Every month Suro is carried out with a tomb with thanksgiving that is followed by all residents

No	Culture Site Name	Location	Coordinate		Information
			X	Y	
6	Petilasan Puncak G. Condong	Condong Campur, Sruweng	347503	9160422	The igneous rock that the residents saved to meditate
7	Makam Mbah Agung	Karngtengah, Karanggayam	346058	9161153	The Sacred Tomb of the Mataram Kingdom family, often visited by people from various regions
10	Petilasan Panembahan Senopati	Kaligending, Karangsambung	353904	9161131	Trail trip of Panembahan Senopati studied at Kyai Gending which was marked by a whisper hearing the sound of gending from the west, each suro was held a feast and performances of Ebeg
11	Petilasan Mbah Astra Guna	Peniron, Pejagoan	350243	9161164	The location of the Astra Guna in order to make the kris use their hands
12	Makam Sipako- Kertadrana	Wonotirto, Karanggayam	352507	9166702	The tomb of the sacred Diponegoro warrior, often used for pilgrimage
13	Museum Tosan Aji	Clapar, karanggayam	348167	9164578	Heritage museum inherited from Untung Suropati, there are kris and tumbak.
14	Makam Mbah Kepadangan/Untung Suropati	Clapar, karanggayam	347560	9163606	Cultural heritage that many people visit to approach meditation / hermitage.
18	Pendopo adipati Panjer Gunung	Banioro, karangsambung	353869	9163817	The former Kolopaking V pavilion, on an area of 400 m2, in the form of stacked stones and large trees

