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Settlement Arrangement Strategy Using an Eco-Settlement Approach in The Rammang-Rammang Karst Tourism Area

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Abstract

The Rammang-Rammang karst area is one of the two karst areas in the world that are drained by rivers. This karst area has been a Geopark National Park since 2017 and is being proposed as a world cultural heritage or World Site Heritage (WSH). This protected area is directly adjacent to community settlements so that it demands economic development, trade, transportation, services, and has implications for increasing the need for housing and settlements for tourists. The emergence of various activities if not controlled will reduce the environmental quality of the karst area. For this reason, this study aims to identify environmental, social, economic, and institutional conditions around the Rammang-Rammang Karst area, Maros Regency; Develop a settlement arrangement strategy with an eco-settlement concept approach. The research method is qualitatively with spatial, descriptive, and SWOT data analysis techniques. The results of the research on settlement structuring strategies with the Eco-settlement approach are: Improving community skills through several trainings to support tourism sustainability, especially tourism management skills. Economic improvement through diversification of tourism-related livelihoods such as being a boat driver, selling local food, and managing homestays. Improved accessibility of footbridge repairs to tourism objects. Biodiversity is a potential for new tourism development. Climate change is a threat to

ecological resilience, so flood mitigation is needed, preventing damage to geodiversity, flora and fauna. Tourism supporting infrastructure and facilities that have the potential to be developed are homestay models on stilt houses with environmentally friendly technology. Support for community institutional aspects, cooperation and partnerships with various parties can be a control for sustainable tourism.

Keywords: Structuring Strategy, Eco-settlement, Karst Tourism Area.

Introduction

Indonesia has a karst landscape potential of around 154,000 km2 or about 0.08 percent of Indonesia's land area. In South Sulawesi the famous karst area is the Maros Pangkep karst area (KKMP) where the main attraction is the Rammang-Rammang Karst area in Bontoa District, Maros Regency. This type of karst is tower karst which there are only three in the world, namely in China, Vietnam, and including in Maros Regency (Prayuni, 2013). The Rammang-Rammang karst area has the potential for geodiversity, biodiversity and cultural diversity as a Karst Tower World Heritage. The uniqueness of this karst area is that there is a Pute river that surrounds a part of the karst area with a width of 2 to 40 meters (Prayuni, 2013). This uniqueness is a potential that needs to be utilized to support the economic improvement of the local community through efforts to organize ecotourism-based areas.

The development of ecotourism must be supported by the development of tourism supporting facilities and infrastructure. The existence of karst areas that are directly adjacent to residential areas requires a more focused settlement arrangement to support their potential through efforts to prepare components in the form of accommodation facilities to increase attractiveness and support ecotourism activities (Aprilia et al., 2021). Accommodation facilities as a place to rest and stay in tourist destinations are the most important element in tourism activities apart from the tourism object itself (Eridiana, 2016).

The accommodation facilities located in the Rammang-Rammang Karst Area are still in the form of private residences where foreign and foreign tourists prefer to stay at residents' homes to get their own experience. The various potentials that exist in the area if not controlled will result in the emergence of irregular residences and can cause natural and karst damage which is a tourism potential. With the occurrence of unplanned land use changes around the karst area which can result in a decline in environmental quality, it is important to carry out directives that are controlling the use of space, especially the arrangement of ecotourism-based settlements, namely by providing adequate housing and settlements for visitors in accordance with applicable standards and regulations. without destroying nature.

Literature review

The development of ecotourism destinations requires basic prerequisites, one of which is facilities for accommodation. Ecotourism facilities must affect the environment as minimally as possible, must adapt to the environment, when erected the construction needs to be adapted to traditional architecture and materials around it, and use alternative energy sources (Aprilia et al., 2021). One of the types of accommodation is Homestay. Homestay as a private residence owned by the community that has empty rooms for rent to tourists visiting a tourist destination with the aim of

interacting and meeting local people and increasing income from the community (Ibrahim & Rashid 2010). The participation and commitment of the local community is a key factor in the success of the homestay management as well as the synergy of support from the government and the private sector.

There are four factors in the formation of homestays, namely the development of tourism areas, tourist needs, object support from tourist areas, and the use of tourism impacts by the community (Wedatama & Mardiansjah, 2018). The homestay standard for the Southeast Asian region must at least meet certain requirements, including villages that become tourist destinations have at least 5 registered homestay providers, homestay providers must be free from criminal records, and providers must be in general health (Asean Secretariat, 2016). The quality and performance of homestays according to the Asean Homestay Standard is measured based on 9 main criteria and 27 sub-criteria, including the criteria for host, accommodation, type of activity, management, location, cleanliness, safety and security, marketing and promotion, as well as meeting sustainable principles.

The concept of homestay management based on indicators of physical and environmental aspects is seen based on the type of homestay building, cleanliness and sanitation, as well as the condition of other supporting facilities. In the management of aspects of human resources, institutions, and data, it can be seen from the presence of employees who assist in managing homestays, the existence of institutions that specifically handle homestays, community involvement in attending training and homestay planning, homestay owner data, homestay data, financial data, and tourist data. And the promotion aspect is seen from the way homestay owners promote existing homestays (Puspitasari et al., 2019).

Another concept in managing homestays is by prioritizing the concept of culture. The concept of cultural homestay is that tourists will stay in homestays with existing local wisdom and will naturally feel the uniqueness of different cultures in each tourist destination (Khoerudini & Yogyakarta, 2018). Professional homestay management can be an opportunity for the community to attract tourists to stay and enjoy its natural and cultural wealth, so it is required to have supporting facilities that facilitate tourism activities. The main supporting facilities that need to be in tourist areas include transportation facilities and affordability of road access, telecommunications and networks, as well as health and accommodation (Wityaningsih & Yuliastuti, 2017). Garbage management system and waste management also being priority scale to improve due to invit the interest of the tourist and fulfill the community needed (Arifin et al., 2022).

Apart from the various existing concepts, homestay management must pay attention to the surrounding natural conditions, especially the Rammang-Rammang tourist area which is located in a karst cluster landscape. In this study, the concept of structuring settlements built on it is studied and linked to the Minister of Environment and Forestry Regulation of 2020 (Arifin et al. (2022) which regulates in more detail about tourism facilities and infrastructure built in karst areas where buildings must meet safety standards and as much as possible minimize the load on the ground. karst, namely by building infrastructure in the form of a one-story building and not a multi-storey building so that overall it supports sustainable settlements. The development of sustainable settlements, based on ecotourism, is in line with the development of ecological settlements or Eco-Settlement. The criteria from several countries that must be considered in developing Eco-settlement.

