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REFINING CULTURAL LANDSCAPE THEORY BASED ON EMPIRICAL FINDINGS FROM THE JENEBERANG RIVER BASIN, INDONESIA

Muh. Akshar[1*], Muhammad Tahrir[1], Teguh Rizali Zahroni[1], Ridwan[1], Nadia Fatimah Azzahrah[1], Zahrotul Isti'anah Marroh[1].
[1]Wooden Engineering, Samarinda State Polytechnic of Agriculture, Samarinda, Indonesia

*Email correspondence: muhammadin.akshar@gmail.com

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ABSTRACT

Cultural landscapes emerge from interactions between communities and their environments, expressed through land use, spatial organization, environmental adaptation, and cultural traditions. Existing frameworks, however, may not fully capture the socio-ecological characteristics of river basin landscapes. This study identifies the cultural landscape of the Jeneberang River Basin, South Sulawesi, and examines how empirical findings can inform refinement of an existing conceptual framework. A qualitative approach combined field observations, surveys, unstructured interviews, and document analysis. Findings reveal diverse land uses, clustered spatial patterns, environmental adaptations, and continuing indigenous traditions, including *Angnganre-nganre*, *Songkabala*, and *Appalili*. The *Saukang* sacred area and cultural sites such as *Barugaya* and *Bujjulu Toa* demonstrate how collective memory, spiritual beliefs, and customary practices contribute to landscape identity. The relationship between mountainous topography, the Bili-Bili Reservoir, and hydraulic infrastructure further indicates the importance of spatial morphology. Accordingly, this study proposes three refinements: recognizing spatial morphology as an additional physical component, expanding archaeological sites into the broader category of cultural sites, and specifying empirical subcomponents relevant to the basin. These proposals retain the framework's core structure while improving its sensitivity to living cultural practices and complex land–water relationships, supporting contextual landscape assessment and conservation planning across environmentally sensitive river basin regions.

Keywords: Cultural landscape; Cultural sites; Indigenous cultural traditions; Spatial morphology*; *Theory refinement

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INTRODUCTION

A cultural landscape can be seen as a result of continuous interaction between the people and the environment around them. It has evolved through various practices such as settlement, land management, resource use, and cultural activities, which have developed in tune with the specific ecological conditions of the landscape. In such a landscape, natural elements are related to the activities of humans, cultural practices, and heritage elements as well as built environment. From the perspective of heritage, the significance of such landscapes is not only about history but also about their ecological functions, social relations, economic activities, tradition, and other cultural values (Tengberg *et al.*, 2012). These elements of significance can be interlinked and continuously evolving in terms of ecology and socio-economics. It is thus very essential to identify the elements which define a cultural landscape to ascertain its significance and manage it sustainably (Plieninger *et al.*, 2014).

The Jeneberang River Basin in Gowa Regency, South Sulawesi, represents a landscape shaped by continuous interactions between natural processes and human activities. The basin performs several important regional functions, particularly through the Bili-Bili Dam, which supports irrigation, raw water supply, flood mitigation, and hydroelectric power generation (Lukman *et al.*, 2015). At the same time, the watershed is closely connected to the livelihoods and social activities of local communities. Changes in the Jeneberang landscape have been shown to influence various dimensions of community livelihoods, including natural, social, economic, human, and physical capital (Wahid *et al.*, 2025). These interactions demonstrate that the Jeneberang River Basin cannot be understood merely as a hydrological system or a modified natural landscape, but rather as a socio-ecological landscape in which environmental functions and human activities are continuously interconnected.

To identify the cultural landscape of the study area, this research adopts the cultural landscape framework originally associated with Lennon and subsequently applied in the Indonesian context by Indrawati (2015). The framework distinguishes two broad analytical components: land-shaping processes and physical landscape components. More recent landscape studies, however, emphasize that cultural landscapes should be understood as dynamic socio-ecological systems in which physical characteristics, land-use processes, human activities, cultural values, perceptions, and place attachment interact over time (Simensen *et al.*, 2018; Tenzer, 2024). Therefore, in this study, the Lennon–Indrawati framework is retained as the basic structure for identifying landscape components, while more recent perspectives are

Table 1. Basic Cultural Landscape Components Adapted from Indrawati (2015), Based on Lennon (1996)

Land Shaping Processes	Physical Components
Land use and activities	Circulation networks
Response to natural environment	Boundary demarcations
Patterns of spatial organization	Vegetation
Cultural tradition	Buildings, structures and objects
	Cluster
	Archaeological sites
	small-scale elements

Source: Adapted from Indrawati (2015, p. 214), who cites Lennon (1996).

incorporated to strengthen the interpretation of the relationships between physical landscape characteristics, community activities, cultural values, and landscape transformation.

The two-component framework presented in Table 1 provides the initial analytical structure for this study. Nevertheless, contemporary landscape-characterisation approaches indicate that landscape character is not determined solely by physical attributes and land-shaping processes, but also by the interaction f biophysical conditions, land-use patterns, socio-cultural practices, perceptions, and meanings attached to place (Simensen *et al.,* 2018). Accordingly, the present study uses the Lennon–Indrawati framework as a starting point and further interprets the identified landscape components through a contemporary socio-ecological and place-based perspective.

Within this framework, the land-shaping process refers to the ways in which communities shape, organize, use, and respond to the landscapes in which they live. It includes land use and activities, spatial organization, adaptation to environmental conditions, and the continuation of cultural traditions. The physical component refers to the tangible elements of the landscape, including circulation systems, boundaries, vegetation, buildings, structures, objects, spatial concentrations, archaeological sites, and other small-scale physical features. Considered together, these two components provide an analytical basis for understanding how local communities occupy and use space, adapt to physical settings, and maintain cultural practices that contribute to the character of the Jeneberang River Basin.