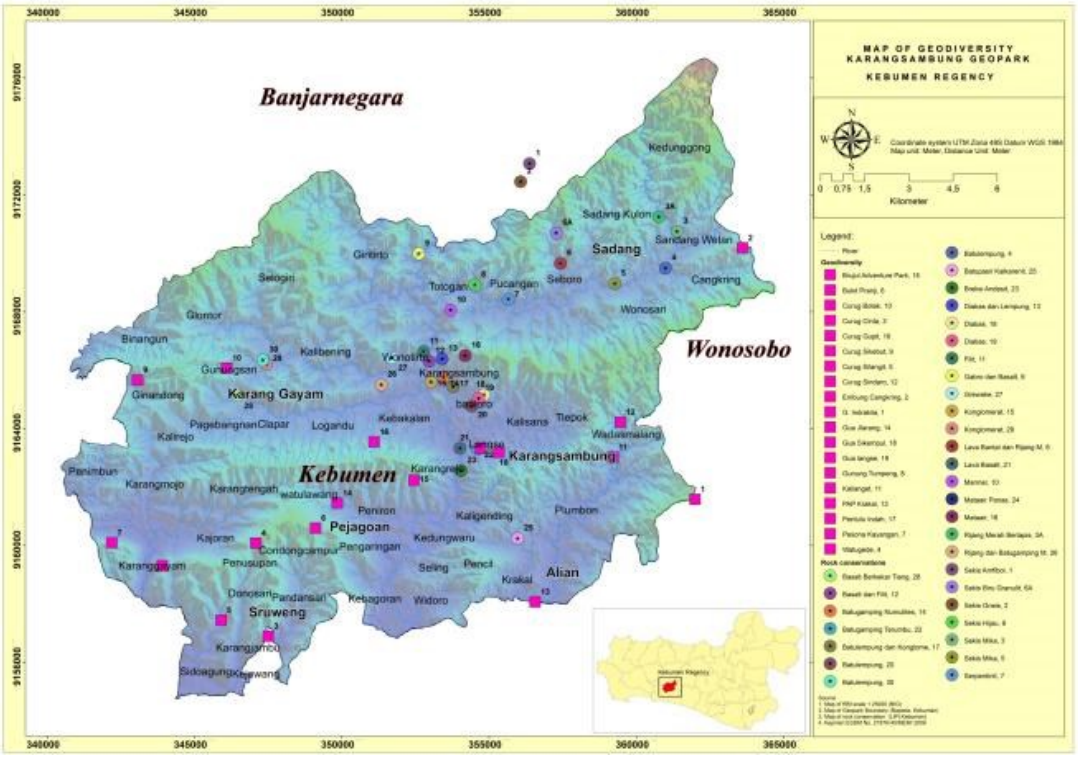

Figure 1. Geodiversity Map of Karangsambung Area

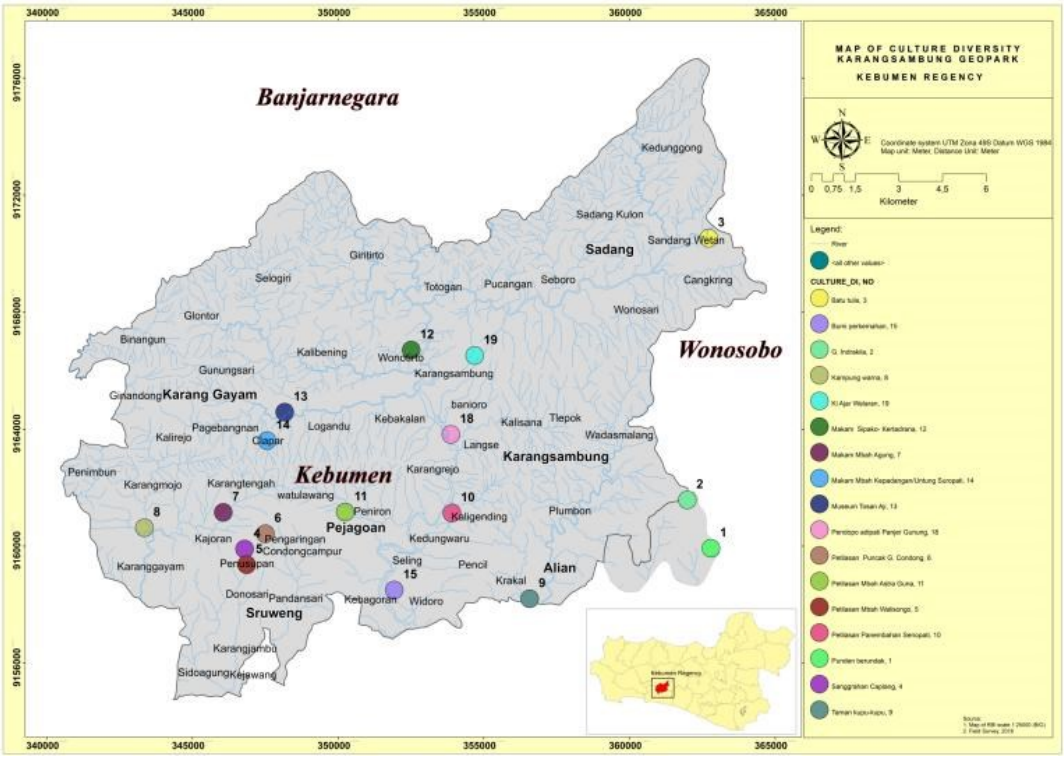

Figure 2. Culture Diversity at Karangsambung Area

b. Biodiversity of Karangsambung Area

Biodiversity in the area reflects the maintenance of environmental conditions. Biodiversity includes the diversity of flora and fauna that live and develop in an ecosystem. Based on the distribution map of Biomass, the area of each biomass area can be seen in Table 4 and Figure 3.

Table 4: Biodiversity in Karangsambung Area

No	Biomass	Area (Hectare)	%
1	Company Forest	5,971.54	20.38%
2	Production forest	300.81	1.03%
3	Hutan Rakyat	1,734.89	5.92%
4	Geological Reserve area	581.81	1.99%
5	Physiographic Forest Area	8,560.05	29.22%
6	Protected Forest Area	931.91	3.18%
7	Water catchment area	420.32	1.43%
8	Green Open Space Area	2.06	0.01%
9	River Boundary Area	639.60	2.18%
10	Wetlands	2,264.56	7.73%
11	Dry land	4,016.70	13.71%
12	Plantation	1,819.75	6.21%
13	Non Biomass	2,051.51	7.00%
		29,295.51	**1.00**