Table 1. Eco-Settlement Criteria for Several Cities and Countries

Eco-Settlement Aspect	Sustainable Development	Criteria Eco-Settlement		
		Leeds	Turkey	London
Social	• Health and safety • Knowledgeand education • Perception in healthy living • *Capacity Building*	• People's Habits • Community Capacity	• Culture • Education • Participation • Empowerment Public	Community Empowerment
Economy	• Materials and Energy • Economic Cycle • Income Distribution • Economic growth • Accessibility • *Local Economic Development*	• Accessibility to the center of the economy • Employment Opportunity • Economic cycle • Funding • Innovation • technology	• Opportunity work • income	• Accessibility/transportation • Economic strategy • Opportunitywork • Innovation
Ecology	• *Biodiversity* • Air quality • Water quality and utilization • Use land • *Energy* • Utilizationresource • Change • Climate	• Quality of housing and houses • House and building standards • Climate change • *Energy* • Co2 Emissions • Utilizationresource	• Air quality • Water quality and quantity • healthy house • Use land • Climate change • *Biodiversity* • Energy	• *Biodiversity* • Air quality • Water quality, conservation and use • Hydrological Cycle • Resource management • Climate change • Disaster mitigation
	• Appropriate technology	• *Sustainable technologies* • Land use (open space, green open space)	• Insightful technology environment	• Materials and energy • Technology • Waste • Land use (open space, conservation area, landscape)
Institutional	Institutional Capacity	• Integration between • *stakeholders* • Supportpolicy	Support for collaboration between stakeholders	• Public service • Government support

Source: Center for Research and Settlement Development, 2006

Methods

The Rammang-Rammang Karst tourism area is located in Bontoa District, Maros Regency. The location point that is the main attraction for tourists is in Berua Village, Salenrang Village, Bontolempangan Village, Maros. The settlements adjacent to the tourist area at the location are the focus of the research (figure 1). The research method is in the form of observation, interviews with homestay owners, community members, and tourism area managers. The selection of informants was carried out by purposive sampling of 76 samples that met the research criteria. This study uses four aspects, namely social, economic, ecological, and institutional. The indicators used in each aspect are based on the theory of the eco-settlement concept from various sources. Supporting factors for environmental, socio-cultural, and economic resilience were identified with a descriptive qualitative approach by considering the existing condition of the research area as a tourist area with a karst landscape. The settlement arrangement strategy was analyzed using SWOT analysis.

Table 2. Research variable

Aspect	Criteria	Indicator
Social	• Knowledge and education	Community education level
	• Community empowerment	Skills based training
Economy	• *Local Economic Development*	Job diversification and people's income levels
	• Accessibility	The quality of the road surface and the availability of the pier to the tourist area
Ecology	• *Biodiversity*	Types of biodiversity
	• Climate change	Forms of flood mitigation
	• Quality of housing and healthy houses	Condition of tourism supporting infrastructure
	• Land Use	Land suitability
Institutional	• Cooperation and partnership	CSR
	• Policy Support	Applicable planning documents

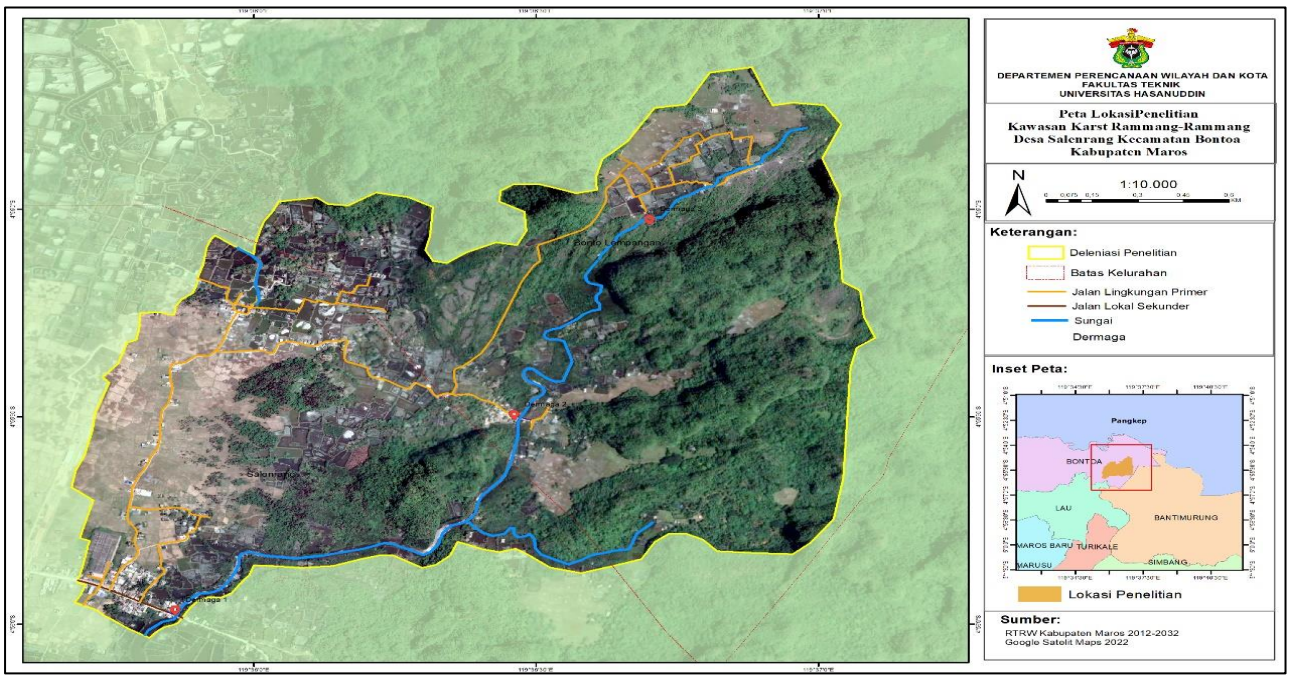


Figure 1. Research Site Map

Results And Discussion

Environmental, Social, Economic and Institutional Conditions of Society

Community Education Level

The level of education of the community in the Rammang-Rammang karst area is low, as can be seen from the number of respondents who are more dominant in completing elementary school education (46%), then not completing elementary school (13%), and graduating from junior high school (30%), at least graduating from high school (11%). This is one of the weaknesses in managing the potential of tourist areas in the region. The community is aware of the importance of the potential of their region but still lacks knowledge in developing and preserving the existing potential.