Previous studies on cultural landscapes have demonstrated that landscape character is shaped by the interaction between human activities, environmental conditions, land-use practices, and cultural values (Plieninger *et al.*, 2014). However, studies that integrate both land-shaping processes and physical landscape components within a river-basin context remain limited, particularly in the Jeneberang River Basin. Existing studies in the area have predominantly focused on hydrological responses to land-use change (Surahman and Darma, 2020), land-use transformation and flood risk (Widodo, 2021), and sedimentation and reservoir management in the Bili-Bili Reservoir (Hasnawi *et al.*, 2025). While these studies provide important insights into the environmental and hydrological dynamics of the basin, the cultural dimensions of landscape transformation, including local practices, spatial organization, cultural traditions, and physical heritage elements, have received comparatively less attention. Consequently, there is still limited understanding of how natural processes and community activities jointly shape the cultural landscape of the Jeneberang River Basin. This study addresses this gap by identifying the cultural landscape characteristics of the basin through an integrated analysis of land-shaping processes and physical components, as well as by examining the factors influencing their development and transformation.

METHODS

This study employed a qualitative research design using field observation as the primary method of data collection, supported by field surveys, unstructured interviews, and document review. Observation was considered appropriate because it enabled the researcher to examine social and cultural practices, community activities, and physical landscape characteristics within their actual environmental context (Satori and Komariah, 2020). Passive participation was applied, in which the researcher observed community activities without becoming actively involved in them. The observations were complemented by interviews and documentation of

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The overall research framework is presented in the flowchart below:

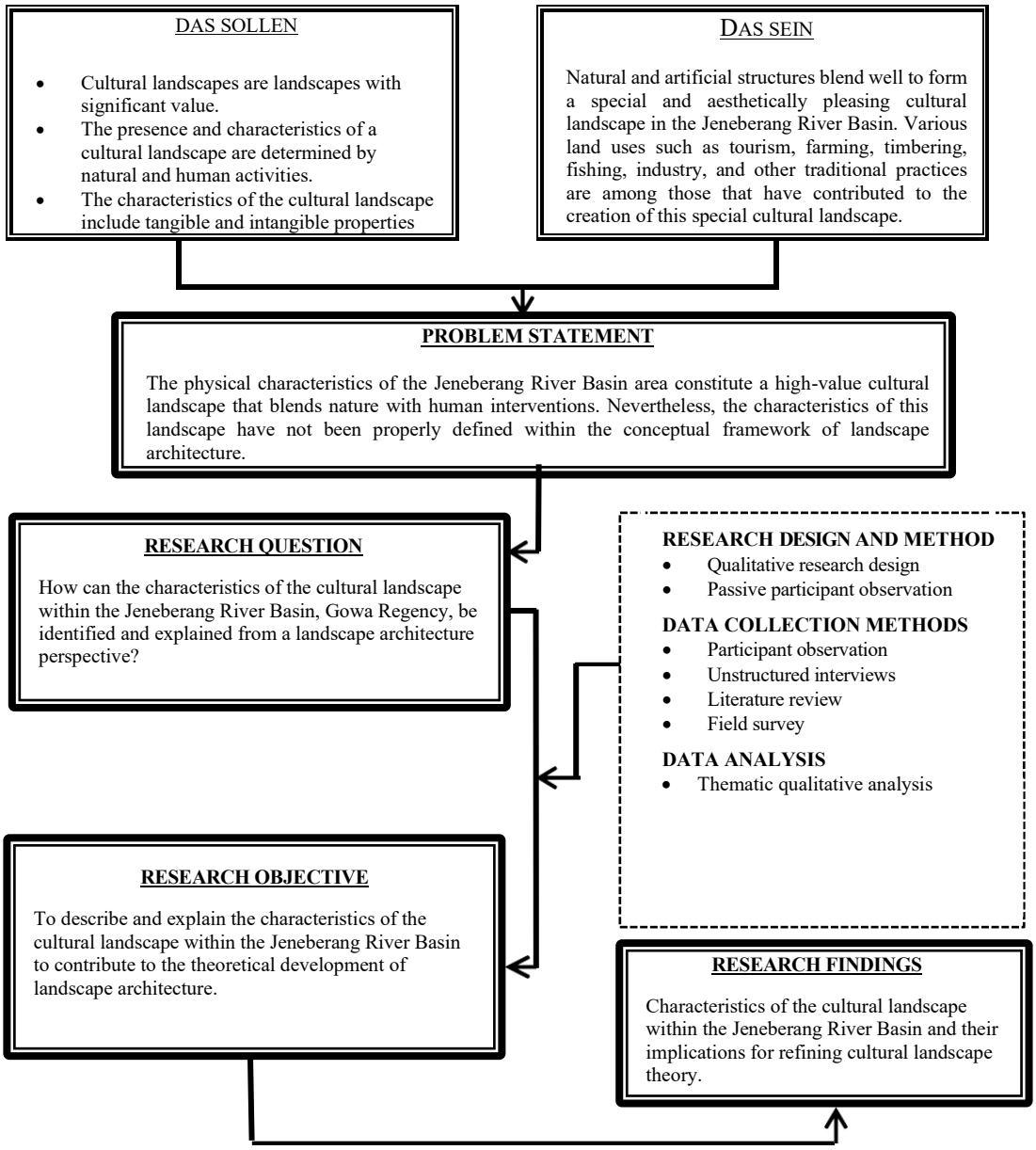

Figure 1. Research Methodological Framework
(Source: Author's analysis, 2026).

environmental features, cultural practices, land-use activities, spatial organization, and physical landscape elements relevant to the study.

