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Rural Tourism Destination Spatial Interventions Face the Risk of COVID-19 Infection

Case Study: Kampong Boenga Grangsil Tourism Destination, Dampit District, Malang Regency

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Abstract: The Kampong Boenga Grangsil (KBG) Tourist Destination development faces significant design challenges in the face of the COVID-19 pandemic. The challenges of the COVID-19 pandemic require adjustments to the design of KBG tourist facilities through physical intervention. Prevention of the spread of the SARS-CoV-2 virus through health protocols is one of the criteria for sustainability design interventions in KBG tourist destinations. The uncertainty of the COVID-19 pandemic ending has forced us to adapt to new conditions, new requirements (social and physical distancing), and new arrangements (physical, social, and health), which are considered in developing spatial intervention design criteria. Community participation is the potential of local wisdom in developing rural tourism destinations. Some basic questions include: (1) What is the role of the Grangsil community in the preparation of health protocols as criteria for the design of physical interventions in KBG Destinations? (2) What are the spatial implications of the need for social and physical distance in rural tourism activities? (3) What are the physical design intervention criteria for tourist destinations to reduce the risk of COVID-19 transmission for visitors? The descriptive exploration method was used to obtain design criteria for the physical intervention of tourist destinations. A participatory approach is essential in exploring these non-physical aspects of planning and design criterion preparations. The study results are the criteria for spatial intervention for KBG destinations facing the risk of COVID-19 infection. This study enriches the spatial design requirements of rural tourist destinations based on the risk mitigation of COVID-19 transmission.

1. INTRODUCTION

¹ The tourism development sector in Indonesia has been experiencing rapid growth. During the COVID-19 pandemic, tourism was the most economically



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affected sector. The problem of COVID-19 transmission occurs in activity clusters that can congregate without physical distance. Large-scale social restrictions can prevent transmission, but large-scale social conditions have harmed the community's economy. The National Economic Recovery Policy in Indonesia during the COVID-19 pandemic provides an opportunity for the district to continue carrying out economic activities using strict health protocols. According to [Yudistira, Sumitro et al. \(2020\)](#), the behaviour of the Coronavirus that has spread throughout the world then mutates into a local virus. The World Health Organization (WHO) has presented findings that the coronavirus has mutated in very complex variations, leading them to believe the uncertainty about when the COVID-19 pandemic will end.

The Government has carried out various policy programs to prevent the transmission of COVID-19 through social and physical distancing, large-scale social restrictions, and a total lockdown ([Yunus and Rezki, 2020](#)). The Government conditioned the public to prepare for or start a new world order with COVID-19. The goal is not to eradicate the virus but to maintain the number of infected people through achieving community herd immunity, increasing the healing rate, and creating a healthy physical environment according to the requirements of health protocols. Public facilities that can cause clusters of COVID-19 transmission have to be redesigned with design criteria based on strict health protocols ([Oh and Gim, 2021](#)). Design adjustments through physical design interventions are one of the requirements in avoiding the occurrence of COVID-19 transmission clusters as a physical mitigation effort ([Nguyen, Imamura et al., 2016](#)).

Tourism activities must be aware of the emergence of new clusters. The primary key is implementing strict Health Protocols in tourism activities. This condition requires increasing immunity by maintaining health, eating healthy foods, exercising, increasing happiness, reducing stress, and basking in direct sunlight. Efforts to increase immunity can be divided into internal and external—individual efforts to improve immunity as an internal factor and external by creating tourist destination facilities.

The development of rural tourism destinations must be based on the local wisdom of the community. Local socio-cultural characteristics with local knowledge, local technology, and local natural potential are local potentials that must be developed. Community participation is the potential of local wisdom in developing rural tourism destinations.