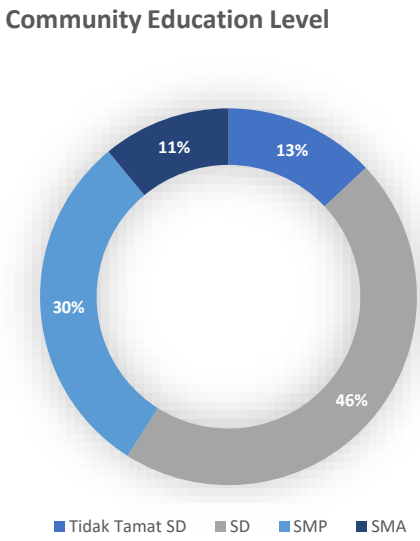


Figure 2. Diagram of the education level of the community at the research site

Skill-Based Training

Skills training is a criterion in identifying community empowerment in the research location. Based on the results of interviews, the community participated in various types of training that had been carried out. There are several types of skills training that have existed during the last two years, namely as follows.

Table 3. Types of Skills Training that has been carried out at the research site

Training Type	Implementation Year
Training to make salted eggs among the people of Kampung Berua	2020
English training for boat rowers at the Rammang-Rammang tourist attraction	2021
Bakery training of various flavors	2021
Archeology tour guide training	2020
English language training for people in the tourist area of Rammang-rammang	2020

Community Income Level

The livelihood of the majority of the people in the research location is farming by utilizing the Pute river for rice fields, gardens, and ponds. The potential of tourist areas is able to encourage

new jobs such as being a boat driver, tour guide, opening a cafe, to becoming a homestay provider. The income level is more dominant at Rp. 1,000,000 – 3,000,000 (74%).

Figure 3. Diagram of the level of community income in the research location

Accessibility

The quality of the road surface is measured based on the ratio of the damaged road to the ideal road. Resultsshows that road conditions are categorized as moderately damaged because the damage is at a level of 51% to 75%. Damaged road surfaces were found at several points, particularly in Berua village. Access roads still use wood and plank materials with inadequate conditions because they have collapsed and have weathered so that it can make it difficult for tourists to reach tourist areas. The pavement in this location is more dominant with soil pavement, namely rice field embankments with varying widths of 0.5 - 2 meters. There are several points that are difficult to reach by land, namely access to Berua village. Tourists must use a boat to get to the location.

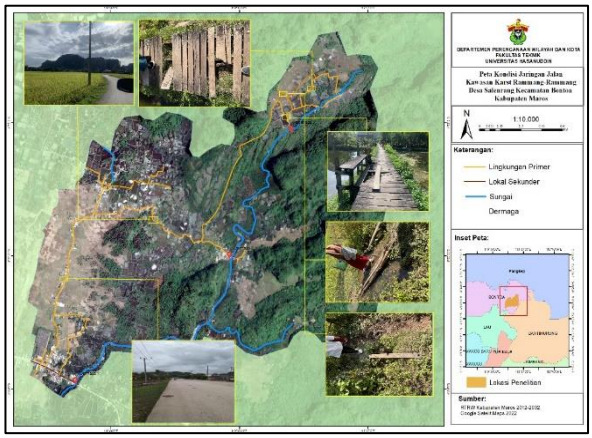


Figure 4. Map of road conditions at the research site

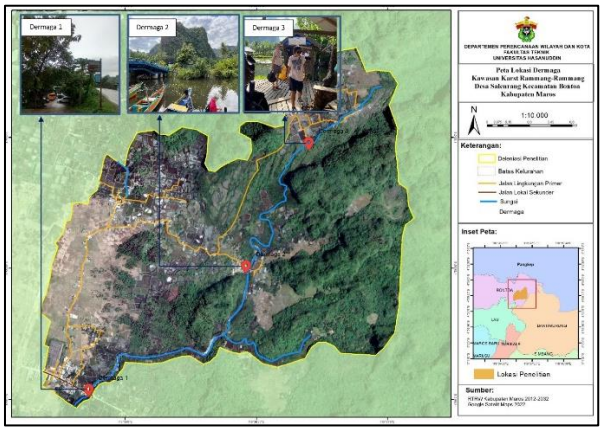


Figure 4. Map of the location of the pier to the rammang-rammang karst area

Types of Biodiversity

Biodiversity in the rammang-rammang karst area is very specific with a limited amount. Species of flora and fauna are endemic and have high economic value. The types of flora encountered were very diverse (figure 5), including rice, coconut, sea ferns, lemidis, lantana, white teak. The flora is used by the community to meet their needs to be used as building materials, also used to make crafts such as fruit baskets and hats from coconut leaves. There are also various types of fauna, such as white storks, various types of fish, bats, crabs, butterflies, ducks, and swallows.

Figure 5. Types of flora present at the research site

Flood Disaster Threat

Based on the results of interviews, the frequency of flooding in the Rammang-Rammang karst area, especially in Berua Village, is increasingly common. At the beginning of the year, the flood submerged the residents' agricultural land for four days with a height of 60 cm to 1 m. If it rains, 62% of the people of Kampung Berua will evacuate to a place where the water level is low and easy to recede. The condition of the river that is narrowed and experiencing sedimentation is the cause of flooding. In addition, the location of the research location is adjacent to the railroad planning line (Figure 6). This threatens the condition of the ecosystem in Berua Village, farmers will fail to harvest and the farmers no longer maintain quality fish species due to the threat of flooding that submerges the ponds and rice fields.

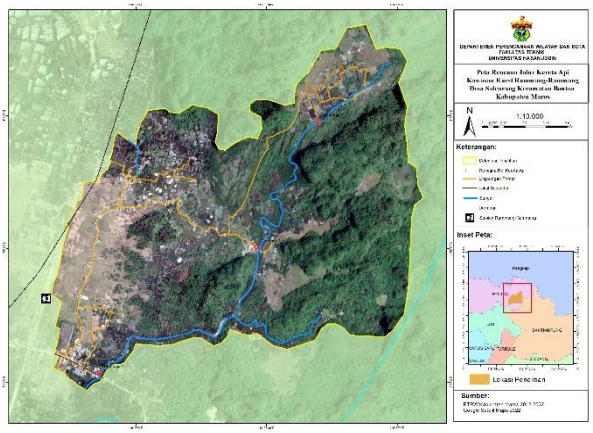


Figure 6. Railroad Plan Map

Residential Facilities and Infrastructure supporting Ecotourism

Based on the survey results, there are several supporting facilities for ecotourism at the research location including accommodation, transportation, trade, worship, education, sports, and health facilities. The supporting infrastructure for settlements around the Rammang-Rammang karst area is identified based on the availability of road infrastructure, clean water, sanitation, electricity, drainage, and solid waste.

