

## CULTURAL LANDSCAPE FUNCTION OF INFORMAL URBAN SETTLEMENT IN EAST NUSA TENGGARA

### FUNGSI LANSKAP BUDAYA PADA PERMUKIMAN INFORMAL DI NUSA TENGGARA TIMUR

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### ABSTRAK

Tema fungsi lanskap budaya menjadi sangat penting seiring dengan kesadaran untuk menciptakan keseimbangan fungsi lanskap ekologi dan sosial di kawasan perkotaan. Permukiman informal kota cukup mempengaruhi fungsi budaya, baik sebagai bentuk bentang alam maupun karakteristik demografi. Tulisan ini bertujuan untuk mengkaji keberadaan beberapa nilai sosial penting dalam lanskap permukiman informal kota dan peran fitur lanskap dalam mempengaruhi aspek nilai sosial penghuni seperti kohesi sosial, rekreasi, rasa tempat, spiritualisme, budidaya, dan kegiatan bisnis. Metode penelitian yang digunakan adalah metode campuran kuantitatif dan kualitatif dengan menggunakan tindakan observasi, pembagian kuisioner, dan wawancara untuk pengumpulan data berdasarkan pendekatan sosiologis dengan anggota masyarakat. Data kuesioner dikumpulkan untuk analisis lanjutan dimana koefisien Spearman digunakan untuk menguji hubungan antara nilai-nilai sosial dan lanskap feature. Hasil penelitian menunjukkan bahwa penduduk di Airmata dan Manutapen memiliki persentase nilai sosial yang berbeda dalam hal fitur lanskap mereka, dan juga dapat dilihat bahwa nilai-nilai kohesi sosial, rasa tempat, dan bisnis lokal menghadirkan hubungan yang lebih kuat dengan fungsi lanskap. Hasil ini menunjukkan pentingnya nilai-nilai sosial dalam masyarakat informal sebagai pendekatan potensial untuk mencapai pengelolaan lanskap berkelanjutan.

**Kata Kunci:** fungsi lanskap budaya; nilai sosial; permukiman informal; lanskap pesisir; keberlanjutan.

### ABSTRACT

The theme of cultural landscape function becomes very important along with the awareness to create a balance of ecological and social landscape functions in urban areas. Urban settlement strongly influences cultural function, both as a form of landscape and demographic characteristics. This paper aims to examine the existence of several important social values in urban settlement landscapes and the role of landscape features in influencing social values aspects of informal residents such as social cohesion, recreation, sense of place, spiritualism, cultivation, and business activities. The research method used is a mixed quantitative and qualitative method by using observations, questionnaires, and interviews for data collection based on a sociological approach with community members. Questionnaire data were collected for further analysis in which the Spearman coefficient was used to examine the relationship between social

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*values and landscape features. The results revealed that residents in Airmata and Manutapen have different percentages of social values in terms of their landscape features, and it can also be seen that the values of social cohesion, sense of place, and local business present a stronger relationship to landscape functions. These results show the importance of social values in informal societies as a potential approach to achieving sustainable landscape management.*

**Keywords:** *Cultural landscape function; Social values; Informal Settlement; Coastal landscape; Sustainability.*

## INTRODUCTION

The rapid urbanization process demands the realization of an ideal and quality urban landscape capable of providing several ecological functions of the landscape in the city area (D'Ambrogi & Guccione, 2021). The landscape function emphasizes the capacity of the landscape to provide goods and services to people (Czyżewski et al., 2021). Thus, sustainable landscape management needs to pay attention to the relationship between natural processes and landscape services (Duarte et al., 2020; Lovell et al., 2021). The basic types of landscape functions are categorized into four major groups, namely: production functions, regulatory functions, ecological functions, and cultural functions (Bolliger et al., 2011). Some benefits of these landscape functions share the same concept as the ecosystem services framework which are the supply, regulatory, and information functions are provided by different landscapes (Madureira et al., 2007).

