

Integration of *Tri Hita Karana* and Sustainable Design for Creative Tourism Villages: Spatial Models in *Bongkasa Pertiwi* Village

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Abstract

The village of *Bongkasa Pertiwi* has significant potential for cultural tourism and the creative economy; however, the area's spatial planning, circulation, facilities, and sanitation are not yet optimal, thereby reducing the quality of the tourist experience and the destination's competitiveness. Furthermore, there is currently no tourism village design model that integrates the *Tri Hita Karana* philosophy with spatially measurable sustainability indicators. This study aims to formulate a creative tourism area design model based on eco-cultural sustainable design. The method used is design research employing the Glass Box approach, combined with spatial analysis, behavioral mapping, tropical climate analysis, and area utility evaluation. The research results show an increase in circulation efficiency of approximately 30%, the provision of green open spaces covering approximately 40% of the area, a reduction in stormwater runoff of approximately 35%, and an increase in public facility capacity of approximately 25%. This study produces a *Tri Hita Karana*-based spatial strategy model that supports the development of sustainable, adaptive, and locally-rooted cultural tourism villages. The village of *Bongkasa Pertiwi* has significant potential for cultural tourism and the creative economy; however, the area's spatial planning, circulation, facilities, and sanitation are not yet optimal, thereby reducing the quality of the tourist experience and the destination's competitiveness. Furthermore, there is currently no tourism village design model that integrates the *Tri Hita Karana* philosophy with spatially measurable sustainability indicators. This study aims to formulate a creative tourism area design model based on eco-cultural sustainable design. The method used is design research employing the Glass Box approach, combined with spatial analysis, behavioral mapping, tropical climate analysis, and area utility evaluation. The research results show an increase in circulation efficiency of approximately 30%, the provision of green open spaces covering approximately 40% of the area, a reduction in stormwater runoff of approximately 35%, and an increase in public facility capacity of approximately 25%. This study produces a *Tri Hita Karana*-based spatial strategy model that supports the development of sustainable, adaptive, and locally-rooted cultural tourism villages.

Keywords: *Tri Hita Karana, Sustainable Design, Tourism Village, Bongkasa Pertiwi, Eco-Cultural Design.*

1. Introduction

1.1 Background

In the last decade, the global tourism

paradigm has shifted from mass tourism to sustainable tourism and community-based tourism (CBT) which emphasizes the balance of environmental, social, and

economic aspects in destination development ("Tour. Dev. – Vol. I Key Areas of Action," 2018). This approach is important in the development of tourist villages because the quality of space, regional identity, and environmental sustainability directly affect the tourism experience and competitiveness of destinations.

In the context of Bali, the increase in tourist visits by 43.3% post-pandemic puts high pressure on the main tourist areas in Badung Regency (Haoxing & System, n.d.). This condition encourages the development of tourism villages based on culture and creative economy as an alternative destination that is more sustainable. *Bongkasa Pertiwi* Village has creative tourism potential in the form of silver crafts, Balinese starling breeding, kelele honey, and recycled crafts. However, the results of field observations show various existing problems, such as an undirected circulation system, lack of wayfinding, limited sanitation facilities, not optimal green open space, unintegrated zoning of tourism and production activities, and weak local architectural identity. These problems show the low spatial quality of the area which has an impact on user comfort and the effectiveness of tourist activities.

Previous research on CBT and sustainable design has generally focused on socio-economic aspects and community empowerment, without translating local cultural values into operational and measurable spatial design parameters (Suansri et al., 2023). In addition, the concept of eco-cultural design and the philosophy of *Tri Hita Karana* (THK) are still widely discussed conceptually and have not been developed into an applicable regional design model (Ardani et al., 2025). This condition shows that there is a research gap between the concept of local culture and the implementation of sustainable spatial design in the context of tourism villages.

1.2 Research Problems

Based on these problems, this study provides an approach to area design based on the integration of *Tri Hita Karana* and eco-cultural sustainable design. Problem-solving strategies are carried out through: (1) the preparation of the THK translation matrix into the creative tourism area zoning system; (2) the development of a node-link-place based circulation system to improve the efficiency and readability of the space; (3) the implementation of a Sustainable Drainage System (SuDS) that is responsive to topographic conditions; and (4) the development of a material decision framework based on environmental performance and local identity. This approach is expected to be able to improve spatial quality, user comfort, and environmental performance in the region simultaneously.

1.3 Purpose

This research aims to formulate a spatial strategy model for creative tourism areas that integrates the principles of *Tri Hita Karana* and eco-cultural sustainable design into a measurable zoning, circulation, and infrastructure system of the area. This research also aims to produce design concepts that are adaptive to the local cultural context and tropical environmental conditions. The integration of the *Tri Hita Karana* principle with an eco-cultural sustainable design approach can improve the spatial quality of tourist village areas through increasing circulation efficiency, optimizing green open spaces, reducing rainwater runoff, strengthening local identity, and improving the comfort and experience of tourist area users.

1.4 Literature Review

• Sustainable Tourism and Tourism Village

The development of community-based tourism (CBT) tourism villages places local communities as the main actors in the

management of tourist destinations to support economic, social, cultural, and environmental sustainability. This approach emphasizes community participation in the process of planning, managing, and developing local tourism potential in a sustainable manner (Giampiccoli & Saayman, 2017). In the context of tourist villages, the success of regional development is not only determined by tourist attractions, but also by the quality of amenities, accessibility, and the integration of regional spaces that are able to create a comfortable and sustainable tourism experience (Agung et al., 2026).