The collected data were analyzed thematically to identify recurring patterns, relationships, and variations within the cultural landscape. The initial coding and classification were guided by the two analytical components presented by Indrawati (2015), based on Lennon, namely land-shaping processes and physical landscape components. Land-shaping processes were examined through land use and activities, responses to environmental conditions, spatial organization, and cultural traditions, while physical components were identified through circulation systems, boundaries, vegetation, buildings and structures, spatial concentrations, archaeological sites, and other small-scale physical elements.

The empirical findings were then compared with the initial cultural landscape framework to assess its applicability to the Jeneberang River Basin. Contemporary landscape-characterisation perspectives were also used to support the interpretation of interactions among biophysical conditions, land-use patterns, socio-cultural practices, perceptions, and meanings attached to place (Simensen *et al.*, 2018). This comparative and interpretive process was used to identify aspects that were consistent with the existing framework as well as empirical findings that required further theoretical clarification or refinement.

RESULTS AND DISCUSSION

Research Location

The research sites were selected based on the presence and diversity of cultural landscape components within the Jeneberang River Basin. For analytical purposes, the selected sites were further segmented according to their hydrological position relative to the Jeneberang River flow and the Bili-Bili Reservoir. The upstream zone comprises Bontokassi, Borisallo, Lanna, and Manuju, representing areas located above or toward the upper catchment of the reservoir. The middle-stream and reservoir-transition zone comprises Bilalang, Moncongloe, Bontoparang, and Belapunranga, where landscape characteristics are strongly influenced by the reservoir, tributary confluences, and associated human activities. Bili-Bili Village represents the dam and the lower edge of the sampled area.

This segmentation is used specifically for the spatial analysis of the selected research sites and does not represent the complete upstream–middle–downstream division of the entire Jeneberang River Basin. The actual downstream section of the Jeneberang River continues westward beyond the selected study locations toward the lower Gowa and Makassar areas. The selected study sites are shown in Figure 2.

As shown in Figure 2, the study area comprises nine villages and urban wards distributed around the Bili-bili Reservoir within the Jeneberang River Basin, namely Bontoparang, Bili-bili, Moncongloe, Bilalang, Manuju, Bontokassi, Borisallo, Lanna, and Belapunranga. These locations represent different spatial, environmental, and land-use settings ranging from mountainous and forested areas to agricultural land, settlements, reservoir infrastructure, river corridors, and other human-modified spaces. The research sites were selected purposively based on the presence and diversity of cultural landscape elements, including natural features, land-use activities, settlement patterns, infrastructure, culturally significant places, and interactions between communities and the surrounding environment. The selected areas therefore provide a representative range of landscape conditions through which the relationship between natural processes and human activities can be examined within the Jeneberang River Basin. Not all administrative units within the surrounding sub-districts were included in the study. Only villages and urban wards that contained landscape elements relevant to the analytical framework were selected. This spatial distribution provides an empirical basis for comparing variations in cultural landscape characteristics and for assessing the applicability of the existing cultural landscape framework to the Jeneberang River Basin. The diversity of physical, functional, and cultural conditions across the selected sites also enables the

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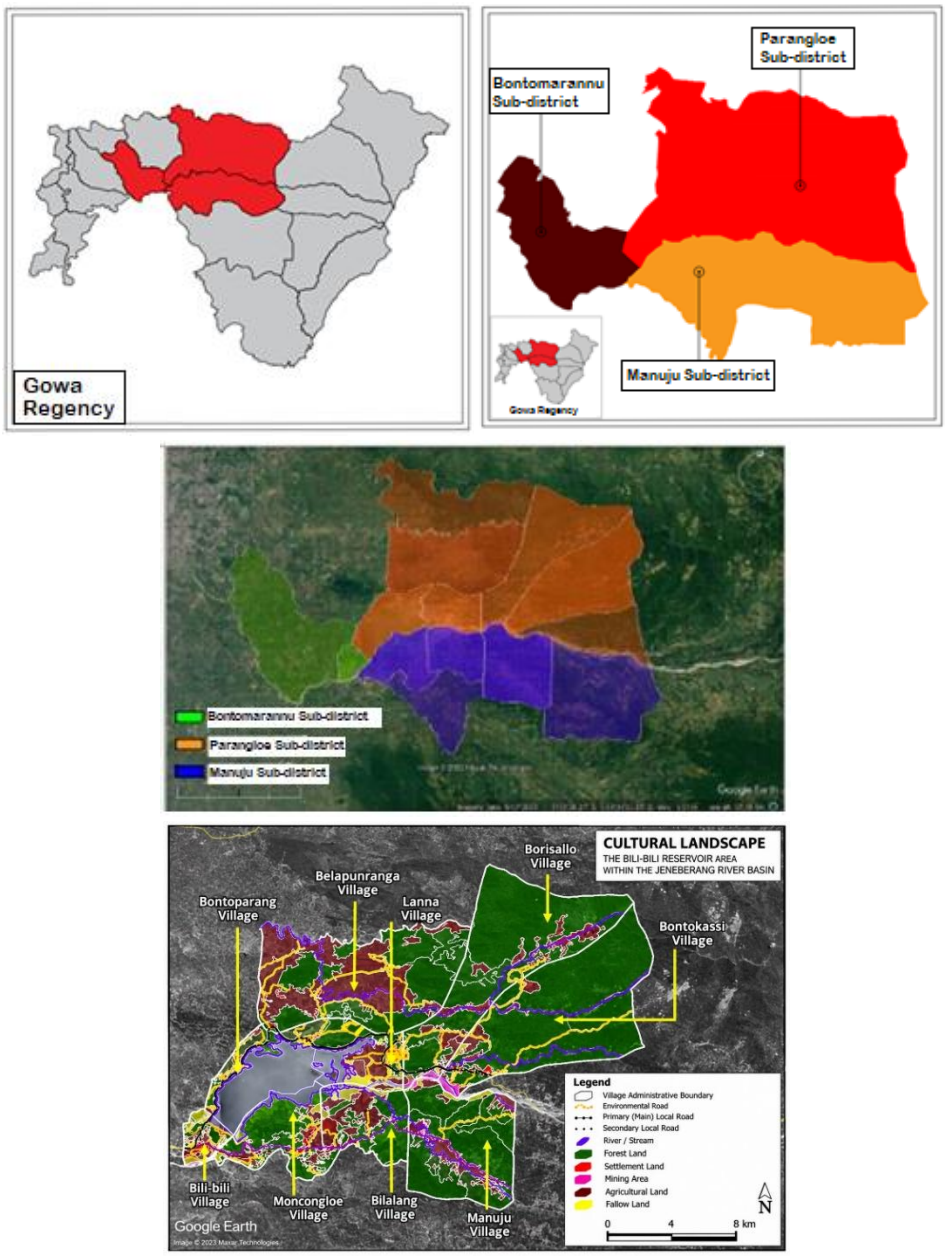

