

TOURISM DEVELOPMENT STRATEGY IN THE KARST AREA OF GUNUNGKIDUL TOWARDS SUSTAINABLE TOURISM

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Abstract

The Gunungkidul Karst area in Yogyakarta, Indonesia, is part of the National Tourism Strategic Area (KSPN) and offers unique ecosystems and attractions, including caves, underground rivers, white sandy beaches, and karst cliffs. However, current tourism policies are outdated and need revision to address today's dynamics. This research identifies the area's tourism potential and challenges, proposing a sustainable development strategy. Data were collected through literature review, observations, and thematic map analysis. Findings reveal two main potentials: the northern mainland with caves and underground rivers, and the southern coast with beaches and karst cliffs. The recommended approach emphasizes sustainability across environmental, socio-cultural, and economic aspects. Practical strategies include developing key destinations (growth pole), enhancing benefits along travel routes (on-route benefits), and encouraging tourists to visit multiple destinations (spillover tourism). The recommendation from this paper is to ensure sustainable tourism in the Gunungkidul Karst Area by prioritizing balanced development through growth poles, on-route benefits, and spill-over tourist strategies to evenly distribute tourist traffic and economic benefits. Strengthen resource management, zoning enforcement, and community involvement to protect the fragile karst ecosystem while fostering local economic growth.

Keywords: Tourism Planning; Karst Gunungkidul; Destination Energy; Tourism Development Concept; Sustainable Tourism

A. INTRODUCTION

The concept of sustainability has become a major focus in the development process, and the tourism sector is no exception. The concept of sustainability was originally defined in the 1980s by Brundtland in the Our Common Future report, as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). Since then, sustainability in the context of tourism has been widely researched and conceptualized with its principles developed and applied to various sectors. In addition, the planning process should consider the ecological and cultural context of the tourism destination. Such as, the importance of protecting natural resources and biodiversity in the context of sustainable tourism development, particularly in protected areas.

To achieve sustainable tourism, a good tourism planning approach is required. That is, sustainable tourism development planning should be able to minimize negative impacts on the environment and socio-cultural communities, but on the other hand can contribute positively to the economy of local communities. This concept is very important to ensure that tourism can be sustained in the long term, as well as providing benefits for current and future generations. Therefore, it is important to apply sustainable tourism planning practices in various locations, including karst protected areas. Quoting from the Center for Environmental Studies of Gadjah Mada University, Indonesia currently has at least 10 Karst Landscape Protected Areas (KBAK) established through the Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia. Of the ten KBAKs, the Gunung Sewu Karst Area is one of them, which includes parts of Bantul Regency, Gunungkidul Regency, Wonogiri Regency, and Pacitan Regency. Of the four districts, Gunungkidul is the district with the largest karst area among the others.

With its karst landscape, Gunungkidul Regency has unique natural and cultural richness (Putri et al., 2023). Based on a study conducted by Prayitno et al. (2022), the karst area of Gunungkidul has unique and distinct characteristics, consisting of caves, underground rivers, and beaches surrounded by karst cliffs. Not surprisingly, with such a landscape, the tourism industry has developed in this protected area. The study of Hafizha et al. (2023) shows that the tourism trend in Gunungkidul continues to increase from year to year, especially after the COVID-19 pandemic, mainly due to the role of digital media. Meanwhile, data from the Central Bureau of Statistics (2024) shows that the number of tourist visits to Gunungkidul from 2021-2023 showed an increase (see Figure 1). The increase in the number of tourists was followed by an increase in the number of facilities such as accommodation and restaurants, which rose from year to year. Data from the Central Bureau of Statistics shows that there are currently at least 183 hotels in Gunungkidul Regency.