In addition, the development of tourism villages based on local culture is considered to be able to improve regional identity while strengthening the creative economy of the community. This is reinforced by research (Santosa et al., 2021) which states that the development of tourism villages needs to pay attention to spatial identity and local character so as not to lose the cultural value of the region.

However, the development of tourist villages in Indonesia still faces various problems, especially in the aspects of public facilities, circulation systems, sanitation, and spatial planning of the area that have not been optimally integrated. (Ayu Rustini et al., 2022) mentioned that the low quality of basic infrastructure can reduce the comfort and experience of tourists. Therefore, a regional design approach is needed that is able to integrate social, environmental, cultural, and spatial aspects thoroughly.

- **Sustainable Design and Eco-Cultural Design in Architecture**

This approach includes energy efficiency, the use of environmentally friendly materials, water management, the reduction of carbon emissions, and the optimization of natural lighting and ventilation.

In its development, the concept of sustainability not only focuses on technical

and ecological aspects, but also begins to integrate local cultural values through an eco-cultural design approach. This approach views local culture as an important part of the formation of regional identity and the sustainability of the built environment (Romadhan & Yuliani, 2025) Through this approach, design not only serves as a technical solution, but also as a medium for preserving local character and strengthening a sense of place.

The application of sustainable design in tropical areas can be carried out through the use of vegetation, building orientation, cross ventilation, the use of local materials, and environment-based water management such as rainwater harvesting and Sustainable Drainage System (SuDS). Research (Ariza et al., 2019) shows that the application of SuDS in tropical areas is able to reduce rainwater runoff and increase water infiltration into the soil. In addition, the use of lightweight materials such as Expanded Polystyrene (EPS) has also begun to be developed as an alternative material that has high thermal insulation capabilities and good construction efficiency (Sayadi et al., 2016).

In the context of the development of tourist areas, the concept of green infrastructure also plays an important role in creating a more comfortable space quality that is adaptive to the tropical environment. (Hindersah et al., 2020) explained that the integration of green open spaces, shade vegetation, and ecological drainage systems is able to increase the comfort of the microclimate while supporting the sustainability of tourist areas.

- **The Concept of *Tri Hita Karana* in Spatial Design**

Tri Hita Karana (THK) is a philosophy of Balinese society that emphasizes the balance of relationships between humans and God (*Parahyangan*), humans and others (*Pawongan*), and humans and nature (*Palemahan*). This concept is the basis for the formation of traditional Balinese spatial

planning and is widely applied in the development of local culture-based areas (Endra et al., 2024).

In the context of designing tourist areas, the THK concept has great potential as a sustainable design approach because it is able to integrate spiritual, social, and ecological dimensions in a harmonious spatial unit. Spatially, the concept of THK can be translated into the regional zoning system. The *Parahyangan* zone is manifested through sacred spaces and symbolic elements of the area, the *Pawongan* zone is manifested through social and economic interaction spaces such as plazas, galleries, and workshops, while the *Palemahan* zone is manifested through green open spaces, vegetation, and the ecological system of the area. This approach allows for the creation of tourist areas that are not only oriented to economic function, but also to social and environmental sustainability.

- **Synthesis and Research Position**

Based on the literature review above, it can be concluded that the concepts of community-based tourism, sustainable design, eco-cultural design, and *Tri Hita Karana* have a strong relationship in the development of sustainable tourism villages. However, previous research generally still addresses social, cultural, or environmental aspects separately and has not developed much spatial design models that are able to integrate all these aspects into an operational and measurable regional system.

This research positions itself to fill this gap through the development of a spatial strategy model based on the integration of *Tri Hita Karana* and eco-cultural sustainable design which is translated into zoning systems, circulation, green open spaces, and regional infrastructure. This model is expected to be a theoretical and practical contribution to the development of adaptive tourism villages.

2. Method

This research uses a design research approach, which positions the design process as an investigative method to generate new knowledge through systematic exploration, analysis, and design synthesis. This approach was chosen because it allows for integration between empirical data, theoretical frameworks, and creative processes in producing scalable and scientifically accountable spatial solutions. Within this framework, this study adopts the rational Glass Box method, which emphasizes the transparency of the design thinking process, so that every design decision can be traced based on the results of analysis and clear criteria.

2.1 Data collection methods

The object of this research is a creative tourism center area in *Bongkasa Pertiwi* Village, Badung Regency, Bali, which has potential for culture, creative economy, and tropical landscape. The unit of analysis includes the scale of the area (zoning, circulation, green open space, drainage), the scale of buildings or activity nodes (spatial function, orientation, materials), and the scale of social-activities related to community interaction and tourism activities.

Data collection was carried out through field observations, semi-structured interviews with village officials, tourism managers, MSME actors, the community, and visitors, as well as literature and regulatory studies related to sustainable tourism villages. The analysis was carried out using spatial analysis, thematic analysis, SWOT, and evaluation based on sustainable and eco-cultural design indicators.

The results of the analysis were synthesized into a design concept based on *Tri Hita Karana* and sustainable design applied to the zoning, circulation, and infrastructure systems of the area. Validation is carried out through data triangulation and stakeholder discussions. The research output is in the form of a spatial strategy model and a master plan for

the development of sustainable tourism villages.