Figure 2. Research Location Map
(Source: Data processed from Google Earth, 2026)

identification of empirical elements that may confirm, extend, or require refinement of the existing theoretical framework.

Land Shaping Processes

Land uses and activities

Various land shaping practices can be witnessed in the Jeneberang River Basin through the patterns of land use existing there and associated activities. Several forms of land use can be found in this region, including the presence of aquatic environment, residential settlements, forests, barren land, mining site, greenbelts and agricultural land. These patterns represent a continuing socio-ecological process, where the interaction of community practices, environmental factors, perception and interventions of the policy can lead to the transformation

of land (Ritohardoyo, 2013). According to the field-based physical terrain analysis, seven main types of land use have been identified in the Jeneberang River Basin: aquatic environment, forest, greenbelt, agricultural land, residential settlement, barren land and mining site. It shows how various are the ways people occupy, use and transform the physical environment of the basin.

Aquatic environment, such as the reservoir and Jeneberang River, provides a valuable resource for the livelihood activities of local people. Fishing is still a common practice among local people that use the aquatic space for harvesting the freshwater fish and mollusks. Various methods of fishing are used by locals depending on the place and the type of fish. For example, the fisherman can use gillnet, cast net, hooks-and-lines, and manual harvesting from the river bottom at its shallow parts. Some of the common species of fish found there are Nile tilapia (*Oreochromis niloticus*), catfish (*Clarias spp*.), Java barb (*Barbonymus gonionotus*) and common carp (*Cyprinus carpio*). Local people not only consume the caught fish but also sell it to earn money. Such selling can be done in roadside food stalls, lesehan restaurant and local markets. This shows how multiple is the role of the aquatic environment of the basin for the cultural landscape of local people.

Patterns of spatial organization

Generally speaking, there are five main forms of spatial organization, which can be categorized as centralized, linear, radial, clustered, and grid. The first one implies the dominance of a central node organizing the space of secondary units, while the linear form involves a sequential formation of units. Radial organization represents the combination of the above two patterns, where linear units spread out from the center, while cluster formation involves grouping of spatial units according to their proximity, visual and other criteria, whereas grid organization implies a more systematic and geometrical layout of spaces (Ching, 2008). In the case of the Jeneberang River Basin, the dominating form of spatial organization appears to be the clustered pattern. Units in question are not placed in accordance with any geometrical rules and resemble the irregular shoreline of the reservoir stretching from the east to the southwest.

The resulting landscape is characterized by considerable heterogeneity, as the units vary in terms of size, distance and placement. Elements of land use do not organize themselves around a single central node but rather appear in an uneven distribution across the basin. Vegetation in this area appears to be concentrated more in the eastern part of the reservoir, however, several parts of the buffer zone are poorly covered with vegetation and border the agricultural and barren lands. Similar patterns are observed in the distribution of settlements and agricultural lands in the form of clusters.

Response to natural environment

Human adaptability to the natural environment is significantly represented in the management of the landscape itself. In cultural landscapes, such reactions are likely to lead to socio-ecological stability where development takes into account the physical conditions and environmental capacities of the region. As stated by Fandeli and Muhammad (2009), an adequate knowledge about the physical conditions of natural landscapes may become a basis for the design of human-made landscape elements that will complement their natural

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surroundings. Such a relationship may be observed in the Jeneberang River Basin through the appearance of additional land uses and activities. For instance, several areas of the hilltops in the basin are developed by the landowners as recreational sites, ecotourism facilities, and camping ground as means of increasing income. Some parts of the buffer zone of the reservoir are used for culinary activities and agricultural cultivation.