A participatory approach based on local wisdom ([Santoso and Wikantiyoso, 2018](#)) is essential in exploring the non-physical aspects of planning and developing design criteria ([Wikantiyoso, Cahyaningsih et al., 2021](#)). Design criteria for rural tourism destinations that can anticipate the risk of coronavirus transmission are an essential solution ([Arenas, Cota et al., 2020](#)). The preparation of design criteria must consider the characteristics of the spread of the Coronavirus, health protocols in public spaces, and the real challenges of designing tourist facilities that are comfortable and safe for visitors ([Bayrsaikhan, Lee et al., 2021](#)). There are three crucial issues in the preparation of physical design intervention criteria for KBG tourist destinations, namely:

- (1) What is the role of the Grangsil community in preparing health protocols as criteria for designing physical interventions at KBG Destinations?
- (2) What are the spatial implications of the need for social and physical distance in rural tourism activities?
- (3) What are the physical design intervention criteria for tourist destinations to reduce the risk of COVID-19 transmission for visitors?

The criteria for the physical intervention design of tourist destinations using descriptive exploration methods. This study enriches the need for spatial design of rural tourist destinations based on risk mitigation of COVID-19 transmission. The results of this study are the criteria for spatial intervention for KBG destinations that face the risk of COVID-19 infection.

2. LITERATURE REVIEW

2.1 Herd Immunity Strategy to Prevent Transmission of COVID-19 through Spatial Intervention

The COVID-19 pandemic has become a global problem that must be handled comprehensively, integrated, and sustainably. SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), often referred to as Coronavirus, spreads fast and is deadly. To prevent the spread of this virus by knowing its transmission behaviour to create herd immunity (Bethune and Korinek, 2020; Brett and Rohani, 2020), striving for community resilience becomes an essential effort to prevent coronavirus transmission. Herd immunity is created by increasing social stability, improving public health awareness, healthy behaviour, and engineering the physical structure of the environment through physical intervention policies (Bethune and Korinek, 2020; Brett and Rohani, 2020).

Some experts claim that the COVID-19 pandemic will be challenging to control until herd immunity is established. Handling the COVID-19 pandemic using vaccines will take a long time. In Indonesia, the vaccination of 70% of the population is targeted for completion by March 2022. While infection-causing activity is decreasing, the risk of transmission is still high, and recovery is slow; it will take time to achieve herd immunity. The Government has an essential role in regulating intervention policies related to socio-economic aspects and public health and safety (Yunus and Rezki, 2020). National economic recovery and prevention of COVID-19 virus transmission are integrated and inseparable policies. Efforts to reduce physical contact between visitors to tourism objects must carry out spatial separation (M. G. Fakhri, Sturm, et al., 2021). Spatial separation is carried out as the implementation of physical distancing (Arenas, Cota et al., 2020; M. G. Fakhri, Sturm et al., 2021; Fitzgerald, Nunn et al., 2020), physical intervention policy (Mdullahi, Onyango et al., 2020), exposure possibilities (M. G. Fakhri, Sturm et al., 2021; Noy, Doan et al., 2020; Stark, Beyer Bartana et al., 2018), interim dance, and health care (George, 2020). Spatial analysis (Keskinocak, Oruc et al., 2020; Macharia, Joseph et al., 2020; Tupper, Boury et al., 2020) to physically intervene in planning for rural tourism destinations must be comprehensive. The primary basis for spatial analysis of intervention policies (Davis, Ferreira et al., 2020) includes; permitted high-risk research (Bermudi, Lorenz et al., 2020; Favas, Checchi et al., 2020), environmental vulnerability (Kiaghadi, Rifai, et al., 2020; Macharia, Joseph et al., 2020), and the importance of physical distancing (Arenas, Cota et al., 2020; Chu, Akl et al., 2020).

This effort aims to control the Coronavirus's spread by suppressing transmission using messages through spatial intervention (non-pharmaceutical intervention) and psychological intervention (Rahmani and Mirmahaleh, 2021).

2.2 COVID-19 Spread Prevention Through Spatial Intervention

The development of sustainable tourism is not only in terms of sustainability for physical growth but also in how the tourism business can be sustainable, including responding to the challenges of the COVID-19 pandemic. In this regard, a community social structure with resilience is needed to overcome the difficulties of the COVID-19 pandemic. Community resilience is the ability to anticipate risks, limit impacts and recover quickly through survival, adaptability, evolution, and growth in the face of rapid change (Community and Regional Resilience Institute, 2013). Human-centered development is needed to harmonize development through community empowerment efforts and the role of existing community resources (Pamatang, Sianipar et al., 2013; Wikantiyoso, Sukanti et al., 2019). Sustainable rural tourism development must achieve a state of resilience to provide excellent service in running a tourism business. Tourism managers must have the ability to manage, plan, and analyze the market as a basis for managing superior tourism services (Sangchumnong, 2018). The need for space transformation is in accord with protocols.