Figure 1. Bongkasa village blockplan. (Source: Personal Analysis, 2025)

2.2 Data Analysis Methods

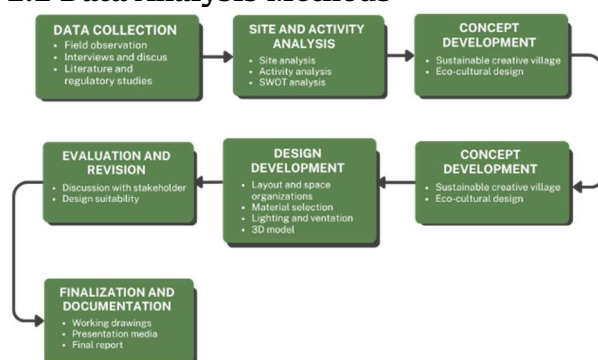


Figure 2. Flowchart. (Source: Personal Analysis, 2025)

2.2.1 Stages of Data Collection

This stage is the basis of the entire design process. Data is collected through:

- Field observation: studying the real conditions of the physical and functional aspects of the village. In this case, observations were carried out directly to *Bongkasa Pertiwi Village*. And collecting data through digital media, such as photos and information from the internet related to the condition of *Bongkasa Pertiwi Village*.
- Interviews and discussions: conducting discussions with *Bongkasa Pertiwi Village* officials, communities, artisans, and local tourism actors to understand the need for space/facilities and the potential for creative tourism activities.
- Literature and regulatory studies:

- 1) Permen PUPR No. 14 of 2017 concerning the Implementation of Building Architecture and Environment
- 2) Minister of Public Works Regulation No. 5 of 2008 concerning RTH, Guidelines for Sustainable Tourism Villages (Kemenparekraf, 2021) to ensure the conformity of the design with national standards
- 3) Minister of Public Works Regulation No. 5 of 2008, concerning guidelines for the Provision and Utilization of Green Open Space (RTH)
- 4) Street Furniture Standard based on PUPR Regulation No. 14 of 2017 & SNI 03-1733-2004

2.2.2 Site and Activity Analysis Stage

This stage aims to understand the relationship between the physical potential of the site, socio-cultural character, and the functional needs of the area. The analysis includes; site analysis, activity analysis and SWOT analysis

Table 1. SWOT Analysis (Source: Personal Analysis, 2025)

	Strategy Formulation	Implementation in Design
S O	Harnessing the potential of local culture and creative communities to develop experiential tourism activities	Provision of craft workshop spaces, local product galleries, and creative outdoor areas as the center of community activities
S T	Using local cultural identity as regional differentiation to increase the competitiveness of destinations	The design of the area uses the concept of eco-cultural design, local architectural elements, and the integration of <i>Tri Hita Karana</i> in spatial zoning
W O	Overcoming the limitations of regional facilities by taking advantage of sustainable tourism development opportunities	The addition of street furniture facilities, sanitation facilities, the construction of public toilets, as well as the arrangement of pedestrian and wayfinding paths to increase visitor comfort

W T	Reduce regional weaknesses while minimizing environmental risks through sustainable design strategies	The application of green open space, ecological drainage system (SuDS), the use of local materials, and zoning arrangements to maintain the balance of the region's environment
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Figure 3. Area Analysis. (Source: Personal Analysis, 2025)

2.2.3 Design Coceptualization Stage

At this stage, it is a process in formulating the basic concept of planning. The main concept used is "Sustainable Creative Village-Eco-Cultural Design", which is the integration between sustainability and local Balinese cultural values. At this stage it is performed:

- The formulation of the concept of *Tri Hita Karana* as the main philosophy of spatial planning (*Parahyangan, Pawongan, Palemahan*).
- Determination of the visual theme and character of the building (organic, natural, Balinese vernacular).
- Designing a linear circulation pattern to direct the flow of tourism from the entrance gate to the exit.

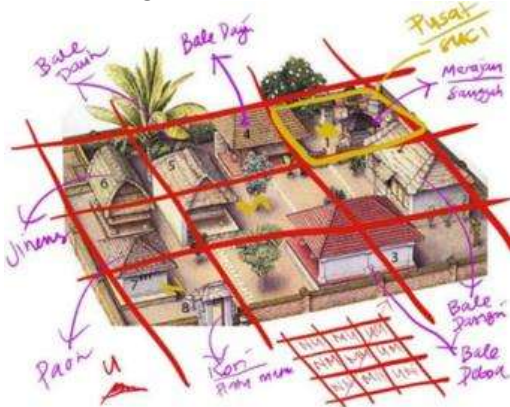


Figure 4. The concept of *Tri Hita Karana* in the place of residence. (Source: Google,2024)

2.2.4 Design Development Stage

This stage focuses on translating concepts into visual and technical forms. Some of the key activities include:

- Development of layout and room organization based on the results of analysis of activities and user needs.
- Determination of key materials such as bamboo, local wood, and EPS (Expanded Polystyrene) to reduce carbon footprint and utilize local resources.
- Simulation of natural lighting and cross-ventilation to support energy efficiency.
- Preparation of digital 3D models and visualization renderings to visually communicate the design to stakeholders.



Figure 5. Moodboard Design. (Source: Google,2024)

The object of this research is *Bongkasa Pertiwi* Village in Abiansema District, Badung Regency, Bali, which has cultural potential, agricultural landscape, and creative economy. The research population includes local communities, artisans, tourism actors, village officials, and tourists as users of the area. Samples were selected based on direct involvement in tourism activities and regional development.

The research uses an environmental design approach with the Glass Box Design method which is open and iterative. Data collection was carried out through field observations, in-depth interviews, documentation, and literature studies related to *Tri Hita Karana* and sustainable design. The analysis was performed

spatially and thematically using AutoCAD, SketchUp, and Enscape software to identify patterns of circulation, zoning, and relationships between spaces.