Accommodation Facilities

Accommodation facilities in the Rammang-Rammang Karst Area are houses owned by local residents which are used as homestays for visitors who want to stay around the tourist area. Kampung Berua is the most common tourist location for homestays with various classifications (figure 7). This location is the center of ecotourism activities in the Rammang-Rammang karst area. The expanse of karst clusters that blend with the lives of local residents makes tourists prefer to visit this destination.

There are 18 families in the location and as many as 9 residents' houses have been converted into residences as well as homestays.

The condition of the homestay in Kampung Berua is classified based on 3 types, including type A, which is a pendopo room that is separated from the owner's house (figure 8). The space facilities provided in this type are in the form of an open space which is a place for all visitor activities. This type of homestay is more dominantly used to wait for dawn and capture the cool morning moments in the middle of rice fields and karst. There is a communal toilet which is three meters from the pavilion room.

Type B is a bedroom space that is integrated with the owner's house (figure 9). This type of homestay is in accordance with the ASEAN Homestay standard, which is to provide bedrooms with sufficient lighting and ventilation. It has two different bedrooms between the owner's and visitor's rooms. There is a separate living room, dining area and kitchen, as well as a shared toilet. The use of shared space in the house allows for social interaction between residents and visitors.

Type C is a living room and a living room without roomization which is integrated with the main house (figure 10). This type of homestay is mostly found in Berua Village, which is about 63 percent of the existing homestays. Does not have a special room as a guest bedroom. The middle room is used as a place for all activities ranging from sleeping, eating, to interacting with the owner of the house. Other facilities such as toilets are located separately with a distance of three meters from the house. The dominant house structure is habitable but still does not meet ASEAN homestay standards.

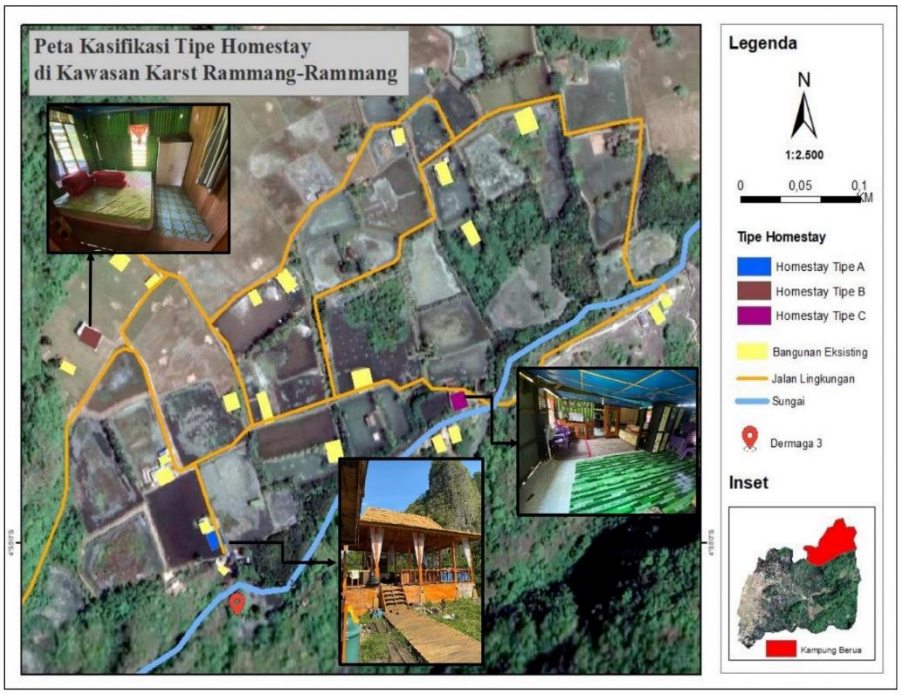


Figure 7. Homestay type classification map


Figure 8. Homestay Type A (a separate pendopo room from the owner's house) in Kampung Berua



Figure 9. Homestay Type B (roomization space that blends with the owner's house)


Figure 10. Homestay Type C (living room and living room without roomization that blends with the core house)

Based on the results of interviews, 69 percent of residents in the Berua sub-district use their private residence as a homestay, so that the community has an alternative side income other than being a fishpond farmer and boat driver. Accommodation facilities located outside the Rammang-

Rammang Karst Area in this case in the Maros Regency area with a distance of 15-20 km from the area via public or private transportation.

Trading Facility

Trading facilities in question are the availability of restaurants, stalls or cafes. Besides being a means of shopping or industry, it is also a work facility for other groups. One of the efforts to increase the pace of the community's economy in the Karst area of Rammang-Rammang Kab. Maros is the availability of trading facilities that serve the needs of the community as well as everyday tourists.

Figure 11. Trading facilities in the form of stalls and cafes around the Rammang-Rammang Karst area

Based on the survey results, there are 43 types of trading facilities in the research location consisting of 10 cafes and 33 stalls or kiosks. Most cafe locations are around Pier Dua. For food stalls only provide snacks, heavy meals are served specifically for the morning, afternoon and evening provided directly by the homestay owner. The average overnight rental price per person is IDR 50,000. If you want complete with dinner or lunch, IDR 50,000 per person and the menu can be ordered by tourists. Generally, tourists ask for special food from Berua village, fish, duck, chicken.

Health facility

The existing health facilities around the Rammang-Rammang Karst location are still very limited. There is 1 pharmacy, namely Apotek Kiara Farma located around pier two (Figure 6). The service radius is 1 km from Berua village (Figure 10).