Such land uses are a sign that the landscape undergoes changes according to the economic interests of the residents. However, the long-term effect of such activities will depend mainly on the compatibility of such activities with the function and environmental capacity of the particular areas. The right allocation of land use according to spatial zoning will allow maintaining ecological processes and the functioning of reservoir-based infrastructure. Conversely, such activities that violate the ecological capacity of the area or the functions of particular land uses will increase environmental pressure and decrease the resilience of the Jeneberang River Basin landscape.

Cultural tradition

Culture encompasses the collective body of knowledge, values, beliefs, customs, laws, ideas, and practices through which people understand and organize their world. In Indonesia, the concept of *kebudayaan* derives from the Sanskrit word *budhayah*, the plural form of *budhi*, meaning intellect or reason. The English term *culture* originates from the Latin *colere*, meaning to cultivate or care for the land, and later developed into a broader concept associated with the cultivation and refinement of human life (Nuryanto, 2019).



Figure 3. Pattui Sumanga procession in the Songkabala tradition at the residence of the pinati (Source: Field observation, 2026)

Table 2. Empirical Findings of Land Shaping Processes in the Jeneberang River Basin Area

Land shaping processes	Empirical Findings
Land use and activities	Water Features / Systems
	Forest Land
	Agricultural Land
	Barren / Wasteland
	Residential Land
	Mining Land
	Greenbelt Land
Patterns of spatial organization	Clustered Pattern
Response to natural environment	Emergence of New Spaces and Activities
Cultural tradition	*Angnganre-nganre*
	Appalili
	Songkabala

Source: Authors' field observations, surveys, interviews, and thematic analysis (2026); analytical categories adapted from Indrawati (2015).

In the Jeneberang River Basin, cultural traditions remain evident in the practices of the community of Bujjulu Hamlet, Bontoparang Village. Traditional practices such as *Angnganre-nganre*, *Songkabala*, and *Appalili* continue to be performed as part of community life. These traditions embody local beliefs, shared values, customary knowledge, and social practices that have been maintained and transmitted across generations. Their continued performance demonstrates that culture in the Jeneberang River Basin is not merely inherited as knowledge, but remains actively practiced and reproduced through community traditions. Therefore, these practices represent living cultural traditions that contribute to the continuity of local identity and the cultural character of the Jeneberang River Basin.

The field findings show that all the four main components of the land-shaping process framework are presented in the study area. At the same time, there are some features of the Jeneberang River Basin which cannot be fully described with the help of the existing general framework and are rather related to the specifics of the watershed landscape. Thus, the findings indicate the possibility of the further development of the theoretical model by taking into account the specifics of the local land use, adaptation practices, and cultural landscape formation.

Physical Components

Circulation networks

The circulation network constitutes an important spatial element that connects the building, space, and other landscape elements into one system (Ching, 1993, as cited in Pynkyawati *et al.* (2016). The efficiency of this network is highly correlated with its accessibility, particularly its accessibility and visual connection to the surrounding area (Savitri, 2021, as cited in Aina, 2022). Through field observation in the Jeneberang river basin, it becomes apparent that circulation is done through multiple modes of travel such as pedestrian ways, road networks, and water transportations. Even though these routes have different

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purposes, they collectively connect settlements, agricultural lands, tourism spots, and hydraulic infrastructures in the basin.

It is also important to note that the presence of these circulation routes indicates how the community uses its movement based on the physical properties of the landscape. Terrestrial movement is primarily done using roads whereas pedestrians' routes provide the local movement within the settlement. Meanwhile, water transportation is still functioning in some parts of the basin due to direct accessibility from the reservoir or river. Overall, the circulation network allows the movement of the community and at the same time sustains the functional relationship between land use areas in the Jeneberang cultural landscape.

Boundary demarcations

Boundary markers are considered an integral part of the physical component of the cultural landscape as they represent the owner of a certain territory, its jurisdictional administration, as well as places requiring protection in certain forms. During field observations in the Jeneberang River Basin, several types of boundary elements were revealed, including monuments, boundary posts, and iron fence. Boundary markers help define the boundaries of community-owned land and the government-controlled territories, thus, preventing possible conflicts associated with the land use and access. It is especially relevant in such areas as green belts and environmentally valuable places where it is essential to clearly delimit the territory for utilization and protection purposes.

Moreover, boundary elements have an impact on the way how space is organized and controlled within the river basin. Boundary markers serve as visible landmarks that divide spaces according to the functions, responsibilities, and protection. Thus, boundary demarcation process is not just an administrative issue but an integral part of the physical composition of the Jeneberang cultural landscape.

Vegetation

Vegetation constitutes an integral part of the physical composition of the Jeneberang River Basin cultural landscape and plays its direct role in the process of ecological function and landscape formation. The field analysis reveals four major vegetation categories: forest vegetation, agricultural vegetation, riparian vegetation, and ornamental vegetation. Each category represents specific spatial setting and serves particular functions in the basin. Specifically, forest vegetation and riparian vegetation provide slope and riverbank stabilization, whereas agricultural vegetation is related to the use of land resources by local communities. At the same time, ornamental vegetation, though less spread in the region, provides aesthetic value for settlements and tourism spots in the area. In general, different types of vegetation affect the issues of soil protection, water regulation, microclimatic conditions, and visual qualities of the landscape.

There are some seasonal aspects of the Jeneberang River Basin that influence its visual aspect, such as the dry season that highlights distinctions between vegetation density, colors, and ground cover. Consequently, the visual aspect of the landscape varies depending on the changing climate conditions and the process of land usage. The role of vegetation in the region extends beyond the mere provision of ecological cover. It also shows patterns of land use and environmental adaptation in the area.