The conclusion of the research was obtained through inductive-verifiable analysis with source and method triangulation techniques, resulting in a sustainable tourism area design that integrates local potential, culture, and environmental design strategies in an integrated manner.

3. Results and Discussion

3.1 Existing Conditions and Identification of Spatial Problems

3.1.1 Description of Visible Characteristics

The site is located in Abiansemal District, Badung Regency, Bali, which has an area of $\pm 1.56 \text{ km}^2$ and consists of three traditional banjars, namely Karang Dalem I, Karang Dalem II, and Tegal Kuning. This site also has a main access road and a secondary road, the main road has a width of 6 meters and a secondary road with a width of 4 meters.



Figure 6. Map of the location of Bongkasa Pertiwi. (Source: Google, 2025)

3.1.2 Analysis of Existing Circulation Patterns

The circulation pattern in *Bongkasa* village has not been directed where the circulation between tourists and other

activities is still one, with the absence of a wayfinding system causing circulation between tourists and production activities to be directional and still mixed.

3.1.3 Zoning and Spatial Analysis

In the existing conditions of the area, the division of spatial functions is still not well structured so that the tourist zone, production zone, and communal zone have not been clearly separated. These three functions tend to mix in one area with no definite boundaries, resulting in overlapping activities. The area that should be a tourist zone is still used along with production activities and daily activities of the community, so that the visitor experience is less than optimal. Meanwhile, communal spaces as a forum for social interaction have also not been designed in a directional manner and are still informal, so they are not able to function as a center for shared activities.



Figure 7. Analysis of the Period of Building and Road Access. (Source: Personal Analysis, 2025)

Based on the accessibility aspect, the site has 1 main road and 1 secondary road, where the main *entrance access* is placed on the part facing the main road, the secondary entrance road after the main road is in the shape of a u whose exit access is also directed to the main road which is in the southern part of the site.

3.1.4 Facility and Infrastructure Analysis

In the existing conditions, the facilities and infrastructure of the area are still inadequate to support tourism activities optimally. Sanitation facilities such as toilets are still limited in number and distribution, so they are not able to serve visitors well. The rest area is also still minimal, characterized by a lack of seating and sheltered areas that reduce the comfort of tourists.

In addition, street furniture such as benches and garbage cans is still very limited, so the function and aesthetics of public spaces are not optimal. The area also does not have a clear signage system or directions, causing visitors to have difficulty in orienting and understanding the flow of the area. Overall, this condition reduces the quality of the tourist experience, so it is necessary to arrange and add facilities in an integrated manner in the design process.

3.1.5 Environmental Analysis (RTH and Drainage)

In the existing conditions of the area, environmental management, especially green open space (RTH) and drainage systems, is still not optimal and well planned. The existence of RTH in the area has not been utilized to the fullest, both in terms of ecological functions and as a public space.

In addition, the arrangement of RTH is also not structured, so it does not form a network of open spaces that are interconnected. This leads to a lack of transition space and water catchment areas that should be able to support the environmental balance of the area. On the other hand, the existing drainage system has not been systematically designed, so the rainwater flow is not well managed and still depends on the natural conditions of the soil and the slope of the land. This condition poses the potential for waterlogging at several points, especially in areas with low contours.

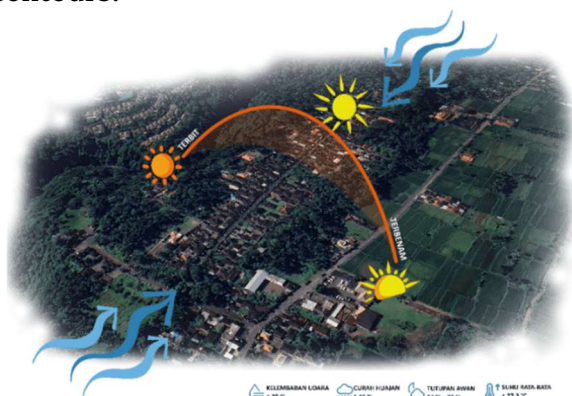


Figure 8. Analysis of Climate Aspects of the Site. (Source: Personal Analysis, 2025)

3.1.6 Architectural Identity Analysis

In the existing conditions, the local architectural identity of the region has not been seen as strong in the existing design elements. The application of traditional architectural elements is still limited to forms, materials, and ornaments, so it is not able to clearly represent the character of local culture. In addition, the area also does not have a distinctive visual character, both in terms of architecture, spatial patterns, and landscape. The absence of a unified design language causes the appearance of the area to be less directed and lowers the image of the area as a tourist destination based on local culture.

3.1.7 Synthesis of Problems

Table 3. Problem Synthesis (Source: Personal Analysis, 2025)

Aspects	Main Problems	Impact on the region	Planning Implications
Zoning & spatial planning	Tourism, production, and communal zones have not been clearly separated	There is overlap of activities and conflicts of spatial functions	Need for zoning arrangement based on functions and spatial hierarchy
Circulation	Undirected paths, without hierarchy and separation of users	Orientation confusion, vehicle and pedestrian conflicts	Need a clear circulation system (primary, secondary, serving)
Facilities	Limited toilets, less rest areas, minimal street furniture, no signage	Lowers the comfort and quality of the traveller experience	Addition of public facilities and wayfinding systems
Environment (RTH & Drainage)	RTH is not optimal and unplanned, drainage	Potential for inundation, uncomfortable microclimate	Need for integration of RTH and sustainable drainage system (SuDS)

	is not systematic	ate	
Architectural Identity	Local elements are not strong yet, no distinctive visual characteristics	The area lacks charm and image	Strengthening designs based on local and cultural identity

These problems show that the spatial performance of the area is still low, both in terms of spatial planning, circulation, facilities, environment, and visual identity. This condition has a direct impact on the decline in the quality of the tourist experience, because visitors do not get comfort, ease of orientation, and a structured space experience. In addition, the efficiency of space use is also not optimal, due to the absence of a clear and integrated division of functions.