The cultural landscape function focuses on the life virtues valued by the people, born from the history they have, the beliefs and illustrative practices they do, and the location they live in (Fish et al., 2016), which are fosters a sense of belonging, togetherness, and awareness of the importance of ecosystem management (Pröpper & Haupts, 2014; Milcu et al., 2013). The cultural landscape function is considered an immaterial function obtained from the landscape, such as recreational activities, spiritualism, and human aesthetic experience (Manikam et al., 2020; Dickinson & Hobbs, 2017). This cultural

function facilitates the relationship between the community and the ecological identity of the region (Chowdhury & Behera, 2021; Lee & Youn, 2022). Studies on the function of cultural landscapes are often found in countries that focus on social values such as agriculture, recreation, and conservation areas (Rastandeh et al., 2021), while aesthetic values and social bonding are the most identified cultural landscape function by the community (Pinheiro et al., 2021). People interact and share understanding and merit with others (Renzl, 2008) on a green urban landscape that provides space for people to understand and learn from others (Riechers et al., 2018).

Discussions about cultural landscape function and its relationship with the urban area have been a worldwide concern since 2005 (Millennium Ecosystem Assessment (MEA), 2005; Cerreta et al., 2021). The effect of urbanization for cultural landscape has a negative correlation whether spatial or not (Leitão et al., 2019; Zhang et al., 2018) where the decline in the function of the landscape in the cultural aspect is due to changes in land use (Li et al., 2019). One significant development in the functioning of the cultural landscape is that agricultural land is considered more valuable than forests (Dou et al., 2019). Social bonding and well-being, place attachment, and a sense of identity are several specific benefits derived from the functions of the urban cultural landscape (Casado-Arzuaga et al., 2014) and the quality of natural landscapes and community activities affect the level of concord and beauty of the area (Muhamad, 2014). Some factors that encourage changes in informal settlements in coastal cities are cultural landscape space, domestic activities, utilization of the bale-bale, informal activities of fishermen, and the existence of lively business space (Darmansyah et al., 2019). Of all the landscape functions, cultural services that provide recreational settings and rational interactions with green spaces involving analytical, illustrative, mental, or spiritual activities are the most favored. Nawrath et al. (2022) emphasize that cultural landscape function that provides a setting for recreation,

intellectual and mental interaction with natural landscapes involving analytical and symbolic activities, and spiritualism is favored the most by low-income communities. However, several studies have found that the cultural landscape function has low economic value (Cheng et al., 2019; Petway et al., 2020).

The function of the cultural landscape referred to in this study is a landscape area in informal settlements that lied by the Kali Kaca River (as part of the Dendeng drainage basin) and the forest along the drainage basin. This area has high water availability but has undergone biophysical changes over recent decades referred to land cover change. This landscape profile is suitable for the field of science on the development of cultural values, and the use of cultural landscape services, such as the benefits of social bonding, recreation, cultivation activities, local economy, sense of place, and spiritualism.

Studies on the function of the cultural landscape that combines quantitative and qualitative analysis have not been widely carried out (Chen et al., 2016). Quantitative methods that involve field observations and questionnaires are invaluable for examining large sample sizes, such as determining social activities such as the number of meeting places between individuals or communities (Pietrzyk-Kaszyńska et al., 2017). Nevertheless, assessment of the ecosystem functions of landscape features that affect the conveyance of social meaning is few and far between. The theme of cultural landscape function becomes very important along with the awareness to create a balance of ecological and social landscape function in urban areas. Recent studies have explained the benefit of the cultural landscape in assisting social values, but empirical investigation of the role of landscape features, especially the landscape function, is still needed. Qualitative methods such as interviewing as well as in-depth questionnaires involving the residents shows the relationship between social values and landscape features.

In detail, this area of analysis will be devoted to (1) investigating the existence of several important social values in the urban set-

tlement landscape; and (2) how the landscape features in the location affect aspects of the social values of informal residents. Two urban villages, namely Airmata and Manutapen, were chosen as the study area because it has historical sites and urban conservation areas that can potentially reveal how landscape features are related and urban conservation areas that can potentially reveal how landscape features are related to sociocultural values.