The number declining of tourists during COVID-19 has become the tourism destination sustainability. The sustainable tourism development process includes three dimensions, namely: 1) ecological sustainability, 2) social and cultural sustainability, and 3) economic sustainability (Dursun and Yavas, 2015; Lee and Jan, 2019). Some of the issues that can affect issues of visits to rural tourist destinations include:

- (1) The Government's Policy on Restricting Community Activities has an impact on reducing the level of tourist visits.
- (2) On the other hand, the Economic Recovery Policy by the Government has not been followed by technical guidelines for the implementation of economic activities in tourist destinations
- (3) There are concerns about the emergence of new clusters of the spread of COVID-19 in tourist destinations,
- (4) People still feel unsafe in tourist destinations that have not implemented health protocols.
- (5) How to prepare KBG as a rural tourism destination with natural potential to face the New Normal Era.
- (6) The location of KBG tourist destinations in low-density rural areas with a comfortable climate becomes an alternative location to increase tourist immunity by applying design criteria that pay attention to preventing COVID-19 transmission.
- (7) Physical intervention efforts in spatial planning and facilities for rural tourist destinations are needed, in addition to non-physical interventions to provide a "feel" of security through the application of comfortable and strict health protocols.

2.3 Rural Tourism Development Through Spatial Intervention

The sustainability of tourism village development, which includes socio-cultural, economic, and environmental aspects, has implications for the shifting of elements of the development of the concept of spatial resilience. Resilience is defined as the ability of a system to overcome disturbances (Wardekker, de Jong et al., 2010) maintain function, structure, identity, and

feedback to normalize an already running system (Walker, Holling et al., 2004). Kemperman and Timmermans (2014) then developed the idea of social resistance by equating it with the ability to deal with climate change.

The resilience of the KBG Destination is the capacity of the social and ecological system (Wardekker, de Jong et al., 2010) and its components (facility space) to withstand the pressure of the danger of the risk of spreading (Benfer and Wiley, 2020; Walker, Holling et al., 2004) the Coronavirus in tourist destinations. Based on previous research, the definition of resilience is the ability to respond to internal and external risk pressures through absorption, adaptation, and transformation in existing basic structures and functions (Utami, Antariksa et al., 2020). (Wikantiyoso, Cahyaningsih et al., 2021) Spatial intervention as a process can be interpreted as an effort to increase the ability of space to absorb, respond to, minimize the impact of the COVID-19. The behaviour of the spread of the Coronavirus, as well as rearrange the spatial planning of tourist destinations to overcome distances (Lu, Zhai et al., 2021; Meerow, Newell et al., 2016), in achieving the New Normal Era order after the COVID-19 pandemic.

From the description above, it can be summarized that the spatial resilience of tourist destinations is the ability of tourist destinations to survive and absorb the impacts of the COVID-19. Destination resilience reflects the capacity of destinations through individuals, communities, institutions, and systems to survive, adapt, and thrive towards a new normal. Spatial intervention efforts must consider the regulatory framework, health protocols, responsive spatial forms to ensure long-term terms, sustainability and functional characteristics, and essential structures.

3. METHODOLOGY

Preventing the spread of the Coronavirus requires community participation. Social, economic, and cultural behaviour will positively handle the covid-19 pandemic. The potential of the rural environment with a very low density and the socio-cultural potential of the countryside become essential social capital in designing destinations with a new post-pandemic order. A participatory approach is needed in this research to explore non-physical aspects in the criteria preparation. The descriptive exploration method was used to obtain design criteria for the physical environment aspect.