3.2 Spatial Performance Analysis of the Region

3.2.1 Circulation Efficiency and Spatial Readability

In the initial condition, the circulation system of the area is still directional and does not have a clear hierarchy, so that vehicular routes, pedestrians, and other activities are mixed with each other. In addition, the region does not yet have an orientation element such as nodes or meeting points that help users understand the flow of the space, so the readability of the region is still low.

As a solution, the design applies a one-way circulation system to create a more structured flow of movement and reduce conflicts between users. The node-link-place approach is also applied, where nodes function as centers of activity and orientation, links as connecting lines, and places as destination spaces such as workshops, galleries, and culinary areas.

3.2.2 RTH Distribution and Quality

Table 4. Softscape Analysis and Landscape Paving (Source: Personal Analysis, 2025)

Element Type	Material Species	Function	Placement Location
Softscape	Cambodian Tree (Plumeria sp.)	Shades and aesthetic elements	Park area, rest area and pedestrian path
Softscape	Bamboo (Bambusa sp.)	Tropical shades and markers	Park area, rest area and pedestrian path
Softscape	Local Cherry Blossoms	Shades and aesthetic elements	Park area, rest area and pedestrian path
Softscape	Grass (Pennisetum purpureum cv.)	Ground cover	Park area and open space
Softscape	Medicinal Plants	Aesthetic elements	Park area and open space
Softscape	Tubers	Aesthetic elements and visual barriers	Park area and open space
Hardscape	Paving Block	Parking area	Pedestrian circulation lanes and parking areas
Hardscape	Cement Finishing	Sitting/building area	Recreation areas and communal spaces
Hardscape	Brick	Pedestrian paths	Pedestrian circulation paths

In the landscape design in *Bongkasa* Tourism Village, especially in the front area of the fence or terrace, it aims to provide an impression of comfort, add aesthetics, and circulation for users. And in the garden area, optimal circulation is also designed, neat arrangement that adds a green impression to the tourist village. The type of elements used in *landscape design*.



Figure 9. Concept of Vegetation and Pavement of Landscape.
(Source: Personal Analysis, 2025)

3.2.3 Drainage and Water Systems

In the initial condition, the drainage system of the area has not been managed properly so that rainwater runoff is quite high and has the potential to cause inundation, especially in areas with less permeable surfaces. In addition, there is no integrated water absorption and storage system.

As a solution, the design is to implement a sustainable drainage system (Sustainable Drainage System / SuDS) through the application of bio-swale to slow down water flow and increase infiltration, infiltration wells to reduce surface runoff, and rainwater harvesting as a rainwater storage system that can be reused for non-potable needs.

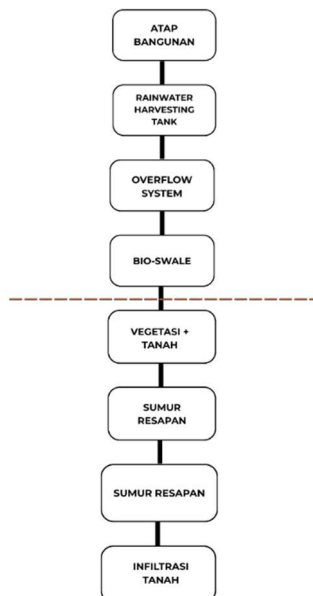


Figure 10. Drainage diagram. (Source: Personal Analysis, 2025)

3.2.4 Facility Capacity

In an effort to improve the quality of service and comfort of the area, the capacity of

previously limited facilities was added. The main facilities that are the focus of the development include toilets, rest areas, and signage systems. This addition is designed based on user needs, activity intensity, and public space comfort standards.

Table 5. Facility Capacity. (Source: Personal Analysis, 2025)

Facility Type	Existing Conditions	Proposed Addition	Placeme nt Location
Toilet	Minimal	2 points	Entrance gate, and in the rest area
Rest Area	Minimal	2 points	In the middle of the village trail
Signage	Not available	10 points	Entrance , and intersect ion

3.3 Design Transformation: Tri Hita Karana Integration

3.3.1 Translation of THK Concept to Spatial

It is shaped in a stable and sturdy triangular geometry, which symbolizes prosperity, unity and progress. This triangular shape also takes the meaning of the word "Tri" from the concept of *Tri Hita Karana* which means three stages or three parts. The triangular shape of the building gives an open, unique impression to all walks of life. The triangular shape with a modular system allows for easier building during installation and dismantling, which can save money, time, and effort.