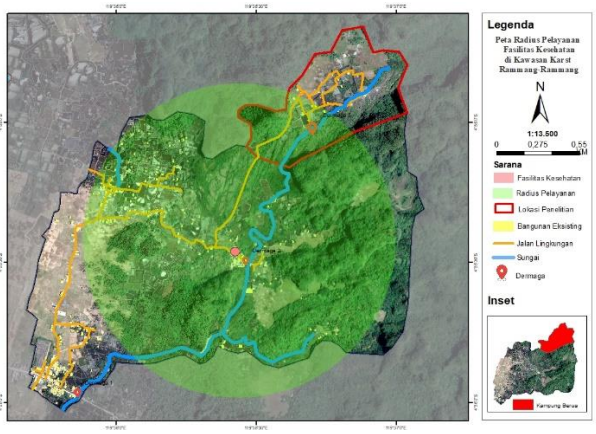


Figure 9. Health Facilities at the research site

Figure 10. Radius Map of Health Facility Services in the Rammang-Rammang Karst Area

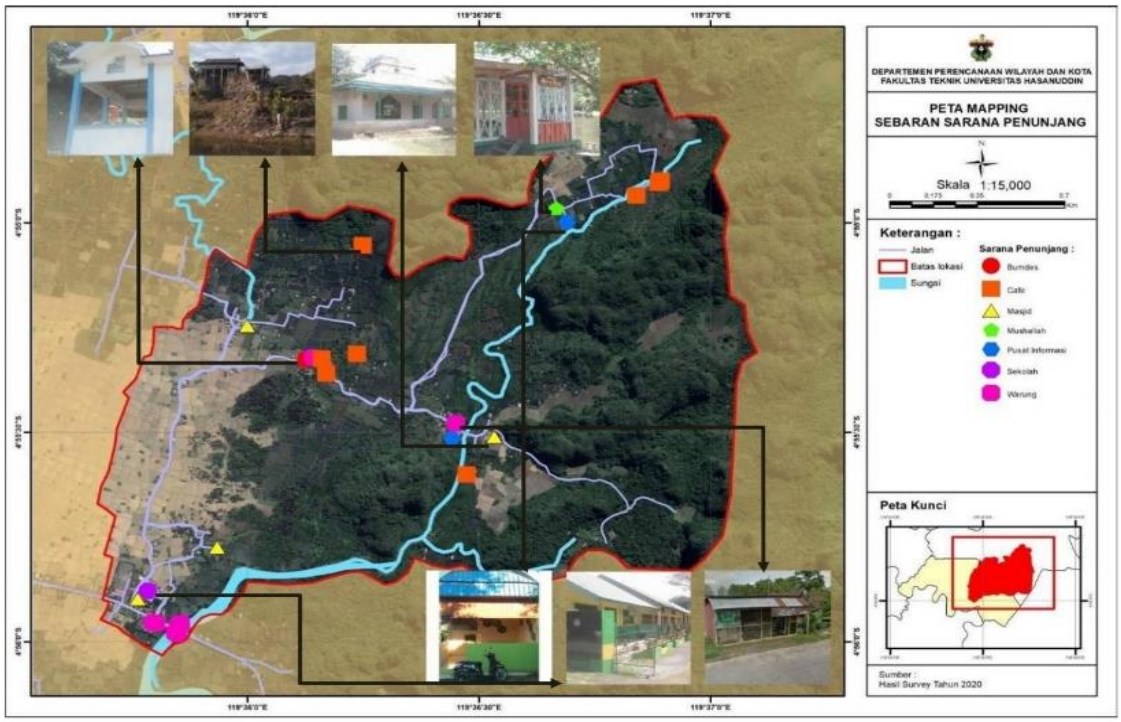
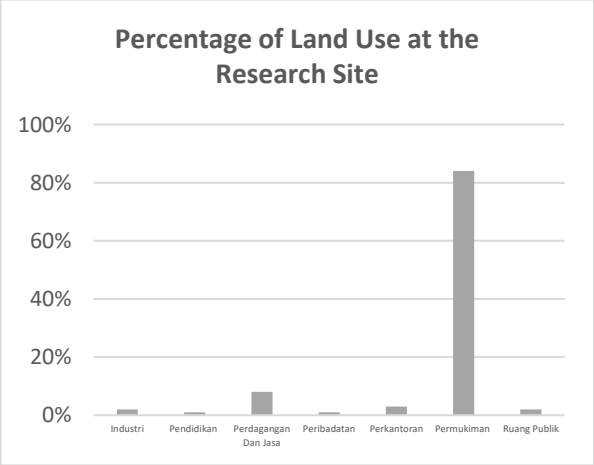


Figure 11. Map of Distribution of Rammang-Rammang. Karst Ecotourism Supporting Facilities

Land Use

Built-up land in the study area is dominated by settlements (84%) and trade and services (8%). There are land uses that are not in accordance with the spatial designation in the applicable spatial plan. For example, settlements located in the dominant wetland agricultural designation area are in Berua Village. This can threaten environmental conditions, so that spatial arrangements in the area need to be paid more attention to, especially building structures that are above the karst landscape.



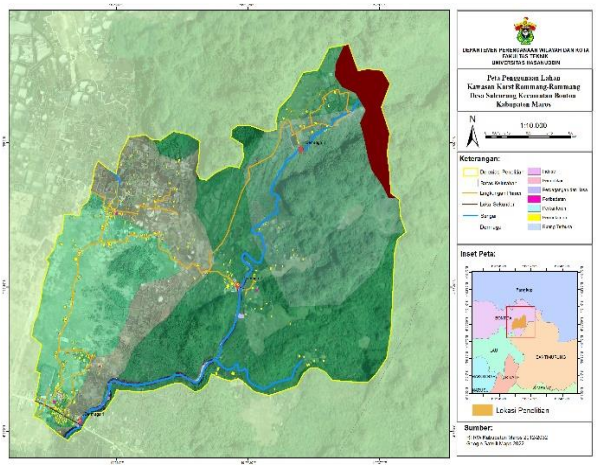


Figure 12. Percentage diagram of actual land use at the research site

Figure 13. Map of land use at the research site

Cooperation and Partnership

Tourist areas that have a high economic value location need assistance and opportunities to increase potential through development, especially in the development zone by cooperating and partnering with both the government and the private sector through Corporate Social Responsibility (CSR). The results of the commercial development are expected to be able to cross subsidize the funding for the construction of community settlements as well as the availability of facilities and infrastructure for the area. Some of the collaborations that have been carried out at the research location are as follows.