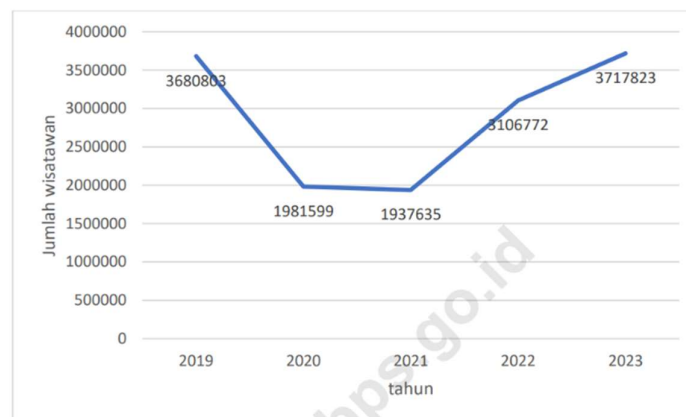


Figure 1. Number of Tourist Visits in Gunungkidul Regency
Source: (<https://gunungkidulkab.bps.go.id/>, 2024)

Recent studies have highlighted the growing significance of integrating digital technology into sustainable tourism practices, particularly in geologically sensitive areas like karst regions. Digital platforms have facilitated enhanced visitor management and education on environmental conservation (Hafizha et al., 2023). Additionally, with the increasing recognition of karst landscapes as both ecological and economic assets, frameworks such as adaptive tourism policies and participatory community management have been emphasized (Zhang et al., 2023). For example, the role of community-driven conservation efforts has been critical in addressing land-use conflicts while promoting geotourism (Ruban, 2018). Despite these advances, a gap remains in operationalizing these strategies in rapidly urbanizing and tourism-driven regions such as Gunungkidul. This study addresses this gap by evaluating the application of sustainability principles and proposing innovative concepts—growth pole, on-route benefits, and spill-over tourism—that align with the ecological and socio-economic dynamics of the Gunungkidul karst area.

Considering the increasing trend of tourism in Gunungkidul Regency, a tourism development plan is needed that can realize sustainable development to avoid negative impacts on the environment and the existing karst ecosystem. Moreover, this area has been designated as a Geoheritage by UNESCO, as well as included in the National Tourism Strategic Area (KSPN) project for the Gunungkidul Karst Area and its surroundings. Although there are several laws and regulations that regulate tourism development in this area, it is necessary to evaluate whether the implementation in the field is in accordance with the principles of sustainable tourism or not. Therefore, this paper attempts to explore whether tourism practices in the Gunungkidul karst area and its surroundings are in accordance with the principles of karst environmentally friendly tourism or not. This paper tries to compare it with tourism practices in other areas, which are considered successful in implementing sustainable tourism from the environmental side of the karst area. From the evaluation results, this paper attempts to formulate a better tourism development strategy in the karst area of Gunungkidul, in accordance with its environmental characteristics. Consequently, sustainable tourism development, especially in terms of the environment, will be created.

B. RESEARCH METHOD

In general, this research used a qualitative-descriptive approach. Data is collected through the study of relevant literature, observation, and the search for thematic maps that help in the data analysis process. First, the research will look for the distribution of tourist attractions in the research location which will then be presented in a map. From the distribution of these attractions, it is then overlaid with the distribution of existing tourism facilities, so that the agglomeration of tourism activities in the study area can be determined. Then, in areas with a high level of agglomeration, the author will conduct field observations related to tourism issues, especially those related to environmental issues. In the next stage,

the author will evaluate the practices in the field with the practices that should be through precedents or pilots that are considered good in practicing tourism in karst areas. In the end, the author will provide recommendations for tourism development strategies in the research location that adhere to sustainable principles.

The study site is located in the Gunungkidul karst area and its surroundings. Administratively, this area is located in Gunungkidul Regency, Yogyakarta Special Region Province. The study location can be seen in Figure 2, which illustrates the distribution of karst landscapes in Gunungkidul Regency.

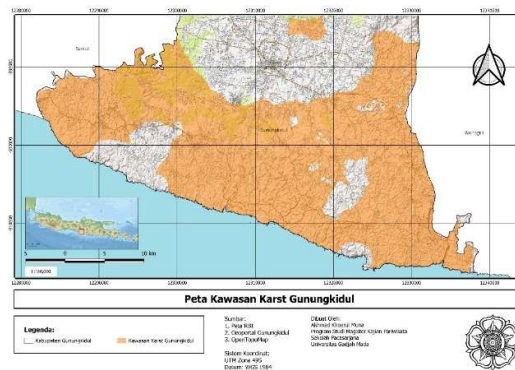


Figure 2. Map of the Research Area, Karst Area of Gunungkidul)
Source: (Processed by the author)