## METHOD

### Study Area

The study area was formerly a downtown area turned into a suburban area (Kota Lama). The current study area is the informal settlements in Airmata and Manutapen villages (Figure 1), located in the middle of Kupang, a city experiencing rapid unplanned urbanization. However, the village area in this city still shows its ecological characteristics, such as the steady growth of green space along the Dendeng watershed and throughout the residential area. This area is considered an informal area because of its dense population, irregularity of buildings, and the buildings' physical condition, which is mostly semi-permanent, land status at home households living in these two areas are on state-owned land status, although residents claim that they have lived in the Kali Kaca River (Airmata) and Teak Forest Area (Manutapen) for a long time and have ownership rights over the land. Based on data from the East Nusa Tenggara Settlement Development Unit, the Airmata village, with an area of 42.83 Ha, is closer to the estuary, part of Kota Lama, which has become more passive because the development of the city has moved to the east. Manutapen, with a total area of 76.75 Ha, is an upland area located further from the coastal area. Both the natives and immigrants affect the social development of these two villages. The population in the Kota Lama sub-district increased steadily from 30195 in 2010 to 34725 in 2020. Table 1 shows the characteristic of informal areas in the study area.

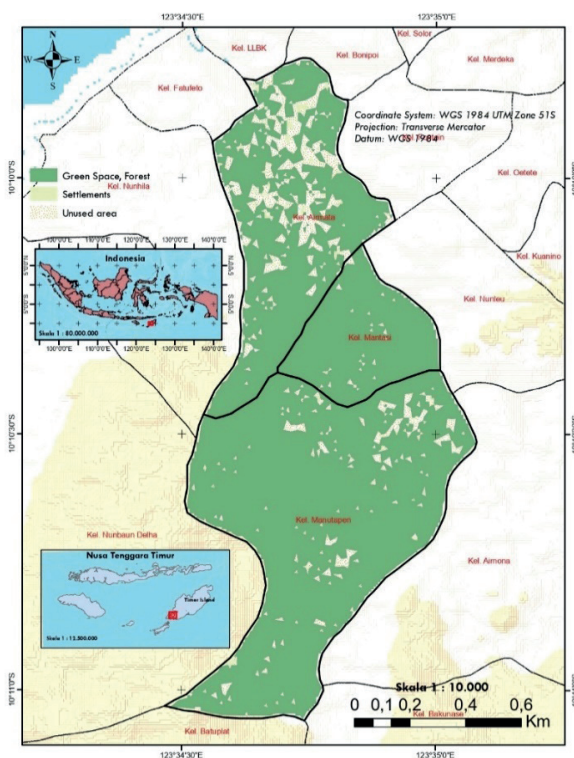


Figure 1.

Two study areas of Airmata and Manutapen, Kupang, East Nusa Tenggara, Indonesia  
Source: Authors (2022)

Table 1.  
Characteristics of Informal Area

Location	Topology	Size (Ha)	Household	Population	Building density (unit/ha)	Physical condition
Airmata	Riverbanks and lowland areas	23.83	235	903	163	>65% semipermanent
Manutapen	Teak Forest area	24.75	278	1009	140	>55% semipermanent

Source: Airmata and Manutapen Subdistrict Data, (2022)

In this study, we also analyzed the spatial-temporal changes in urban green spaces by identifying land cover development in the research area. Land cover is the appearance of physical material on the earth's surface, which describes the relationship between natural and social processes to understand natural phenomena that occur on the earth's surface (Tesfaw et al., 2018). In addition, the land cover also provides the necessary information to determine land changes in an area; for example, to decide the level of green

space deprivation in the study area, a land cover change analysis for 2000, 2010, and 2020 was carried out using remote sensing using ArcGIS 10.3 software. Land cover indicators were obtained by analyzing Sentinel-2 Image, a satellite of the European Spatial Agency that provides accurate and accessible ground-level mapping (Misra et al., 2020).

The settlement's ecological landscape in this area, which consists of green spaces, forests, and river bodies, is considered the embodiment of the community's cultural

values. This type of landscape is a residential area surrounded by tree vegetation, forests, and watersheds. The benefits the community in many ways because it fulfills the residents' basic needs such as water supply, flood-re-

sistant areas, and vegetation to support the economy (Figure 2). The springs and Kaca River (part of the Dendeng watershed) are the leading choices for the fulfillment of clean water sources for residents of this settlement.