Buildings, structures and objects

Structures, constructions, and built works have a major contribution to the physical attributes of the cultural landscape of the Jeneberang River Basin. Among the major engineering works in the basin are the Bili-Bili Dam, spillway, and the irrigation distribution system. The major functions of these engineering works are directly related to water management issues including river flow regulation, flood prevention, irrigation supply, and supplying raw water for the regional water utility company (PDAM) that serves both the regency of Gowa and city of Makassar. Also, the reservoir is used for hydroelectric energy production, while in time recreational and sporting activities appeared in this area adding new functions to the landscape.

These engineering works have importance not only for their functional value, but also because they have impacted the spatial configuration of the basin, its accessibility, land use, and visual appearance. In particular, the dam and the reservoir became integral parts of the modern identity of the Jeneberang River Basin. On the other hand, the recreational and other activities, that have appeared in this area, provide an opportunity for economic growth and changes in land use in the region.

Cluster

According to Ritohardoyo (2013), land use in the landscape is divided into four major spatial clusters, namely water systems, settlements and built-up areas, vegetated areas, and non-vegetated areas. From field observations on the landscape of the Jeneberang River Basin, it appears that the four major clusters are present in the study site. Water system clusters include the Jeneberang River, irrigation channels, Bili-Bili Dam, and reservoirs. The built-up areas include residential settlements along with different facilities like schools, health facilities, religious places, tourism facilities, infrastructure, and transportations. Vegetated areas are varied and include dryland agricultural (tegalan), plantation, irrigated agriculture, rain-fed agricultural, and natural forest. Non-vegetated areas are limited and are composed of barren land, sandy, and rock surfaces.

The distribution of the clusters indicates their different functions within the landscape. Water systems are part of the hydrology of the landscape. Settlement and infrastructure support activities and service provision. Vegetated areas serve not only land-based activities but also ecology, while the non-vegetated areas represent certain conditions of the landscape. Unlike these clusters function separately from each other, they are actually connected spatially and influence one another. This cluster formation gives an insight on how ecological processes, human activities, infrastructure, and land-based activities operate together in the cultural landscape of the Jeneberang River Basin.

Cultural Sites

Based on an interview with H. Djumada Karaeng Se’re, a local community elder, the term *Saukang* is believed to derive from the Makassarese word *sau*, which conveys a sense of relief, rest, or release from fatigue. According to the interviewee's account, the term is associated with an oral tradition describing a king who, while traveling through his territory with his entourage, stopped to rest in a shaded location surrounded by large trees. In this context, *Saukang* is associated with the local expression *passau-sauang*, referring to a cool,

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shaded, and comfortable resting place where travelers could recover from the fatigue of their journey. This interpretation explains the association of *Saukang* with resting structures and mature trees that define the physical and spatial character of the site. Over successive generations, the location, initially understood as a resting place, gradually acquired broader cultural and spiritual significance through the intergenerational transmission of customary values, beliefs, and traditions. The local community subsequently recognized and preserved the area as a place for performing customary rituals and traditional ceremonies, while also regarding it as a symbolic space embodying spiritual connections, collective memory, and enduring relationships with their ancestors. Thus, *Saukang* can be understood not merely as a physical space characterized by distinctive landscape features, but also as a cultural landscape shaped by the interaction of local history, natural elements, spiritual beliefs, and the continuity of community cultural practices.

The sacred area is characterized by mature shade trees that create a distinctive spatial enclosure and contribute to a unique microclimate. Within this area, several culturally significant sites are identified, including *Bujjulu Toa*, and *Batu Pajaga Timungang*. According to local beliefs, *Bujjulu Toa* is regarded as the spiritual dwelling place of *Patanna Pa'rasangang*, meaning “the master of the domain,” while *Batu Pajaga Timungang* is believed to be the dwelling place of a spiritual guardian associated with the protection of the sacred area. The cultural and spiritual significance of these sites is closely linked to the customary rituals, ancestral beliefs, and traditional practices maintained by the local indigenous community. Thus, the presence of these sacred sites proves that they cannot be seen as the only archaeological elements. Instead, their significance is supported by collective memory, performance of ritual practices, customary beliefs and people’s relations with the surroundings landscape. In other words, the significance of these sites can be seen as tangible and living cultural heritage. Therefore, the results of the research can serve as grounds for expanding the category of archaeological-site component of Lennon’s approach into the one of cultural sites.



Figure 4. Bujjulu Toa cultural site (left) and Batu Pajaga Timungang (right), located in the middle of the reservoir.
(Source: Field observation, 2026)

To visually demonstrate this distinctive characteristic of the Jeneberang cultural landscape, selected cultural sites within the Saukang sacred area are presented below. These photographs provide visual evidence of the physical presence of the sites and their spatial setting, complementing the cultural meanings, collective memory, and customary practices described above.

The visual evidence shown in Figure 4 reinforces the interpretation of these sites as cultural components of the Jeneberang landscape. Their physical presence within the reservoir area, combined with the meanings attached to them by the local community, demonstrates that their significance extends beyond their material form. These sites function as places of collective memory, spiritual belief, and customary practice, thereby strengthening the argument for recognizing them as cultural sites rather than merely archaeological remains.