The research approach through the participatory planning and design method is illustrated in Figure 1. The participatory planning and design method in the design criteria is used to implement regulations and behavioural characteristics of the spread of the Coronavirus. The process of designing this study uses a participatory approach (Zanudin, Ngah et al., 2019) through the involvement of stakeholders in the preparation of protocols and design criteria. This study aims to model the design criteria for the spatial intervention of rural tourism destinations in mitigating the risk of covid-19 infection. Three stages in this research, namely:

- (1) Identification of spatial intervention design criteria; identify the spatial implications on the need for social and physical distance in rural tourism activities.
- (2) Preparation of design criteria for physical intervention efforts in tourist destinations;
- (3) The planning and designing criteria and their implementation in the Grangsil master plan

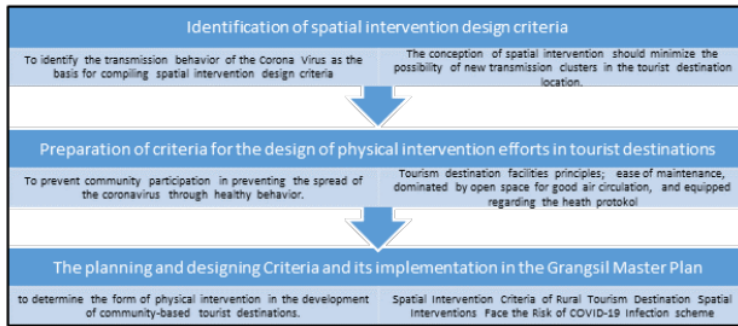


Figure 1. Research method Scheme

3.1 Identification of spatial intervention design criteria

The first stage is to identify the transmission behaviour of the [Corona Virus](#) as the basis for compiling spatial intervention design criteria. Based on the behaviour of [SARS-CoV-2 transmission](#), prevention of spreading, and prevention efforts in the form of non-pharmaceutical interventions and efforts to establish herd immunity, a health protocol is established with the community. Destination health protocols are the basis for drafting the concept of spatial interventions for tourist destinations. The conception of spatial intervention should minimize the possibility of new transmission clusters in the tourist destination location.

Community participation in the preparation of health protocols is an integral part of socializing the importance of healthy living in the tourist environment during the Pandemic. Health protocols for tourist activities are made to benefit tourists and the community around the destination ([Bayrsaikhan, Lee et al., 2021](#)). Ignoring the implementation of the protocol resulted in the emergence of new clusters of COVID-19 transmission ([Oh and Gim, 2021](#)).

3.2 Preparation of criteria for the design of physical intervention efforts in tourist destinations

There are five principles ([Figure 2](#)) for [preparing physical intervention design criteria](#) in the form of a Master Plan to reduce the spread of COVID-19 infection:

- (1) To prevent community participation in preventing the spread of the Coronavirus through healthy behaviour. Community participation in healthy behaviour and adherence to health protocols will create an environmental atmosphere for tourists ([Wikantiyoso, Sukanti et al., 2019](#), [Wikantiyoso, Cahyaningsih et al., 2020](#)). It needs efforts to increase public awareness.
- (2) Develop public awareness to comply with health protocols and prevent coronavirus transmission by avoiding crowds through physical distancing and social distancing mechanisms.
- (3) Hygiene and health destination environment (WHO, 2020); Tourism destination facilities should be designed with the principle of ease of maintenance, dominated by open space for good air circulation, and equipped with facilities for washing hands in every facility.
- (4) Following government regulations regarding implementing economic recovery activities in the pandemic era, tourist destination activities

must use strict health protocols to prevent the spread of Coronavirus. The policy for limiting physical-economic activities is based on the considerations in the Master Plan design.

- (5) The need for more open space for activities, good air circulation, increased sunbathing, and vitamin D absorption for visitors. Vitamin D is also beneficial for boosting immunity against coronavirus infection (Ali, 2020; Murdaca, Pioggia et al., 2020; Nair and Maseeh, 2012; Ü. Türsen, B. Türsen et al., 2020).