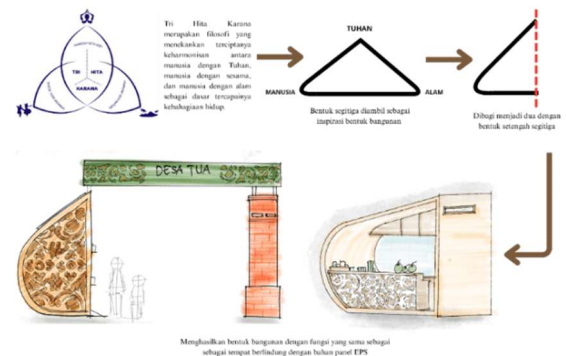


Figure 11. Shape Transformation. (Source: Personal Analysis, 2025)

3.3.2 Development of Area Zoning

The zoning of the area is divided into three categories. Public zones areas that have a high level of accessibility and are the main spaces for visitor activities, such as entrance gates, garden areas, rest areas, and booths. Semi-public zones are areas that have limited access but can still be used by visitors in certain activities. This zone includes a craft workshop room, an education room, and a community creative activity area. The service zone is an operational support area for the area that is not part of the main activities of visitors. This zone includes utility rooms, waste treatment areas, staff rooms, and other service facilities

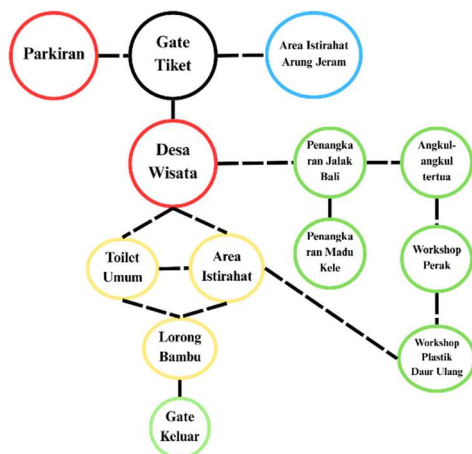


Figure 12. Bubble Plan. (Source: Personal Analysis, 2025)



Figure 13. Redesign of the Bongkasa Tourism Village Masterplan. (Source: Personal Analysis, 2025)

3.3.3 Regional Activity Structure

The integration of *Tri Hita Karana* in zoning also integrates the *Tri Hita Karana*

principle, which divides the spatial structure into three main layers. The *Parahyangan* layer is manifested through communal spaces and regional landmarks that have symbolic value and become the orientation point of space. The *Pawongan* layer is realized through social interaction spaces such as plazas, workshops, galleries, and culinary areas that are the center of community and tourist activities. Meanwhile, the *Palemahan* layer is realized through green open space, buffer vegetation, and an ecological drainage system that maintains the balance of the region's environment.

3.4 Implementation of Eco-Cultural Sustainable Design

3.4.1 Material strategy

The selection of materials in the design of sustainable tourism areas not only considers aesthetic and structural aspects, but also environmental impacts throughout the material life-cycle, ranging from production, transportation, use, to recycling potential. In the design of the *Bongkasa Pertiwi* Village tourist center, the use of Expanded Polystyrene (EPS) is considered as a supporting material because it has lightweight characteristics, has high thermal insulation capabilities, and is easy to produce in the form of prefabricated panels. The weight of EPS is very light (around 10–30 kg/m³) and the use of lightweight materials such as EPS can reduce the need for heavy equipment and reduce carbon emissions during the construction process. EPS has resistance to moisture and mildew, making it suitable for use in areas with high humidity levels such as tropical regions.

Table 6. Material Comparison. (Source: Personal Analysis, 2025)

Aspects	Eps (expanded polystyrene)	Bambo	Light Brick
Material weight	Very light	Lightweight	Medium
Strength	Non-structural	Lightweight	Semi-structural

		structu ral	
Thermal insulation	Excellent	Good	Enough
Constructio n speed	Very fast	Fast	Medium
Carbon impact	Medium	Very low	Medium
Recycling potential	There are but limited	Biodeg radabl e	Limited
Climate Suitability	Good as insulation	Excele nt	Good
Aesthetics	Limited	Very high	Standard
Lifetime	High if treated	Mediu m	Height

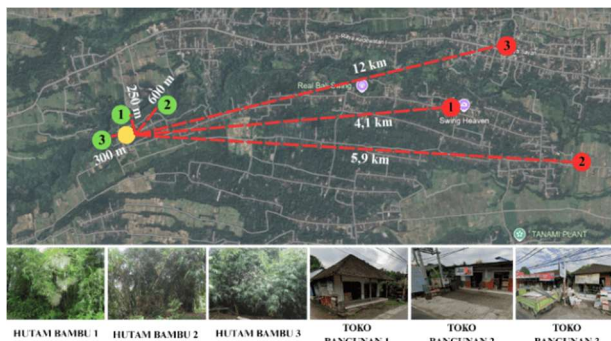


Figure 14. Map of Material Locations Around the Site.
(Source: Personal Analysis, 2025)

The materials used in this design use strong, durable, and environmentally friendly materials and prioritize local materials that are easy to find and also support sustainable design and reduce carbon footprint. The selected material will be applied to walls, roofs, structures/columns, and accessories.

3.4.2 Energy Strategy

Open buildings use skylights to maximize lighting, and the use of solar panels is used for closed buildings to utilize sunlight and reduce excessive energy consumption. The use of solar panels is also applied to street lights, and garden lights to add an aesthetic impression and support the sustainability system.