C. FINDINGS AND DISCUSSION

Agglomeration of Tourism and Energy Activities in Gunungkidul Karst Area

Based on the identification of tourist attractions in the karst area of Gunungkidul, there are at least 59 tourist attractions. Of the 59 tourist attractions can be grouped into beach attractions, caves, waterfalls, underground rivers, artificial tourism, and cultural and historical tourism. Based on its distribution, the existing tourist attraction objects are scattered in the karst land area and in the coastal area. Tourism attraction objects in karst land tend to be scattered, while tourism attraction objects in coastal areas tend to be agglomerated in the central part of the south side. The agglomeration of tourism activities increases when data on tourism support facilities are added, which include accommodation facilities, restaurants, and the number of tourists who come (see Figure 3).

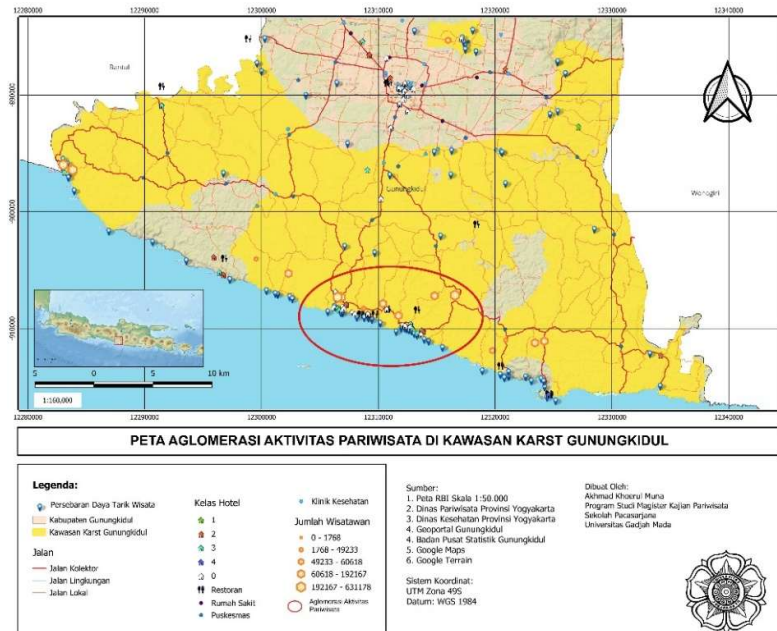


Figure 3: Map of Tourism Activity Agglomeration in the Karst Area of Gunungkidul.
Source: (Processed by the author)

Based on Figure 3 above, this agglomeration of tourism activities covers parts of Saptosari, Tanjungsari, and Tepus sub-districts. Most of the tourism attractions in the area are beach tourism. Tourism activities in the area are supported by several accommodation facilities and restaurants as well as easy access. This can be seen if the area is connected by a collector road that connects the tourism area with several other areas. Meanwhile, based on the characteristics and conditions of the Gunungkidul karst area, it can be seen that the main energy of this area is the karst landscape which has a uniqueness and beauty that distinguishes this area from the surrounding areas. This is characterized by landscapes such as caves, underground rivers, and white sand beaches that are different from the surrounding areas. The unique geomorphologic processes give the area its authentic character, both inland and coastal areas. For this reason, UNESCO designated the Gunungkidul karst area as part of the Gunungsewu Geopark.

However, the high level of tourism activity in the Gunungkidul karst area, especially in the circled zone (see Figure 3), presents both opportunities and challenges for tourism development. The opportunity is that tourism development can absorb labor and improve the local economy. However, the challenge is that karst sustainability is very vulnerable with the development and tourism activities in the karst area of Gunungkidul. The existing tourism problems will be described in the next section.