Small-scale elements

Small-scale landscape elements serve a supportive role and create the impact on the visual and comfortable nature of public spaces inside the Jeneberang River Basin. Most of the mentioned components are located in the public park situated at the entrance of the Bili-Bili Multipurpose Dam that is often used as a place for recreation by local communities and guests from nearby districts. In this particular case, hardscape landscape components include landscape and street lighting, stone benches, walkways made of paving stones, and a memorial. Facilities described above ensure circulation, provision of resting places, orientation, and usage of the park as a place for recreation by the community.

As for the softscape landscape components, there are various species of ornamental and shade plants such as palms, Hibiscus tiliaceus, Gmelina arborea, Syzygium myrtifolium, Samanea saman, and lawn turf. This composition creates a shade, provides a visual enclosure and contributes to the appearance of the park while softening the presence of built facilities in the area. Despite their small size, such landscape elements play a significant role in the creation of the recreational atmosphere of the place and its visual appearance.

Spatial Morphology

Spatial morphology involves the total physical organization of the landscape resulting from the interplay of natural landforms and constructed forms. In addition to the shape of the landscape, spatial morphology focuses on how various components of the landscape relate spatially and functionally (Dahal *et al*., 2017). Spatial morphology in the Jeneberang River Basin is largely affected by the presence of the mountains, Bili-Bili Reservoir, and hydraulic infrastructure. This results in a multifunctional landscape that provides for hydropower, agriculture, tourism, and water resource management within one spatial system.

It is noteworthy that the hydromorphology of the basin plays a critical role in forming the spatial morphology of the basin. The water collected in the Jeneberang River is used as raw water in supplying the Regional Water Utility (PDAM) of Gowa Regency and Makassar City. Besides, the reservoir also serves irrigation and flood control purposes. These functions depend greatly on the physical features of the basin as well as the infrastructure created within the basin. From this perspective, spatial morphology should be recognized as a separate physical feature of the cultural landscape.

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Table 3. Empirical Findings of Physical Components in the Jeneberang River Basin Area

Physical Components	Empirical Findings
Circulation networks	Pedestrian routes; Road networks; Water transportation
Boundary demarcations	Boundary monuments; Boundary stakes; Iron fence; Greenbelt boundary
Vegetation	Forest vegetation; Agricultural vegetation; Ornamental vegetation; Riparian vegetation; Seasonal vegetation changes
Buildings, structures and objects	Bili-Bili Dam; Spillway; Irrigation network
Cluster	Water systems; Settlements and built-up areas; Vegetated areas; Non-vegetated areas
small-scale elements	Garden lights; Stone benches; Monument; Street lights; Paved walkways; Palm trees; *Hibiscus tiliaceus*; *Gmelina arborea*; *Syzygium myrtifolium*; *Samanea saman*; Lawn
Cultural sites	*Saukang: Bujjulu Toa*; *Batu Pajaga Timungang*
Spatial Morphology	Natural landscape; Engineered reservoir; Mountainous topography; Land–water interface; Multifunctional landscape

Source: Authors' field observations, interviews, and thematic analysis (2026); classification adapted from Indrawati (2015), with cultural sites and spatial morphology proposed as refinements in this study

.

Table 3 summarizes the physical landscape components identified in the Jeneberang River Basin, including circulation networks, boundaries, vegetation, built structures, spatial clusters, small-scale elements, cultural sites, and spatial morphology. These findings support two proposed refinements to the Lennon–Indrawati framework: broadening archaeological sites to cultural sites and recognizing spatial morphology as an additional physical component. Based on the results obtained from the empirical research, the following changes have been suggested for the cultural landscape framework proposed by Lennon and used by Indrawati (2015). The category of archaeological sites is replaced with the more general term of cultural sites. Such modification enables the framework to encompass both material elements of the landscape and those whose importance depends on ritual activity, collective memory, and culture. Besides, spatial morphology becomes an independent physical component since the total composition of landform, water, infrastructure, and human activity is a major factor that determines the uniqueness of the Jeneberang River Basin.

Apart from that, some sub-categories of the physical component are developed further to take into account the specifics of the socio-ecological environment of the Jeneberang River Basin. Such changes are made to adapt the framework for use in a specific environment without changing the conceptual framework proposed by Lennon. Thus, the refined conceptual framework provides a contextually based platform for the analysis of cultural landscapes in river basin settings where natural processes, infrastructure construction, land uses, and cultural practices are tightly interconnected.

CONCLUSIONS

Empirical results clearly demonstrate that the cultural landscape of the Jeneberang River Basin was formed during a long-lasting interaction between natural processes and human intervention. The physical aspect of the cultural landscape includes buildings, structures and objects, circulation patterns, boundaries, vegetation, small-scale landscape elements, land-use

patterns, cultural sites and spatial morphology, while the processual aspect of the cultural landscape is manifested through land uses and activities, reactions to the environment, spatial organization patterns, and culture persistence. These empirical results basically confirm the framework of the cultural landscape developed by Lennon and further modified by Indrawati (2015). At the same time, some specific characteristics of the Jeneberang River Basin identified during the empirical analysis demonstrate that certain amendments should be made to the above-mentioned framework in the context of the river basin setting. The proposed amendment adds the category of spatial morphology to the list of physical components and broadens the category of archaeological sites up to cultural sites so that not only places related to tangible cultural heritage but also those that preserve living traditions and practices could be taken into account. Some additional empirical components have been added to represent some characteristics unique for the Jeneberang River Basin setting. In this way, the proposed modifications do not replace the initial framework but simply broaden its applicability.