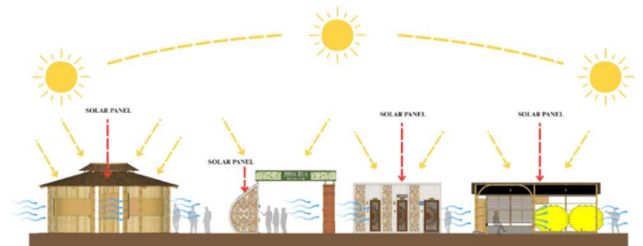


Figure 15. The Concept of Energy Utilization. (Source: Personal Analysis, 2025)

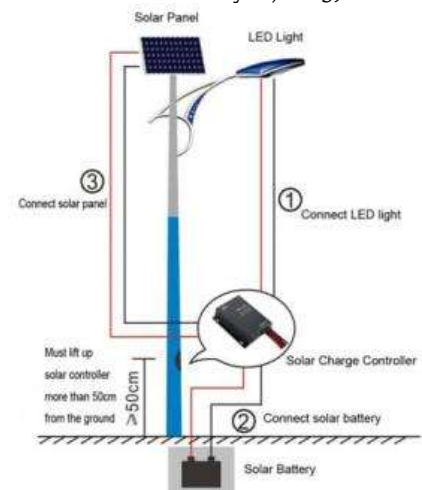


Figure 16. How Street Lights Work With Solar Panels.
(Source: Google, 2025)

3.4.3 Water Strategy RAINWATER HARVESTING

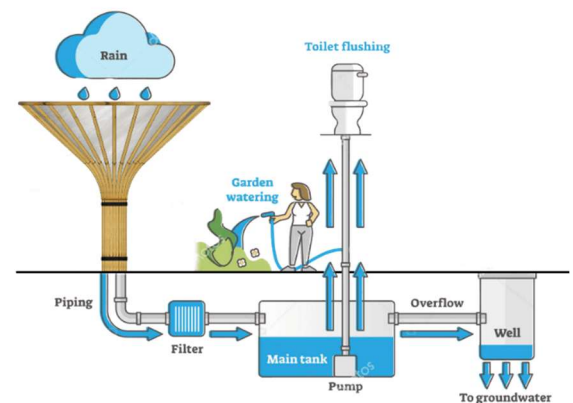


Figure 17. Water Management Concept. (Source: Personal Analysis, 2025)

The design of implementing a *rainwater harvesting* system by utilizing high rainfall to reduce water runoff by up to $\pm 35\%$. Rainwater is captured through roof gutters, drained into pipes, and then stored in tanks to be reused as watering plants and toilet needs.

The topographical condition of *Bongkasa Pertiwi* Village which is hilly causes rainwater flow to move quickly to low areas

and has the potential to cause inundation. To overcome this, infiltration wells and biopores were added to increase water infiltration into the soil. Meanwhile, excess runoff is channeled through the drainage system of the area to the city channel and rivers in the western part of the site which have a lower elevation, so that it can reduce the potential for flooding during heavy rains.

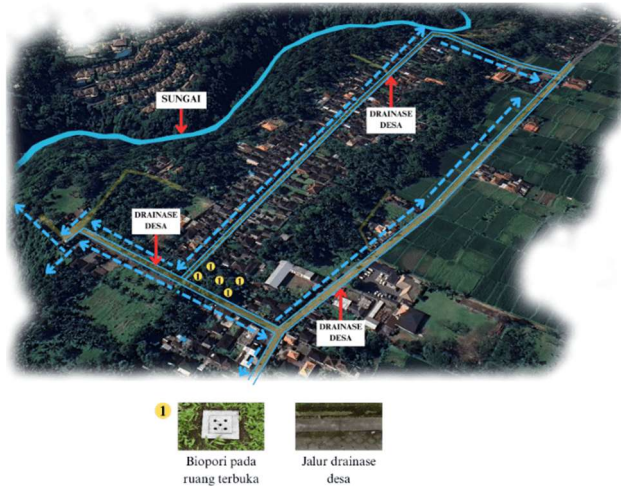


Figure 18. Drainage System and Inundation Prevention.
(Source: Personal Analysis, 2025)

3.5 Spatial strategy model

3.5.1 Model Structure



Figure 19. Model Structure. (Source: Personal Analysis, 2025)

3.5.2 Model Visualization and Explanation

• Facade and Street Furniture Models

Inspired by the shape of a farmer's hat because *Bongkasa Pertiwi Village* has a large rice field with community professions as well as farmers, being inspired by the concept of building façade. The design form is inspired by the farmer's hat, creating a dynamic and unique building shape from

other buildings with the aim of reducing the use of excessive roofing. The building is made of EPS (*Expanded Polystyrene*) a dynamic and effective material for various types of building shapes. The walls on the building are designed to connect to the roof resembling a semi-triangular shape. The design minimizes excessive land use by optimizing natural lighting to enter evenly.



Figure 20. Sketch and Result of Shape Transformation.
(Source: Personal Analysis, 2025)

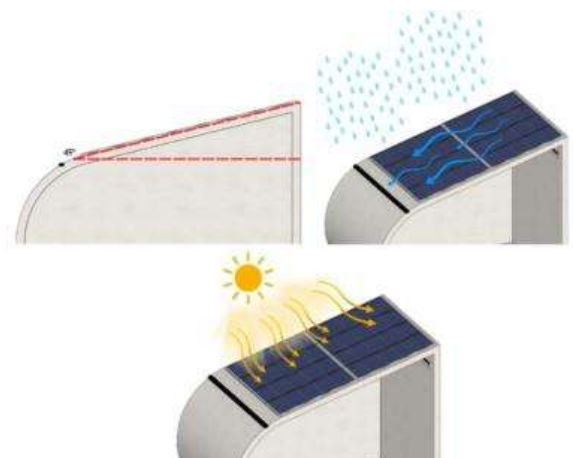


Figure 21. Shape function. (Source: Personal Analysis, 2025)

From the shape of the roof that tilts 45°, it serves to capture sunlight for lighting at night, and as a path for rainwater to fall during the rainy season

For *street furniture*, it is inspired by the shape of the roof of the Balinese *angkul-angkul* located in *Bongkasa Pertiwi Village*. The application of function and shape as a roof using natural materials such as bamboo and reeds, adds a local and natural impression to *street furniture*.