Tourism Issues in Gunungkidul Karst Area

Tourism development attracts tourists to visit a particular tourist destination (Ruban, 2018). Most communities benefit from the socio-economic aspects of tourism development, including job creation and business opening, infrastructure development, and regional economic growth. However, tourism also has an impact on the environment (Baloch et al., 2023). In addition, tourism planning that ignores geological aspects will add more impacts on the environment (Budianta, 2022). Another impact on the environment is environmental degradation, this impact includes ecosystem disruption where an increase in tourist activities can disrupt underground ecosystems, especially in the karst area of Gunungkidul and can affect the balance of the natural environment (Addesso et al., 2022). Furthermore, the increase in tourist visits may increase the volume of vehicles that cause air pollution and congestion (Baloch et al., 2023). In addition, the increasing number of tourists to Gunungkidul's karst areas, such as caves and beaches, has encouraged land conversion for facility development. Despite boosting the local economy, unplanned development can damage karst ecosystems and reduce their hydrological functions. Some tourist attractions experience negative impacts such as litter, vegetation damage and water pollution. An example is the land conversion that has occurred at Gesing Beach and Heha Ocean View.

Furthermore, the karst areas of Gunungkidul are notorious for having limited surface water due to their highly porous structure, so most of the water is absorbed directly underground, making it difficult to supply water to the population, especially in the dry season. Tourism spatial planning that does not pay attention to water management can exacerbate water shortages for both the community and the local ecosystem. As of August, 13 sub-districts out of a total of 18 sub-districts in Gunungkidul are affected by drought. These areas are located in the southern region with characteristics of limestone hills (karst), making it difficult to find springs on the ground. The sub-districts experiencing drought are Panggang, Saptosari, Tepus, Girisubo, Rongkop, and others (Fardi, 2024).

Therefore, water management in famous tourist destinations such as Pindul Cave requires careful management to reduce overuse and pollution (Romza et al., 2023). In addition, it is also important to assess the carrying capacity of water resources. Research in other regions shows that analyzing water needs for tourism is carried out comprehensively by considering projections of future water needs as a form of preventing water problems that can occur at any time, especially during the dry season (Sudipa., 2020; Widyaningsih et al., 2021).

Precedents for Tourism Management in Karst Areas

Based on the development of global tourism trends, karst areas have become an attraction for tourists in recent decades. The trend can be found in several developed countries that can be a model in managing karst areas as tourism areas. The author uses two examples of cases of managing karst areas as tourism areas that are considered to be managed in accordance with sustainable principles. The cases that can be used as precedents for Gunungkidul karst area are as follows.

1. Mammoth Cave National Park, USA

Based on its existence, Mammoth Cave is a karst area whose landscape is formed by the dissolution of limestone or other carbonate rocks by acidic water. So that the process forms geological features such as caves, stalactites, stalagmites, wells, and underground rivers. The geosite is a National Park that was inaugurated by the US government in 1926 and has been a UNESCO World Heritage Site since 1981 consisting of rolling hills, deep river valleys, and the world's longest cave system (Durlet et al., 2024) Mammoth Cave played an important role in the beginnings of tourism in America, where it has been a tourist attraction since 1816 and was frequented during and after the war. Today, Mammoth Cave is a popular karst area in the world that is used as a tourist attraction. In addition to its uniqueness in the form of a few large chambers and spacious passages, Mammoth Cave also has an underground river flowing in several parts of the cave and this has made it a tourist attraction with several activity offers, such as exploring the cave, hiking, canoeing, fishing, camping, and others. In practice, Mammoth Cave serves as an exemplary model for implementing sustainable tourism principles due to its flexible long-term planning, efficient management of natural resources, empowerment of local communities and stakeholders, regular monitoring and evaluation, and strict regulations on tourist activities (Kisasembe, 2022).

2. Great Ocean Road, Australia

Aspirations for the Great Ocean Road and Its Region (2019) The Great Ocean Road (GOR) is one of the world's most scenic coastal routes, encompassing some of Australia's most famous and visited natural attractions. The Great Ocean Road (GOR) is a popular tourist destination that attracts more visitors than the Great Barrier Reef and Uluru combined, making it an important tourism asset for the state of Victoria. However, the Great Ocean Road and surrounding landscape are currently threatened by natural forces, climate change, and increasing visitation and population. The Victorian Government is committed to protecting the GOR coastline and landscape through regulation, a unique planning framework and improved planning approval processes. The Great Ocean Road has implemented an action plan that includes stand-alone legislation to recognize and protect iconic landscapes, the

establishment of dedicated coastal and national park management bodies, and a planning framework embedded in long-term, holistic legislation to guide local planning. Additionally, the plan emphasizes regular reviews of framework implementation and a robust planning approval process to ensure sustainable development (The State of Victoria Department of Environment, 2018).