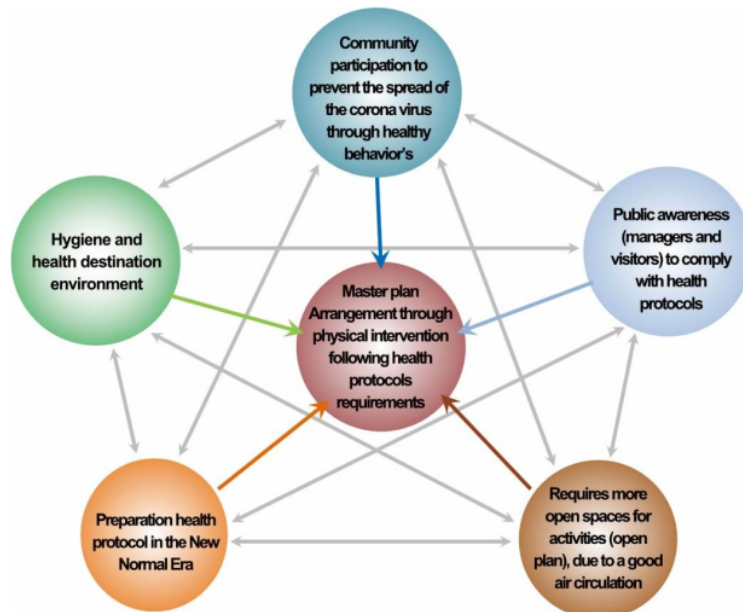


Figure 2. Physical intervention design criteria to avoid the Spread of Coronavirus

3.3 The planning and designing Criteria and their implementation in the Grangsil Master Plan

The final stage: 8o Implement design criteria in planning and designing tourist destinations to reduce the spread of COVID-19. Design criteria based on health protocols determine the physical form in developing community-based tourist destinations. Applying the requirements is a participatory approach to creating community-based tourist destinations. This stage is the final stage in using the physical intervention design criteria (Figure 2). Important things to note are;

- (1) Evaluate the vulnerability of existing destination spaces
- (2) Understand the process of spreading SARS-CoV-2 and Health protocols
- (3) Possible stakeholder interaction in the tourism destination.

Overall, physical intervention efforts in tourist destinations are carried out through the Spatial Intervention Scheme of the Spatial Intervention determination process of Rural Tourism Destinations Facing the Risk of COVID-19 Infection (Figure 3).

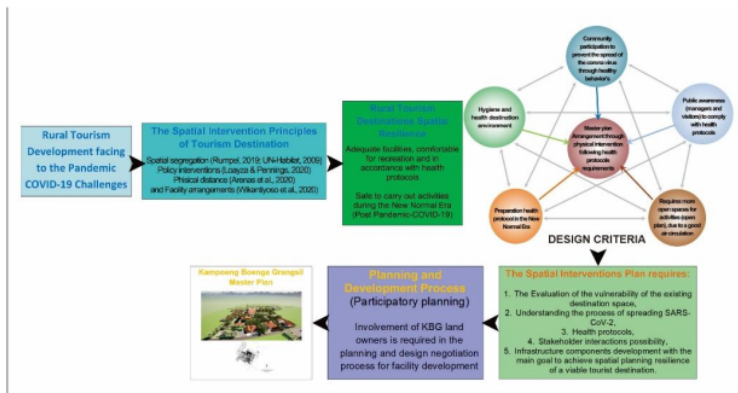


Figure 3. The spatial Intervention determination process of Rural Tourism Destination Spatial Interventions Face the Risk of COVID-19 Infection

4. RESULT AND DISCUSSION

4.1 KBG as Case Study

Location of KBG on the slopes of Semeru Mountain, about 5 km from Malang City, at an elevation of 700 meters above sea level, in Grangsil Hamlet, Jambangan Village, Dampit District, Malang Regency. It has excellent potential for the development of outdoor tourism that supports physical and social distancing efforts.