Figure 22. Sketch of the Result of Shape Transformation.
(Source: Personal Analysis, 2025)



Figure 23. Result of Shape Transformation. (Source: Personal Analysis, 2025)

- **Structure Model**

For the building structure, a river stone foundation structure system is used to support bamboo poles that continue upwards to the roof, but in some buildings such as guard posts, public toilets and *booths* use steel frames with cast foundation structures.

For buildings made of EPS such as guard posts, public toilets and *booths* use a modular system of panels/shape pieces. Where construction is carried out in stages with a form that can be made on location or ordered according to size, which begins with making the foundation, installing or forming a frame, installing EPS materials, and *finishing*.



Figure 24. Concept of Structure. (Source: Personal Analysis, 2025)

- **Model Entrance**

Because there are no guard posts and tickets on the site, the *entrance* design was made in front of the entrance road which faces west but the building faces South so

that it is easy for users to see.

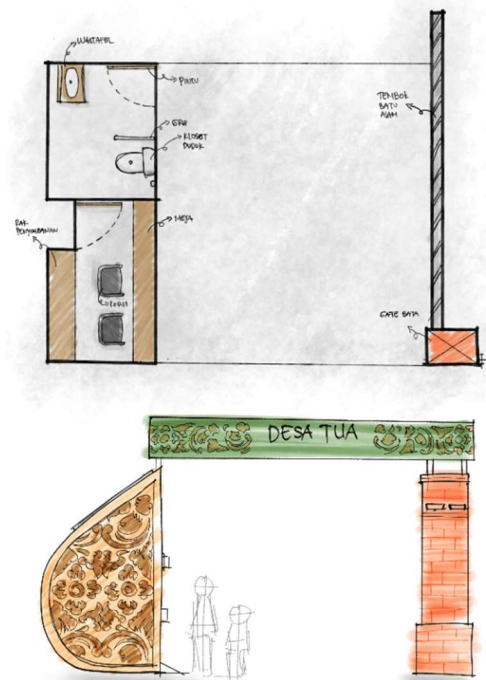


Figure 25. Sketch the shape of the gate entrance. (Source: Personal Analysis, 2025)



Figure 26. Keyplan and Gate Entrance Concept Results.
(Source: Personal Analysis, 2025)

- **Circulation Model**

The circulation in this Tourism Village is designed with a unidirectional system with a clear flow and is easily accessible to visitors, the community, and managers. With information on the layout map of the Tourism Village and the installation of directions at various points, it makes it easier for users to understand the flow of the Tourism Village.



Figure 27. User Circulation of the Site. (Source: Personal Analysis, 2025)



Figure 28. Circulation of Vehicle and Pedestrian Lanes Towards the Site. (Source: Personal Analysis, 2025)

• Planning Atmosphere Model



Figure 29. The atmosphere of Bongkasa Pertiwi Tourism Village. (Source: Personal Analysis, 2025)

3.6 Theoretical Discussion

Previous research on tourism villages and community-based tourism has generally focused on social aspects, such as community empowerment, community participation, and strengthening the local economy. However, the spatial and architectural aspects of the area are still not discussed in depth.

In contrast to previous research, this study focuses on spatial approaches and regional design to improve the quality of tourist villages. The focus of the research includes zoning arrangements, circulation systems, facilities, green open spaces, and the application of sustainable principles and eco-cultural design based on *Tri Hita Karana*.

This research contributes in the field of architecture through the application of local cultural values into spatial strategies, in the field of planning through the socio-ecological model of structuring tourist areas, and in the field of tourism through improving regional identity, comfort, and quality of tourist experience. Thus, this

research contributes conceptually and practically to the development of sustainable tourism villages based on local culture.

3.7 Practical Implications

The results of this study have practical implications for architects, governments, and village communities in the development of sustainable tourism areas based on local culture. For architects, this research can be a reference in compiling a tourist area design guideline that integrates the principles of sustainable design and the concept of *Tri Hita Karana* into the zoning, circulation, green space, and ecological system of the area. For the government, the results of the research can be used as a reference in the preparation of zoning strategies, improvement of public facilities, and the development of sustainable drainage systems and green open spaces. Meanwhile, for the village community, this research provides benefits through improving the quality of spaces that are more comfortable, structured, and productive, while supporting the development of the creative economy and strengthening the local identity of tourist areas.

4 Conclusions

This research shows that the spatial quality of tourist villages can be improved through the integration of the *Tri Hita Karana* principle and the eco-cultural sustainable design approach. The design results show an increase in circulation efficiency by $\pm 30\%$, the provision of green open space $\pm 40\%$ of the area, a reduction in rainwater runoff $\pm 35\%$ through an ecological drainage system, and an improvement in the quality of public facilities by $\pm 25\%$.

Conceptually, this research resulted in a spatial strategy model that integrates local cultural values into the zoning, circulation,

and infrastructure systems of the region. The model shows that the *Tri Hita Karana* concept can be applied as a design parameter that supports space quality, environmental performance, and user comfort at the same time.

Practically, the results of the research can be a reference for architects, governments, and tourism village managers in developing sustainable and contextual areas. However, this research is still limited to the conceptual design stage and does not include technical simulations or in-depth quantitative evaluations, so it needs to be further developed in the next research.

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