Policy Implications and Contributions

1. Theoretical Contribution:

   In addition to that, this paper provides an empirical application of the cultural landscape concept based on the Lennon's cultural landscape framework with the inclusion of empirical data about the Jeneberang River Basin. The theoretical contribution of the study includes the incorporation of spatial morphology as a physical component as well as of the broadening of the concept of archaeological sites to the concept of cultural sites, which allows accommodating not only tangible heritage but also culturally relevant practices. Besides that, the study reveals some peculiarities of the process of land-shaping, such as water systems and creation of new spaces and activities related to the change of the livelihood patterns and landscape use.
2. Policy Implication:

   According to the results of the analysis, the value of cultural landscapes needs to be taken into consideration in the regional spatial planning and zoning policies. Land-use policies within the Jeneberang River Basin should take into account not only the economic and infrastructural functions of the land but also the historic spatial pattern, the morphology of the landscape, culturally significant places and traditions relevant to the local community. The integration of these components into the planning policy will decrease the conflict between the development and the conservation, while the protection of environmentally sensitive areas will be enhanced.
3. Practical & Conservation Application:

   From the practical perspective, the framework offered in this paper can be used for the development of the integrated approach to the management of watershed and cultural landscapes. According to the results of the analysis of the Jeneberang River Basin, the hydraulic infrastructure of the large scale, especially the Bili-Bili Dam and the infrastructure that is connected with the dam, can co-exist with the culturally relevant places and traditions, as well as with the traditional agriculture. Therefore, the strategies of the conservation should not be limited by the protection of the physical sites, but the relationships between communities, ecological processes, land use and infrastructure should also be taken into account. The participation of local communities in the

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management and planning can ensure the sustainability of the conservation measures from the ecological, cultural and socio-economic perspectives.

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REFERENCES

Aina, N. (2022) "Implementasi Pendekatan Placemaking Pada Desain Lanskap Kawasan Wisata Jembatan Barito," *BORDER: Jurnal Arsitektur*, 4(2), pp. 125–138.

Ching, F.D.-K. (2008) *Arsitektur: Bentuk, Ruang, dan Tatanan*. 3rd ed. Erlangga.

Dahal, K.R., Benner, S. and Lindquist, E. (2017) "Urban Hypotheses and Spatiotemporal Characterization of Urban Growth in the Treasure Valley of Idaho, USA," *Applied Geography*, 79, pp. 11–25. Available at: https://doi.org/10.1016/j.apgeog.2016.12.002.

Fandeli, C. and Muhammad (2009) *Prinsip-prinsip Dasar Mengkonservasi Lanskap*. 1st ed. Yogyakarta: Gadjah Mada University Press.

Hasnawi, M.H. *et al.* (2025) "Impact of river infrastructure on sediment distribution to maintain reservoir lifespan: A case of the Bili-Bili Reservoir, Jeneberang Basin, Indonesia," *Jurnal Teknik Sipil dan Perencanaan*, 27(2).

Indrawati (2015) "Pembentukan Lanskap Permukiman Perdesaan," *Jurnal Teknik*, pp. 213–226.

Lukman, M. *et al.* (2015) "Sediment transport analysis for securing water (Case study: Upper Jeneberang River)," *Proceedings of the 2nd International Conference on Coastal and Delta Areas (ICCDA). Jurnal Unissula*, pp. 69–76.

Nuryanto (2019) *Arsitektur Nusantara Pengantar Pemahaman Arsitektur Tradisional Indonesia*. 1st ed. Edited by A. Holid. Bandung: PT Remaja Rosdakarya.

Plieninger, T. *et al.* (2014) "Sustaining ecosystem services in cultural landscapes," *Ecology and Society*, 19(2).

Pynkyawati, T. *et al.* (2016) "Desain Pola Sirkulasi Bangunan Multifungsi Ditinjau Dari Segi Keamanan Dan Kenyamanan Pengguna Bangunan The Bellagio Residences Jakarta," *Jurnal Reka Karsa*, 4(1), pp. 1–14. Available at: https://ejurnal.itenas.ac.id/index.php/rekakarsa/article/view/1375.

Ritohardoyo, S. (2013) *Penggunaan dan Tata Guna Lahan*. Edited by A. Pratama. Yogyakarta: Penerbit Ombak.

Satori, J. and Komariah, A. (2020) *Metode Penelitian Kualitatif*. 8th ed. Bandung: Alfabeta.

Simensen, T., Halvorsen, R. and Erikstad, L. (2018) "Methods for landscape characterisation and mapping: A systematic review," *Land Use Policy*, 75, pp. 557–569.

Surahman, S. and Darma, B.P. (2020) "Perubahan penggunaan lahan dan dampaknya terhadap karakteristik hidrologi DAS Jeneberang menggunakan model SWAT," *Jurnal Envisoil*, 2(1).

Tengberg, A. *et al.* (2012) "Cultural ecosystem services provided by landscapes: Assessment of heritage values and identity," *Ecosystem Services*, 2, pp. 14–16.

Tenzer, M. (2024) "Social Landscape Characterisation: A people-centred, place-based approach to inclusive and transparent heritage and landscape management," *International Journal of Heritage Studies*, 30(3), pp. 269–284.

Wahid, S.T.K.M. *et al.* (2025) "Observing the landscape and lifescape of the Jeneberang Hulu Watershed: Interactions between development and local communities.," *Journal of Landscape Ecology*, 18(3), pp. 84–99.

Widodo, T.N. (2021) "Land use change study and the increased risk of floods disaster in Jeneberang watershed at Gowa Regency, South Sulawesi, Indonesia," *IOP Conference Series: Earth and Environmental Science, 824, 012045* [Preprint].

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