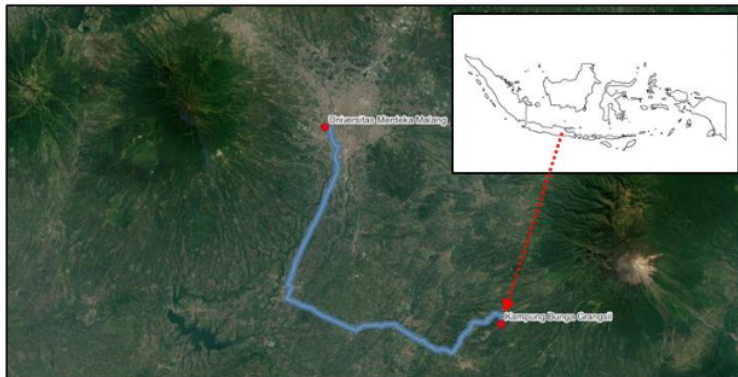


Figure 4. Kampoeng Boenga Grangsil Location

Possessing potential natural conditions with low population density (Figure 4), Grangsil Hamlet is a tourist location that supports efforts to develop destinations with herd immunity. The Government launched a National Economic Recovery Policy in June 2020. This economic recovery policy has implications for tourism sector activities, including the tourist continuation of KBG, which has seen a significant increase in visitor numbers. There is an increasing trend in the number of cases infected with the second wave of the virus in East Java from November 2020 to December 2020. During this period, the Government restricted community activities.

The social restriction policy implementer 2020 has impacted the number of visitors to the KBG tourist destination. These conditions show the challenges of COVID 19 infection for economic recovery in rural tourism activities. Economic recovery activities in the tourism sector require physical intervention efforts to organize tourism in such a way as to provide a sense of comfort and security from coronavirus infection threats. The social distancing policy in the second wave of the COVID- 19 spread shows a significant decrease in visitors (Oh and Gim, 2021). The tourist destinations must ensure the safety and health of visitors from the threat of coronavirus infection.

4.2 Spatial Intervention Design Criteria through design principles to prevent transmission of COVID-19

Based on the behavior of SARS-CoV-2 transmission, prevention of transmission, and prevention efforts in the form of non-pharmaceutical interventions and efforts to establish herd immunity, the concept of spatial intervention for tourist destinations was proposed. The conception of spatial intervention must minimize the possibility of new transmission clusters in tourist destination locations.

Table 1. Design criteria of physical intervention determination

No.	New Normal order protocol in the tourist area	Design criteria of physical intervention
1.	Tightening the implementation of health protocols, wearing masks, checking the temperature with a thermal gun.	Providing checking space at the primary access
2.	Washing hands.	Provide a place to wash hands where visitors touch materials; greenhouse, coffee cafe, photo spots, culinary facilities.
3.	Maintain physical distance.	Design of facilities that require a physical space of 1 – 2 meters from visitors; The width of the pedestrian path, the distance between the seats in the sitting group.
4.	Maintain user social distance to avoid crowds.	Group sitting design which is limited to a maximum of users with a minimum length of 1.5 meters
5.	Apply design requirements that are sufficiently wide and well ventilated.	Room design with sufficient room openings (at least 50%) improves room air circulation.
6.	We are applying the principle of outdoor activities.	Facility design is dominant in open space (80%) to ensure the circulation of a relaxed environment.
7.	Facilitating sunbathing activities, optimizing exposure to direct sunlight for the body's intake of vitamin D	Open space facilities provide opportunities to exercise with sun exposure to increase immunity. Shade-free pedestrian way design principles. Shade-free for path design; Pedestrian design with sky path. Open space is a good alternative

The COVID-19 virus generally spreads through airway contact and droplets. The World Health Organization (WHO) recommends a comprehensive set of actions (World Health Organization, 2020) to prevent the spread of the Coronavirus, some of which are related to spatial intervention

efforts in tourist destinations, namely; (1) Wearing cloth masks in certain situations; (2) Always clean hands frequently; (3) Maintain physical distance whenever possible; (4) observe coughing and sneezing etiquette; (5) avoiding crowded places, narrow and closed spaces, and indoor places with poor ventilation, wear a cloth mask when in confined spaces that are too crowded to protect others; (6) Ensure good environmental ventilation in all enclosed places and proper environmental cleaning and disinfection; (7) With direct sunlight exposure, open space design is a good alternative for the body's vitamin D intake; (8) Open pedestrian facilities provide opportunities to exercise with exposure to the sun to increase body immunity.