Table 4. Types of Cooperation and partnerships at the research site

Cooperation Type	Cooperation Actors
Provision of trash bins around the Rammang-Rammang karst area	Bosowa Cement
Provision of trash bins at the Rammang-Rammang tourist attraction	PT Pos Indonesia
Provision of digital payment tools through QRIS	Bank Indonesia
Assistance for the procurement of homestays in the form of a pavilion room in the Rammang-Rammang karst area	Bank Indonesia

Settlement Strategy

Analysis of Regional Development Strategy

Analysis of internal factors and external factors is used to determine the strategy for the development of the research area. These factors are identified based on indicators on social, economic, ecological, and institutional aspects. So it can be classified as a SWOT key factor. The classification can be seen in the following table.

Table 5. Analysis of internal and external factors

Aspect	Internal factors		External Factors	
	Strength	Weakness	Opportunity	Threat
Social				
• Thick rustic feel	√			
• The community provides housing as a homestay	√			
• Unique and adaptive stilt houses	√			
• Low education level		√		
• There is skills training			√	
Economy				
• Additional livelihood in tourism			√	
• Low Economic Level		√		
• Easy accessibility				
• The distance between the adjacent tourist areas				
Ecology				
• Biodiversity is so diverse and unique as a tourist attraction			√	
• There are worship facilities	√			
• The house grows without distance rules		√		
• No TPS tersedia		√		
• Homestay does not meet technical standards		√		
• Road condition partially damaged		√		
• Limited access to clean water		√		
• Unorganized drainage		√		
• Inadequate health facilities		√		
• Flood threat		√		
• Threat of crop failure				√
• Landslide threat				√
• Eroded karst area				√
• Garbage out of control				√
• Development destroys protected areas				√
• Decrease in the level of health and environmental quality				√
Institutional				
• Supporting planning documents are available	√			
• Proposed as World Heritage by UNESCO			√	
• Cooperation and partnership			√	
• Investment support through RTBL			√	
• Open cooperation opportunities for the private sector			√	

Determination of strategy using SWOT matrix analysis (Table 8). The results of the identification of internal factors and external factors are reviewed in the IFAS (Internal strategic Factors Analysis Summary) matrix and the EFAS (External strategic Factors Analysis Summary) matrix. The IFAS matrix is the result of an assessment of internal factors which include strengths and weaknesses. While the EFAS matrix is the result of an assessment of external factors which include opportunities and threats. The following results were obtained.

Table 6. IFAS Matrix

Internal factors	Explanation	Note:	Weight	Rating	Weight and Rating
Strengths	1. There are already several houses that function as homestays in tourist locations so that tourists can easily get access to lodging	S1	0.1	2	0.2
	2. In general, a house in the form of a stage makes it more unique and adaptive.	S2	0.2	3	0.6
	3. *Biodiversity*so diverse and unique as a tourist attraction	S3	0.1	3	0.3
	4. A rural feel that is so thick with wetland agriculture and surrounded by karst hills	S4	0.2	3	0.6
	5. There are trading facilities that serve the daily needs of the community and tourists	S5	0.1	2	0.2
	6. There is already a mosque so that the public and tourists can easily access the facilities of worship	S6	0.1	2	0.2
	7. There is already a planning document at the tourist location	S7	0.2	2	0.4
	Total Strength (Strengths)	**S**		**1.0**	**2.5**
Weaknesses (Weknesses)	1. The house grows without any rules of distance from the protected Kars hills.	W1	0.1	3	0.3
	2. There is still a lot of garbage scattered at tourist sites and there are no TPS	W2	0.1	1	0.1
	3. Homestays located in tourist locations are not in accordance with applicable technical standards	W3	0.1	2	0.2
	4. The condition of the road at the tourist location is in the form of a wooden footbridge with damage at several points and has not reached all objects in the settlement	W4	0.2	2	0.4
	5. Limited access to clean water, tourist locations still use Karst hill springs and are rainfed	W5	0.1	1	0.1
	6. Drainage is not organized and when it rains it will cause flooding	W6	0.3	3	0.9
	7. Inadequate health facilities	W7	0.1	1	0.1
	Total Weaknesses (Weknesses)	**W**		**1.0**	**2.1**

Table 7. EFAS Matrix

Factor external	Explanation	Note:	Weight	Rating	Weight and Rating
Opportunities	1. The more attractive Rammang-Rammang tourism for foreign tourists by being declared a World Heritage by UNESCO	P1	0.1	1	0.1
	2. Can be reached by boat in a short time	P2	0.1	2	0.2
	3. Biodiversity, geodiversity and cultural diversity and the number of objects around settlements that can be processed and developed to be more interesting	P3	0.2	2	0.4
	4. Fostered cooperation in the form of assistance and training from the Central, Provincial and Regency Governments as well as the private sector in the form of CSR	P4	0.3	3	0.9
	5. The applicable building and environmental planning products support sustainable investment and regional planning	P5	0.2	3	0.6
	6. Private parties can invest in the Kars area as long as they follow the rules of the conservation area and involve the local community	P6	0.1	2	0.2
	Opportunities	**P**	**1.0**		**2.4**
Threats	1. The threat of flooding causes material losses and tourist areas are not functional	T1	0.2	3	0.6
	2. Threat of rice harvest failure and fish/pond farming	T2	0.3	3	0.9
	3. The threat of landslides in the karst area if you don't control it	T3	0.1	1	0.1
	4. The erosion of the Kars area as a conservation area	T4	0.1	2	0.2
	5. Uncontrolled waste does not disturb biodiversity	T5	0.1	1	0.1
	6. Development destroys protected areas	T6	0.1	2	0.2
	7. Decrease in the level of health and environmental quality	T7	0.1	1	0.1
	Threats	**T**	**1.0**		**2.2**

From the results of the above assessment using IFAS and EFAS supporting analysis, it is known that the strategic position in the SWOT quadrant matrix is:

X= Strength – Weakness

= 2.5 – 2.1

= 0.4

Y= Opportunity – Threat

= 2.4 – 2.2

= 0.2

Thus, it is known that the position of the X axis = 0.4 and the Y axis = 0.2

The results of the IFAS and EFAS analysis determine the location of the quadrant that shows the appropriate strategy is in quadrant I that the value of strengths and opportunities is greater than the weaknesses and challenges. So it focuses on SO strategy.