**Figure 2.**  
Landscape Function Profile in the Study Area.  
Source: Authors (2022)

Cultural landscape functions provided by riparian and upland areas have aesthetics, social cohesion, recreation, agriculture activities, and spiritualism aspects (Table 2). This

area also has production and habitat functions such as water availability and provision of food, which we did not include in the analysis of cultural landscape functions.

**Table 2.**  
Description of Landscape Function

Landscape Function (sub) type (Yang et al., 2016; Rastandeh et al., 2021)	Description by previous studies.
Cultural Spiritualism	Provide a place with cultural heritage and religious historical values to elevate the spirit of spiritualism (Chowdhury & Behera, 2021; Lee & Youn, 2022).
Social bonding	Provide a sense of social bonding between individuals and communities, share problems and activities (Pinheiro et al., 2021; Lee & Youn, 2022; Xin et al., 2020).
Sense of Place	Provide a sense of attachment to a place that expresses the relationship between humans and the ecological conditions of a particular location as well as social and cultural conditions as Intangible cultural landscape (Ryfield et al., 2019; Wartmann & Purves, 2018).
Local business	Provide an environment and landscape that supports people's survival by building their local economic capacity (Xin et al., 2020).
Recreation activities	Provide a beautiful ecosystem as a place for gathering and relaxation and to appreciate the important association between people and the environment (Xin et al., 2020; Brambilla & Ronchi, 2020).
Agricultural activities	Provide a cultivation area that can stimulate community togetherness and increase basic household income (Dou et al., 2019; Assandri et al., 2018)

Source: Yang et al. (2016) and Rastandeh et al. (2021)

Data collection was done through various means, such as observations, questionnaires, and interviews with residents in the two villages. The identification of community activities and landscape features was through the observation method. Direct questionnaires were provisioned in several social areas, such as riverbanks, agricultural spaces, mosque areas, gathering places, main streets, and home industry areas. Furthermore, we conducted interviews with the community to reveal the landscape attributes that influence their reasoning about the social values that exist in the area. Respondents were selected randomly while looking at the balanced ratio between the old, young, male, and female groups.

The observation method is carried out on the landscape feature area to purposively witness the social activities depicting the social values in Airmata and Manutapen and the landscape features associated with their usage (e.g., riparian forests, rivers, and bridges). The resulting data are grouped to complete the observations. In situations where hundreds of people are doing the same social activity, it is necessary to record the time and number of people involved in the observation. In this study, we made 302 observations.

We provisioned questionnaires to unveil the relationship between social values and landscape features, complement the surveys, and ultimately get a complete assessment through statistical analysis. In the questionnaire, respondents were first asked to answer inquiries about the relationship between the existence of the landscape and existing social values. In addition, what respondents feel about the social values (social cohesion, recreation, cultivation activities, sense of place, spiritualism, and local business) are measured by a 5-point Likert scale. To complete this analysis, we interviewed the respondents because they have detailed perceptions of various features of the parks. There were 95 questionnaires collected for further analysis, wherein the Spearman coefficient analysis was used to examine the

relationship between social values and landscape spots using SPSS Statistics 24 software.

We conducted interviews to gain the participants' perceptions of social values as a function of the cultural landscape and its relationship to landscape spots. Interviews were also intended to clarify the outcome obtained from the observations and questionnaires. Due to the varying level of education of the participants, an explanation of landscape function was introduced before we conducted the interview. Interviews were conducted for 30-60 minutes, depending on the interest and amount of time the respondent had. We conducted a total of 32 interviews in this study.

## **RESULTS**

Airmata Village has existed since 1800 with historical and cultural values (Regional Museum, 2020). Previously, this area was the location for the disposal of Dutch prisoners and the beginning of the development of Islam in the city of Kupang (1806). The area of Airmata is 42.64 ha with a population of 1830 individuals, 88% are Muslims. Airmata has a strong respect for religious aspects, for example, decision-makers are made by the mosque's imam and obeyed by the community. People run home industries such as selling snacks and food. As a livelihood, most residents still rely on fishing in the sea and working in the city as carpenters/temporary laborers. Manutapen village began to develop in the 1970s and is a large area with natives and immigrants, has an area of 76.75 ha with high topography, and this area is inhabited by most of the population is Christian. The village head is the manager of the regional administration. Villagers grow coconuts and palm fruit, own pig farms for family savings, and work in the city as carpenters/temporary laborers.