Source: Spatial Data of Spatial Planning District. Kebumen 2011-2031

3.3 Regional Spatial Planning

The Development of Geopark Karangsambung Area Policy was formulated to achieve Vision and Mission in regional development. The development policy of Geopark Karangsambung must integrate the aspects of protection, education and sustainable development, with the concept of sustainable regional development management that harmonizes three natural diversity, namely geodiversity, biodiversity, and cultural diversity. The synergy between the diversity of geology, biology and culture must be highlighted as an inseparable part. The concept of regional space development is to take steps that include:

1. Integrating, uniting and harmonizing regions with urban systems.
2. Social justice and cultural insight;
3. Develop regional plans and designs that are able to empower local economic growth;

4. Improvement of building and environment management that creates harmonization between space (urban space) and regional form (urban form) significantly.
5. Development of environmental facilities;
6. Repair of regional infrastructure and facilities.
7. Encouraging the development of sustainable regional management, which is participatory and three components (community, business and environmental empowerment).

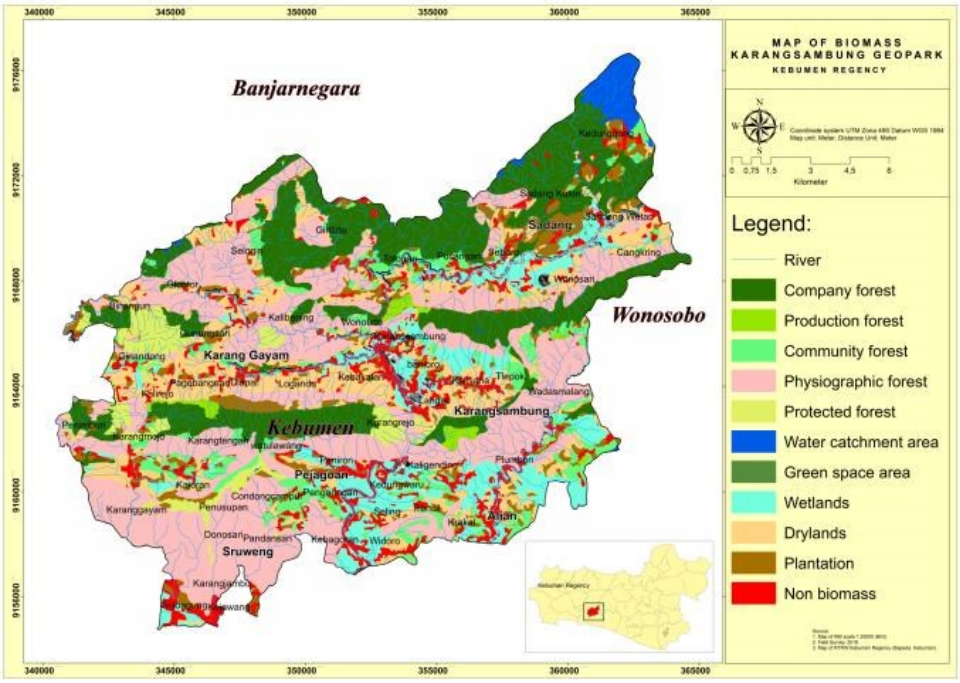

Figure 3. Biomass Map of Karangsambung Area

Based on the distribution of geodiversity and access to existing areas, this area can be divided into 4 (four) development zones. Development zone 1 is located around Karangsambung, development zone 2 around Sadang, development zone 3 around Karanggayam and development zone 4 around Krakal-Alian (Figure 4).