Table 8. SWOT Matrix

INTERNAL/ EXTERNAL	**STRENGTH (S)** 1. There are already several houses that function as homestays in tourist locations so that tourists can easily get access to lodging. 2. In general, a house in the form of a stage makes it more unique and adaptive. 3. Biodiversity is so diverse and unique as a tourist attraction 4. A rural feel that is so thick with wetland agriculture and surrounded by karst hills 5. There are trading facilities that serve the daily needs of the community and tourists 6. There is already a mosque so that the public and tourists can easily access the facilities of worship 7. There is already a planning document at the tourist location	**WEAKNESSES (W)** 1. The house grows without any rules of distance from the protected Kars hills. 2. There is still a lot of garbage scattered at tourist sites and there are no TPS 3. Homestays located in tourist locations are not in accordance with applicable technical standards 4. The condition of the road at the tourist location is in the form of a wooden footbridge with damage at several points 5. and has not reached all objects in the settlement 6. Limited access to clean water, tourist locations still use Kars hill springs and are rainfed 7. Drainage is not organized and when it rains it will cause flooding 8. Inadequate health facilities
OPPORTUNITIES (O) 1. The more attractive Rammang-Rammang tourism for foreign tourists by being declared a World Heritage by UNESCO 2. Can be reached by boat in a short time 3. Biodiversity, geodiversity and cultural diversity and the number of objects around settlements that can be processed and developed to be more interesting 4. Fostered cooperation in the form of assistance and training from the Central, Provincial and Regency Governments as well as the private sector in the form of CSR 5. The applicable building and environmental planning products support sustainable investment and regional planning 6. Private parties can invest in the Kars area as long as they follow the rules of the conservation area and involve the local community	**Strength – Opportunities (SO)** 1. Directing the construction of homestays in accordance with the applicable building and environmental plans. (S1,W5) 2. Utilisebiodiversity, geodiversity and cultural diversityto expand the coverage of existing tourist attraction areas or develop to new locations (S3, O3) 3. Conduct counseling about entrepreneurship to the community in order to improve the local economy. (S3, O3) 4. The government or the private sector together with tourism managers work together to improve worship facilities according to the reference standards for infrastructure criteria. (S4,O4) 5. Typical rustic stilt houses can be developed to attract foreign tourists, while maintaining the authenticity of the original architectural forms (S2, O1) 6. Market local community products through the availability of trading facilities with the help of funds from the government and CSR. (S5, O4) 7. Provision of utilities and supporting facilities for the area to support the achievement of goals as a world heritage area (S7, O1) 8. Development of geotourism in accordance with the carrying capacity and capacity of the area through limiting the number of visitors (S7, O2)	**Weaknesses – Opportunities (WO)** 1. Conducting outreach to local communities regarding the management and recycling of waste into useful goods (W1, O2) 2. The government and the private sector provide assistance to repair homestays to comply with applicable technical standards (W2, O4) 3. The government makes repairs to roads at tourist sites in accordance with the applicable building and environmental planning (W3, O5) 4. Tourism managers and the government by involving local communities to repair and maintain drainage (W6, O4) 5. The government made improvements to health facilities at tourist sites (W7, O4) 6. The government provides access to clean water at tourist sites (W4,O4) 7. The government and managers provide TPS locations (W5,O4)

Settlement Strategy using Eco-Settlement Approach

Based on the results of the SWOT analysis, the regional development strategy according to the research location is a strategy that focuses on strengths to increase existing opportunities. The strategic design is combined to determine a settlement arrangement strategy using an eco-settlement approach.

Table 9. Focus of Settlement Completion Strategy with Eco-settlement approach

Eco-Settlement Aspect	Structuring Strategy Focus
Social	• Directing the construction of homestays in accordance with the applicable building and environmental plans. • Typical rustic stilt houses can be developed to attract foreign tourists, while maintaining the authenticity of the original architectural form
Economy	• Conduct counseling about entrepreneurship to the community in order to improve the local economy. • Market local community products through the availability of trading facilities with the help of funds from the government and CSR.
Ecology	• Utilise,*biodiversity*, *geodiversity*and cultural diversityto expand the coverage of an existing tourist attraction area or develop it to a new location • Provision of regional utilities and supporting facilities to support the achievement of goals as a world heritage area
Institutional	• The government or the private sector together with tourism managers work together to improve worship facilities according to the reference standards for infrastructure criteria. • Development of geotourism in accordance with the carrying capacity and capacity of the area through limiting the number of visitors

Social Aspect

The appropriate strategy in developing the social conditions of the community in the research location is to maintain a strong rural characteristic.A unique rural stilt house can be developed as a homestay to attract foreign tourists, while maintaining the authenticity of the original architectural form and avoiding modern-style designs so that the culture of the building is maintained. In accordance with the characteristics of the area where the majority of the people live in semi-permanent stilt houses with building materials using local materials such as wood and stone.

Communities can build homestays with the main building materials in the form of local materials that are easily available and contextual to the surrounding environment such as wood and bamboo. For roofing material, it is directed to use thatched roofs from coconut or palm leaves. As for the finishing materials, use materials that are resistant to the sun's heat and humid air without reducing the uniqueness of the material. And do not use finishing that uses paint with contrasting colors.

The construction of homestays also needs to pay attention to the applicable Building and Environmental Planning (RTBL). One of them needs to follow the arrangement of the placement of the building. Building additions must be placed in adjacent sections of existing buildings and allocated in one site block. In addition, the laying is also not allowed to interfere with the visual view of the karst. In addition to the laying of buildings, there are rules for land use zones that are allowed to build homestays, namely in the rural cultural zone and the rural tourism zone. An illustration of the placement of buildings that are permitted and not permitted can be seen in the following figure.

Figure 14. Illustration of allowed building placement

Figure 15. Illustration of the laying of buildings that are not permitted

Economic Aspect

Local economic development can be supported through marketing strategies for community-made products. One of the local products typical of rammang-rammang is handicrafts made from palm leaves into fruit baskets, to hats. The availability of adequate trading facilities can help people market handicrafts to tourists. In addition, the local government is expected to be more aggressive in conducting outreach about entrepreneurship to the community, especially regarding the development of micro, small and medium enterprises to help stimulate local economic growth.

Another alternative to develop the community's economy is to offer handicrafts in activity centers with a wider service scale. So that the community does not only wait for the arrival of tourists around the tourist area but also picks them up at the entrance of the main tourist activities at the pier as a meeting point. In addition to handicraft products, local people can also offer crops such as fish and shrimp, considering that the fisheries sector is the dominant sector in Bontoa District.

Cooperation with the community can also be done through capital. Tourism development certainly requires no small amount of capital. Therefore, the cooperation of the private sector must consider capital assistance to increase micro-enterprises in the community. The community is given the opportunity to obtain education and training in managing tourist areas, providing tourism services, and inculcating entrepreneurial values. Until the involvement of local communities as entrepreneurs or managers of accommodation, attractions, transportation and other supporting services.