Study on Tourism Development Policy in Karst Area of Gunungkidul

The planning of Gunungkidul karst area in Yogyakarta is supported by various regulations that ensure sustainable development while preserving nature. DIY RTRW Regional Regulation No. 10 Year 2023 emphasizes the importance of preserving karst ecosystems in the development of the area, ensuring that development activities are carried out without damaging their ecological value (Zhang et al, 2023). These protected karst areas are a major attraction for nature tourism, where tourists can enjoy the beauty of nature while supporting conservation. In addition, Minister of Energy and Mineral Resources Regulation No. 17/2012 designated limestone hills in karst areas as Karst Landscape Areas (KBAK), providing a protected status that safeguards these areas from damage. This encourages the development of geotourism, where tourists can enjoy the uniqueness of the area's geological formations while expanding their knowledge.

In addition, DIY Governor Decree No. 129/KEP/2022 established the Karst Essential Ecosystem Area Management Forum to protect karst areas from threats, such as illegal mining and pollution. The forum designs management strategies that involve many parties, including local communities, so that tourism can develop sustainably without damaging the karst environment. On the other hand, DIY Governor Regulation No. 71 Year 2022 supports the development of an Earth Park (Geopark) in Gunungkidul, which not only preserves geological uniqueness but also attracts international tourists. The existence of this Geopark strengthens Gunungkidul's position as a natural tourism destination based on environmental preservation and education, supporting environmentally friendly local economic growth.

Recommendations for Tourism Development in Gunungkidul Karst Area

Based on the current condition of tourism and looking at some examples of tourism management in karst areas in developed countries above, the author provides several recommendations for tourism development in the karst area of Gunungkidul. The development concept recommendations include:

1. the concept of growth pole

Basically, the growth pole concept refers to the development of industrial centers that encourage regional economic growth by concentrating resources and tourist attractions, increasing integration and encouraging cooperation between tourism

stakeholders. Consequently, this approach is able to optimize the spatial structure of karst areas and encourage cooperation between regions to promote balanced tourism development (Tang, 2011). In other words, the growth pole concept seeks to build around leading areas and destinations while maintaining sustainable tourism principles.

2. the concept of on route benefits

The concept of on-route benefit can be interpreted as tourism development that encourages high-route benefits. This means that there needs to be a planned tourist travel route, so that tourist spending is not only done in one destination, but shopping can be done in several other destinations (Vanhove, 2022). Thus, the total tourist expenditure will be greater and evenly distributed across many destinations in the Gunungkidul karst area.

3. the concept of spill over tourists

This concept emphasizes efforts to encourage tourists to not only visit one destination, but to try to visit many destinations. This concept is very important to reduce the overflow of tourists in the attraction with a high number of visits. To implement this concept, of course, it needs to be balanced with good bargaining power in developing tourist attractions.

D. CONCLUSION

The Gunungkidul karst area is renowned for its distinctive natural features, including karst cliffs, caves, underground rivers, and white sand beaches, making it a popular tourist destination. However, the increasing tourism activities present challenges such as environmental degradation, water resource scarcity, and uneven economic benefits, which strain the local infrastructure. Addressing these challenges requires the implementation of risk-based spatial planning and adherence to zoning regulations, such as those outlined in the Yogyakarta Special Region Regulation Number 9 of 2018, to ensure development aligns with the area's environmental carrying capacity.

To promote sustainable tourism, recommendations include adopting the growth pole concept to focus development around key destinations, implementing on-route benefits to spread economic gains across multiple locations, and encouraging tourist spillover to reduce overcrowding at popular sites. Despite these strategies, limitations remain in addressing critical issues like ecosystem disruption and the inconsistent enforcement of policies. Future research should delve deeper into these challenges to provide comprehensive and actionable solutions for achieving sustainable tourism in the Gunungkidul karst area.

LIMITATIONS AND FUTURE RESEARCH

This study is macro in nature, so a micro study is needed to plan tourism in more detail. In addition, the socio-cultural aspects have not been explored in depth, so future studies are expected to further research these aspects.

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