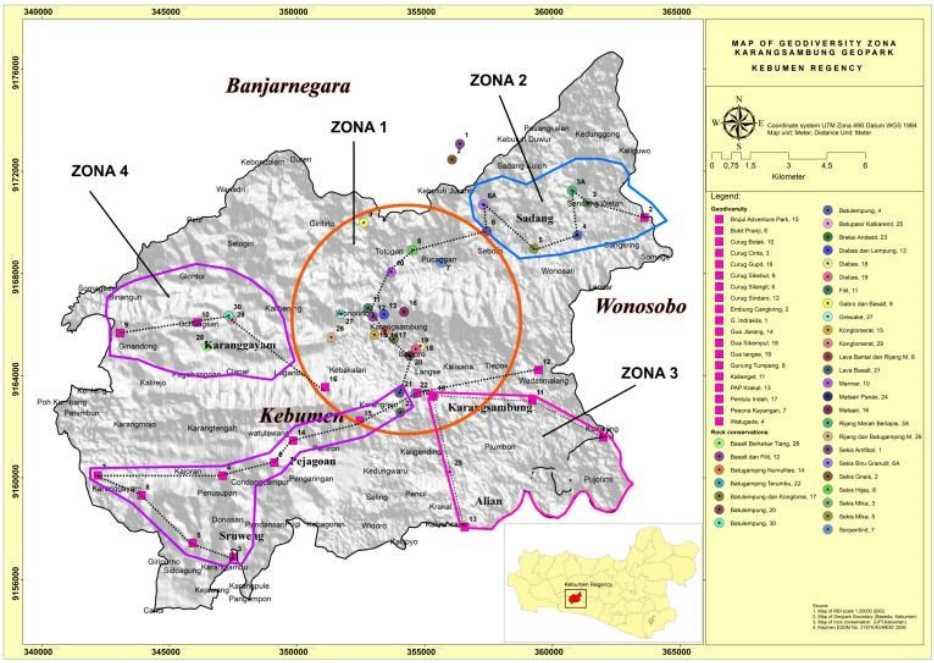

Figure 4. Clustering Map of Geodiversity

Area zoning is also carried out for the distribution of cultural diversity and biological diversity. The distribution map of the three geopark pillars is then overlayed by considering topographic conditions and road access,

resulting in a zonation map of Karangsambung geopark development (Figure 5). Based on the distribution patterns of geological sites, cultural sites, biodiversity and policy analysis concerning the karangsambung area, the zoning of the Geopark area can be divided into 4 (four) zones:

1. Zone 1 (Geoheritage)

The Geo Heritage Zone is based on this zone having a large geological / geographic distribution and gathering in this zone. As the core zone of information development and research on geodiversity area. The distribution of this zone is around Karangsambung Village and LIPI. Thematic main functions are:

a. Geotourism based on geological and educational activities
b. Protection and development geoparks in geodiversity locations
c. Protection of the Lukulo River as a natural structure of the area
d. Tourist support services (lodging)

Thematic support functions are:

a. Settlements
b. Agriculture
c. Local scale trade

2. Zone 2 (Geoagro)

Geo Agro Zone is based on the distribution of geodiversity (7 points), with the main potential of the zone being the development of agropolitan Sadang. As an agro zone, there is a special theme of the combination of geo and agricultural development that will strengthen tourism. The distribution of zone 2 is around Cangkring Village to Seboro Village, Sadang District. Thematic main functions are:

a. Agropolitan, geotourism supporting agricultural activities (with superior commodities)
b. Protection and development of geopark at geodiversity locations
c. Protection of the lukulo river upstream as the natural structure of the region
d. Tourist support services (lodging)
e. Gate / external door

Thematic support functions are:

a. Settlements
b. Plantation, forestry
c. Local scale trade

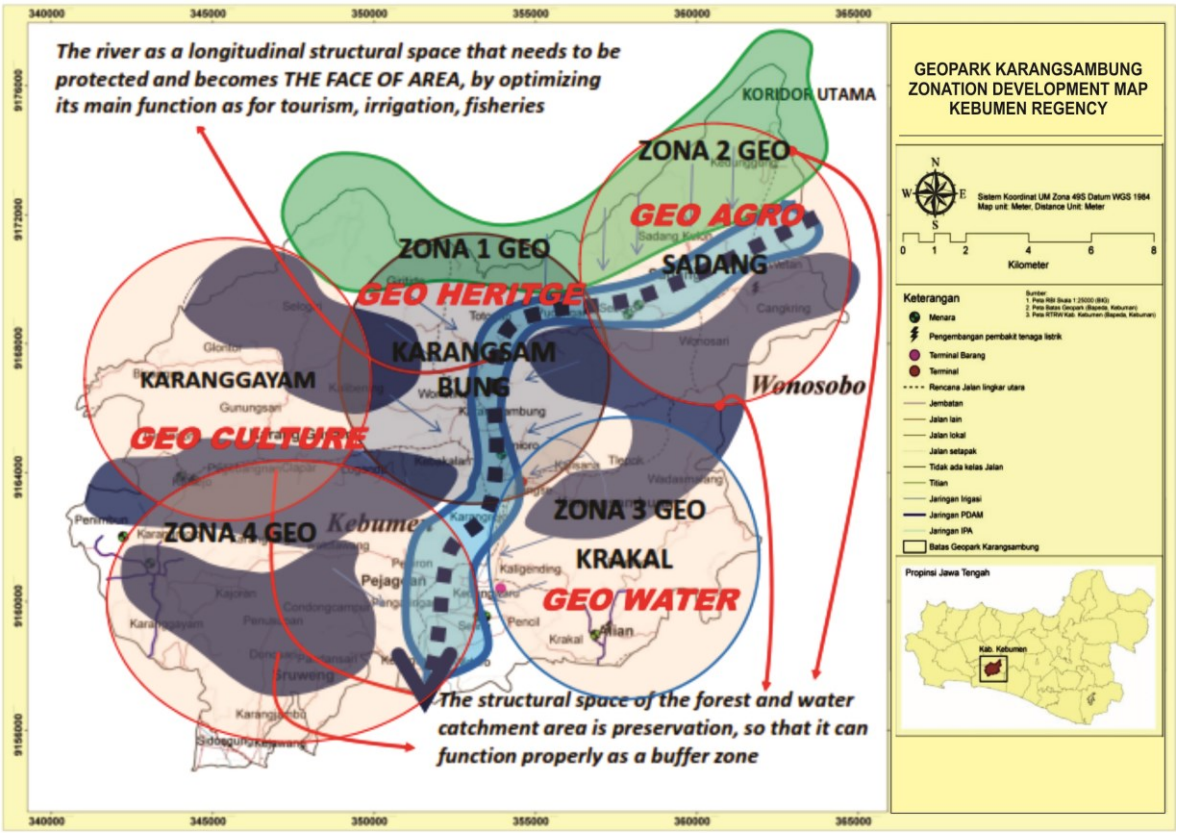

Figure 5. Development Map of Karangsambung Geopark Zone

3. Zone 3 (Geo Water)

Geo water zone is based on the distribution of geodiversity (5 points), with the unique presence of hot water bath "Krakal", curug sindaro as a supporter of tourism. The spread of zone 3 is around Krakal Village to Wadasmalang. Thematic main functions are:

a. Hot spring geotourism activities
b. Protection and development of geothermal parks in geodiversity locations
c. Protection of the Lukulo River as a natural structure of the area
d. Tourist support services (lodging)
e. Gate / door to the south

Thematic support functions are:

a. Settlements
b. Plantation, agriculture
c. Local scale trade

4. Zone 4 (Geo-Culture)

Zone Geo Culture / Culture is based on the distribution of geodiversity (13 points), with the uniqueness of the mountainous landscape and the many sociodiversity (local culture), as a support for tourism. Distribution of zone 4 is around Peniron Village to Karanggayam. Thematic main functions are:

a. Natural geotourism activities with the main function of local culture / culture
b. Protection of the earth in geodiversity locations
c. Protection of the Lukulo River as a natural structure of the area
d. Tourist support services (lodging)
e. West gate / door

Thematic support functions:

a. Settlements
b. Plantation, agriculture
c. Local scale trade

4 Conclusion

Based on the above discussion, it can be concluded that Karangsambung Region is an area that has complicated and unique geological conditions due to rock variations and geological structures. The geological conditions make Karangsambung have diverse and numerous geodiversity. Biodiversity and culture diversity of the region also show diversity so that this area is very suitable for geopark development. Zoning of geopark development is divided into 4 (four) zones namely geoheritage zone, geo-agro zone, geo-water zone and geo-culture zone. The center point development of the geoheritage zone is geotourism for education and research, geo-agro zones for geotourism based on agriculture, geo-water zones for geotourism based on hot water and geo-culture zones geotourism based on cultural**.**

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