Ecological Aspect

The structuring strategy on the ecological aspect focuses on the utilization of biodiversity and the improvement of tourism supporting infrastructure. Utilise*biodiversity, geodiversity*and cultural diversityThis can be done to expand the coverage of an existing tourist attraction area or develop it to a new location. The biodiversity in the Rammang-Rammang karst area, if managed properly, can become a new tourist attraction.

The culture of the community that still maintains the traditional rural feel is also an added value that can attract foreign tourists to visit. These potentials need to be supported by tourism supporting infrastructure.

Provision of utilities and supporting facilities for areas that are still inadequate, such as repairing road networks, repairing drainage channels, waste networks, providing clean water, repairing waste water networks, to renovating homestays that do not meet standards. In detail can be seen in the following table.

Table 10. Strategy for providing utilities and tourism supporting facilities

Utilities / Tourism Support Facilities	Structuring Strategy	Criteria standard
Road Network	1. Pedestrian paths that pass through agricultural land, made embankments with a width of 0.6-1.2 m. 2. Road conditions, especially in Berua village, need to be improved by increasing the embankment height higher than the rice fields and ponds.	
Drainage Network	1. Areas that do not have drainage channels, especially in Berua Village, need to make tertiary drainage channels for each building as a form of flood mitigation 2. Drainage in natural tourism areas must be built openly and use hardening or if it is not possible to build it openly then it can be a closed system with due observance of conservation rules.	
Waste Network	1. Public trash cans are placed at a distance of 50 m and must not interfere with pedestrian circulation. There must be a separation between organic and inorganic waste. 2. Increasing community participation in sustainable waste management by starting with sorting and processing waste and reducing the amount of waste 3. Every housing facility, trade and service facility and public facility must be equipped and supported by TPS	• SNI 03-1733-2004 Minister of Environment and Forestry Regulation No. P.13/ MENLHK/ SETJEN/ KUM.1/ 5 / 2020 Maros Regent Regulation 2016 concerning RTBL
Clean water network	1. Provision of clean water networks in areas that are not yet available, especially in areas with a high concentration of visitors, such as in Kampung Berua 2. The provision of clean water for the needs of nature tourism is taken from surface water, not from ground water. 3. The placement of the PDAM's clean water network is directed not to be in a row of electricity and telephone networks that use cable networks underground or in the air so that they must be placed on one side of a different road.	
Wastewater network	1. Sewer lines for households should be equipped with waste treatment facilities provided in each residential environment, so as not to pollute the river 2. Toilets in nature tourism areas are built separately for male and female visitors, including for persons with disabilities, each of which must be equipped with a clear nameplate, sufficient clean water, hand washing and dryer areas, closets, closed trash cans, and urinals.	

Institutional Aspect

Institutional aspects are an integral part to support the sustainability of the area. Cooperation between the government, the private sector, together with tourism managers, must be able to increase the potential of the area through empowering local communities while still paying attention to the ecological balance. The development strategy on the institutional aspect must be in accordance with the carrying capacity and capacity of the area through limiting the number of visitors.

Conclusion

The social condition of the community with a low level of education, but very responsive to several trainings to support tourism sustainability, especially the ability to manage tourism. Economic conditions with low income levels, but open job opportunities through diversification of

livelihoods related to tourism such as boat drivers, local food sellers and homestay managers. Accessibility conditions with road quality indicators are still low, but the pier is adequate. The ecological condition of biodiversity becomes the potential for new tourism development if it is managed properly. Climate change is a threat to ecological resilience, so flood mitigation is needed, preventing damage to geodiversity, flora and fauna. Tourism supporting infrastructure and facilities that have the potential to be developed are homestay models on stilt houses with environmentally friendly technology. Aspects of community institutions support cooperation and partnership as well as control from various parties.

REFERENCES

Aprilia Kumaji, R., Hakim, L., & Pangestuti, E. (2021). Ecolodge Sebagai Sarana Akomodasi Pariwisata Berkelanjutan. *Profit*, *15*(01), 27–42.

Arifin, M., Wunas, S., Pratiwi Mushar, W. W., Lakatupa, G., & Mandasari, J. (2022). The Development of Mitigation-Based Infrastructure of Coastal Settlement and Fishery-Economic Resilience.

Asean Secretariat. (2016). The Asean Homestay Standard. ISBN 978-602-0980-74-4. Jakarta.

Eridiana, W. (2016). Sarana Akomodasi Sebagai Penunjang Kepariwisataan Di Jawa Barat. *Jurnal Geografi Gea*, *8*(1).

Ibrahim, Y., & Rashid, A. (2010). Homestay Program and Rural Community Development in Malaysia. Journal of Ritsumeikan Social Sciences and Humanities, 1(2), 7–24.

Khoerudini, F., & Yogyakarta, U. N. (2018). Cultural Experiences Melalui "Homestay Budaya" Sebagai Pariwisata Kreatif. *Technology and Vocational Education of Postgraduate Department. 15*(1), 12–17.

Peraturan Bupati Maros Nomor 97 tahun 2016 Tentang Rencana Tata Bangunan dan Lingkungan (RTBL) Kawasan Geowisata Rammang-Rammang Kabupaten Maros..

Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor P.13/ MENLHK/ SETJEN/ KUM.1/5/2020 Tentang Pembangunan Sarana dan Prasarana Wisata Alam di Kawasan Hutan.

Prayuni, I. R. A. (2013). Perancangan Lanskap Koridor Sungai Pute di Kawasan Karst Rammang-Rammang sebagai Kawasan Geowisata. Prosiding Temu Ilmiah IPLBI.

Puspitasari, D., Ahimsa-Putra, H. S., & Wijono, D. (2019). Persepsi Dan Pengelolaan Homestay Di Desa Wisata Wukirsari, Bantul. *Jurnal Kawistara*, *9*(1), 1.

Wedatama, A. A., & Mardiansjah, F. H. (2018). Pengembangan Homestay Berbasis Masyarakat Pada Kampung Homestay Borobudur. *Jurnal Pengembangan Kota*, *6*(2), 135.

Wityaningsih, W., & Yuliastuti, S. (2017). *Identifikasi Kesiapan Homestay Untuk Keberlanjutan Desa Wisata Pancoh, Kabupaten Sleman*. Seminar Hasil Penelitian Bagi civitas akademika 2017 November, 79–96.