Airmata and Manutapen have several landscape features, among them are riparian forests, hilly forests, and the Kaca River located along the Dendeng watershed whose headwaters are in the upland area. The main road passes through the two villages, divid-

ing the settlement into the riverside area and upland settlement. In the upland settlement, there are several multilevel paths leading to each neighborhood. Residents also use a bridge to cross the river to the neighboring village. In Manutapen, there is a rock cliff adjoining a coconut plantation which also functions as a windbreak. This area is often exposed to annual floods and cyclones, so residents use the mosque area as an emergency evacuation area for residents.

The Kaca River is part of the Dendeng watershed that passes through Airmata (topography 30-60 m asl) and Manutapen (topography 60-120 m asl). The Kaca River has a second-class water quality standard and is utilized for water recreation facilities, freshwater fish cultivation, animal husbandry, and agriculture (Solo, 2020). The river is one

of the main water sources for the surrounding community and residents from neighboring villages. The wetness map of this area (Benain Noelmina WPFMC, 2020) shows that 0.6 Ha (0.4 %) of the total area has moderate wetness due to the presence of twenty-three springs, which were twenty in Airmata, three in Manutapen. The springs in the area were flowing artesian springs formed due to hydraulic pressure within the aquifer, forcing the groundwater to rise above the land surface, especially in lowland residential areas (Airmata and Manutapen). It is supported by high rainfall, which has a major effect on both villages, compounded by the presence of forest landscapes in the upstream areas, river borders, and green spaces of upland areas. Types of cultural landscape functions found in the study area can be seen in Table 3.

**Table 3.**  
Types of Cultural Landscape Functions found in the Study Area

Type	Description
Recreation	Green landscapes in the highlands and lowlands are slowly becoming residential areas crossed by the Kaca river (part of the Dendeng watershed) in the old downtown area. Recreational facilities managed by the community of informal settlements have not been optimally utilized, but they still offer facilities for sitting, walking, and enjoying the scenery. In addition, the forest of urban river borders presents natural features. Recreational activities go along with community activities on the river.
Sense of place	The unique view of most cities when they are in the upland area and the natural elements of the river are the distinctive characteristics of the region: therefore, aspects such as beautiful nature, well-maintained ancient buildings from the Dutch colonial era, and forest cover are the sense of place of this place.
Social cohesion	The togetherness of the informal settlement community through activities in meeting their daily needs raises social bonds. It provides social interaction and adaptation in dealing with disasters. The community often conducts social events in historically valuable cultural spots, which are driven by common religious aspects.
Spiritualism	The existence of the first mosque in East Nusa Tenggara and the graves of local kings and freedom fighters from the colonial period are a source of the spirit of religious belief and worship that creates a spiritual attraction between humans and their landscapes.
Cultivation	Vacant land in residential areas, river borders, and hilly areas stimulate the spirit of cultivation, driving the informal community to fulfill the daily needs of plant cultivation and community social activities.
Local business	Culinary activities from this area are well known and are always sought after by Kupang city residents. For many years, culinary existence continues to be preserved and popular community culture even though there have been many new types of culinary in the city.

Source: Authors (2022)

### Land Cover Change in the Research Area

The following is the mapping of land use changes in the study area in 2000, 2010, and 2020. The Spatiotemporal map in 2000 (Table 4) showed that of the total area of 138.18 ha, 87.94 ha (63.6%) was the green space area, settlements 35.09 ha (25.4%), and the unused area 15.15 ha (11%). Analysis in 2010 showed a significant decrease in green space, which was 47.33 ha (34.3%), settlements increased to 77.10 ha (55.8%), and the unused land decreased to 13.75 ha. Over a decade, the green space area was reduced substantially to 40.61

ha (29.3%). However, the opposite happened in 2020, where the residential area increased to 79.20 ha (57.3%) and unused land experienced a significant decrease of 3.45 ha, and green open space increased to 55.53 ha or 40.2%. The results of the survey and interviews confirmed that an increase of 8.2 ha of green area in this area from 2010 to 2020 was the result of crop succession because of increased rainfall and community planting activities in the Airmata and Manutapen areas. The ecological conditions of this landscape support the development of cultural landscape functions throughout the year.