4.3 The Grangsil 2020-2030 Master Plan

The total area of the KBG Masterplan is approximately two hectares, with eleven landowners managed by the KBG manager. The land for the entire Master Plan is a combination of residential plots (about 25% or 5000 m²) that work as flower growers. The area used as a tourist facility is around 15000 m². In design criteria number 6 in *Table 1*, regarding the principle of outdoor activities, the dominant facility design criteria are in open spaces (80%) to ensure the circulation of a relaxed environment. The design implementation of this principle of open space was 12,750 m² or an area of 85% of the total area of the tourist area (*Figure 5*).

Referring to *Table 1*, regarding the design criteria of physical intervention, the Grangsil master plan design implementation is based on these seven criteria. Each criterion does not stand alone in this implementation but can be a combination in implementing the Master Plan design. *Table 2*. Show the results of design execution of the design criteria as an effort to spatial intervention in KBG tourist destinations.



Figure 5. Grangsil 2020-2030 Master Plan

Table 2. Application of design criteria in the 2020-2030 Grangsil master plan and its facilities

No.	Design criteria	Design Implementation
1.	Provide a place to wash hands where visitors touch materials; a greenhouse, coffee cafe, photo spots, and culinary facilities.	
2.	Design of facilities that require a physical distance of 1 – 2 meters from visitors; The width of the pedestrian path, and the space between the seats in the sitting group.	
3.	The sitting group design is limited to a maximum of 4 users with a minimum distance of 1.5 meters. Room design with sufficient room openings (at least 50%) improves room air circulation.	
4.	Facility design is dominant in open space (80%) to ensure the circulation of a relaxed environment.	
5.	Open space facilities provide opportunities to exercise with sun exposure to increase immunity	
6.	Shade-free pedestrian way design principles. Shade- free for path design; Pedestrian design with sky path. open space is a good alternative	

5. CONCLUSIONS

The COVID-19 pandemic is a severe challenge to tourism-based economic recovery efforts for rural communities. Activities and design of tourist destinations must ensure the safety and health of visitors from the threat of coronavirus transmission. Economic recovery activities in the tourism sector require physical intervention efforts in tourist destinations to provide a sense of comfort and security from the threat of coronavirus infection. Physical intervention design criteria are needed to mitigate COVID-19 transmission to prevent the occurrence of new clusters in tourist destinations.

The eighth design criteria as a form of spatial intervention in tourism destination design development, namely:

- (1) Providing checking space at the primary access,
- (2) Provide a place to wash hands where visitors touch materials,
- (3) Design facilities that require a physical distance of 1 – 2 meters from visitors,
- (4) The sitting group design is limited to a maximum of 4 users with a minimum distance of 1.5 meters,
- (5) Room design with sufficient room openings (at least 50%) improves room air circulation,
- (6) Facility design that 80 % open space (domination) to ensure the circulation of a relaxed environment,
- (7) Open space facilities provide opportunities to exercise with sun exposure to increase immunity, and
- (8) Shade-free pedestrian way design principles.

The challenge of developing post-pandemic tourism destinations requires designing adaptive innovations to health protocols. The development of community-based tourist destinations, such as KBG destinations, must go through a participatory process in preparing design criteria to mitigate the impact of the spread of COVID-19. The design intervention and KBG tourism destinations are a form of physical spatial intervention carried out to increase the resilience of destinations post the COVID-19 pandemic. Applying design criteria based on the principle of community-based health protocols is one of the alternative solution innovations in facing the challenges of the COVID-19 pandemic in the future.

AUTHOR CONTRIBUTIONS

Conceptualization, Respati W., Diyah S.C., and Aditya G.S.; methodology, Respati W., Diyah S.C., and Aditya G.S.; Illustration, Triska P.W.; resource person, Etikawati T.P; Planning and design preparation, Triska P.W.; writing—preparation of the original draft, Respati W., Diyah S.C., and Aditya G.S.; reviewed and edited Respati W., and Diyah S.C.; supervision, Respati W., Diyah S.C. All authors have read and approved the published version of the manuscript.

ETHICS DECLARATION

The involvement of the authors in the preparation of this manuscript implies that they have no conflict of interest regarding the publication of the paper.

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