**Table 4.**  
Land Cover Change in 2000, 2010 dan 2020

No.	Land cover	2000		2010		2020	
		Size (ha)	%	Size (ha)	%	Size (ha)	%
1	Green open space	87.94	63.6	47.33	34.3	55.53	40.2
2	Settlement	35.09	25.4	77.10	55.8	79.20	57.3
3	Unused land	15.15	11.0	13.75	9.9	3.45	2.5
Total		138.18	1	138.18	1	138.18	1

Source: Authors (2022)

### Social Value as a Landscape Function

We conducted a total of 302 observational studies with residents of informal settlements in Airmata and Manutapen, with a total of 46% being male and 54% female. The observations revealed more than fifteen activities in several different landscape features. According to the social value of each landscape feature, the most frequent activities are, talking, sitting, praying, and fetching water in the river. The landscape also supports activities that welcome hundreds of people, such as religious festivals and social health events. Certain landscape features have different numbers of people using landscape space with preferences distinctive to gender or age. In addition, users preferred different things for different times. For example, fewer people pass through the main road on normal days than on religious holidays. Another example, washing in the river is a famous activity every morning, while playing football is often done from three to six o'clock in the afternoon.

We distributed 95 questionnaires and conducted 32 interviews. The score indicated that the villagers showed positive social values in each of the landscapes in Airmata and Manutapen. The results of the interviews highlighted those residential areas and house of worship were more prominent as places for social interaction and areas to participate in social actions, as well as popular religious occurrences, which increased socialization and social bonds. Settlements are very popular because they are where almost all daily activities and livelihood activities take place. They are close to rivers and springs, and even ecotourism areas managed by residents are also carried out in front of the residential area of the Manutapen village. Respondents stated that several social activities carried out in settlements with their neighbors describe their social relationships. For example, one respondent stated: "I am a fisherman, but I also work as a freelance construction worker when I am not sailing. This natural and intimate environment gives me comfort that I



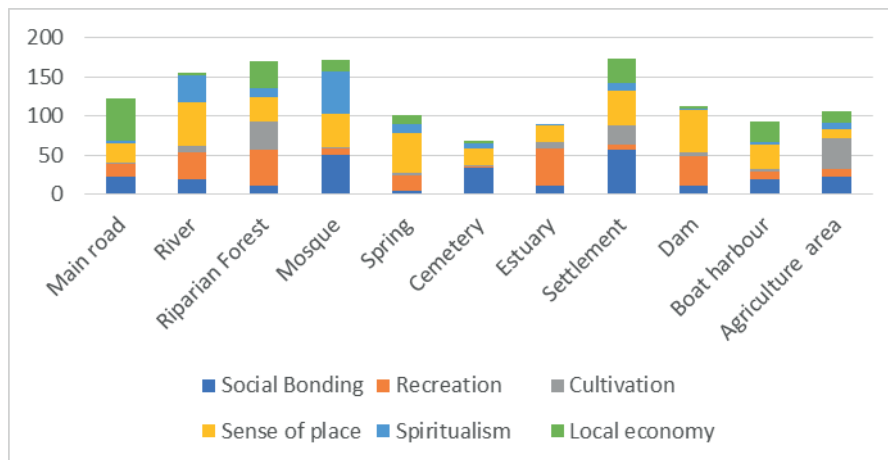
did not get anywhere else, especially during religious holidays. Another respondent stated, "I am a housewife, but every dry season, when the pipe water (PT. PAM) drains a little, I rely heavily on the river for my vegetable cultivation needs, as do some members of our women's farming community."

**Social Values Associated with Landscape Features.**

The following are the results of the evaluation of the landscape features Airmata and Manutapen, which are characterized by six social values. In Airmata, the most common targeted features were rivers (51.6 % or N = 156), mosques (56.9% or N = 172), forests (46.6% or N = 141), and Settlement (57.2% or N = 173). These features are closely related to the social values adopted by the community. Religious celebrations are always initiated by residents of the Airmata Mosque, the first mosque in Kupang. Based on interviews, the value of spiritualism and neighborhood ties in conducting social events is one of the most prominent social values held by the community. Spring and rivers also have a high sense

of place value. In addition, the unique landscape function can also be seen from the combination of social bonding functions with a sense of place, such as the response to flooding. The fishermen in Airmata have a special location as a gathering point and make a specifically dedicated area on the riverbank to protect their boats from flooding. Residents in this area also have an association called the Dendeng River Observer Community, which experienced semi-conflicts with regional managers due to the water extraction program in the upper Dendeng River (Survey, 2022).

The local economic activities of the residents are closely related to the main road in this area (Figure 3). Most of the residents' businesses, especially culinary, are located on the main road. Interviews with residents who work as traders revealed that their culinary business could earn Rp750,000 - Rp1,500,000 per day. The riparian forest in this area can provide complementary ingredients such as banana leaves for food wrappers, coconut milk, natural food coloring, and even fabric dyes. It shows the close relationship between the local economy and riparian forest.



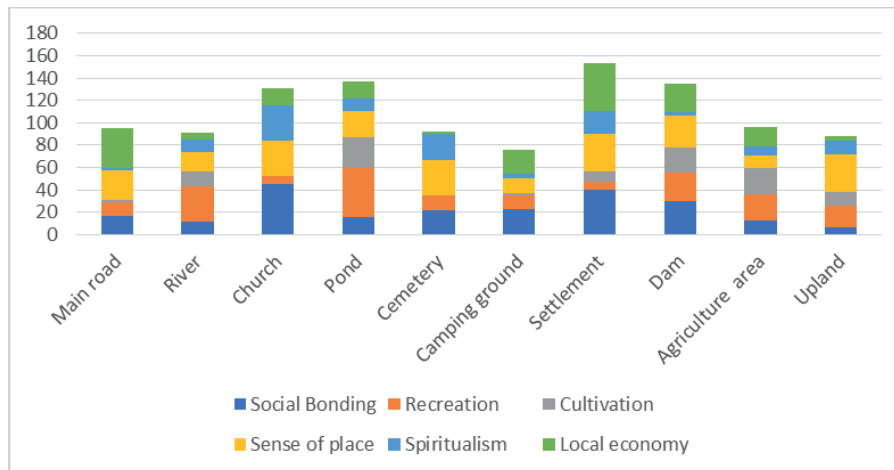
**Figure 3.**  
Landscape Features related to Social Value in Airmata  
Source: Authors (2022)

The most common targeted features in Manutapen (Fig 4) are Pond (45.4 % or N = 137), Church (43.3 % or N = 131), Settlement (50.6 % or N=153), and Dam (44.7 % or N = 135). These features are closely related to

people's activities and habits. The residents' belief is one of the most determinant aspects that support the social values in Airmata and Manutapen. Most of residents in Airmata are Islam and Christian in Manutapen, which is

indicated by many social activities that residents carry out in the church. Besides being one of the local recreation icons that residents often go to, the pond is an alternative water source during the dry season for either daily

use or cultivation. Several communities carry out cultivation activities in the dam area, which can strengthen the sense of place, cultivation, and social bonding aspects.



**Figure 4.**  
 Landscape Feature related to Social Values in Manutapen  
 Source: Authors (2022)

The interviews showed that the respondents did as many as 29 physical activities that were related to social values. Some of

these activities take place at landscape features such as the main street, Kaca River, settlement, bridge, mosque, pond, forest, etc (Figure 5).



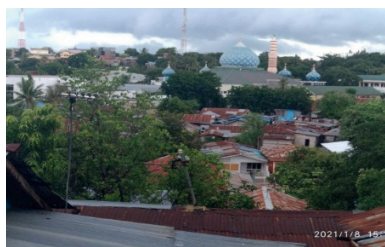
Social event in the main street



The Kaca river



Cultivation spot in the river side



Settlement



Pond



Mosque as historical heritage

**Figure 5.**  
 Several Landscape Features  
 Source: Authors (2022)

Table 5 shows the average coefficient of the usage of the six-landscape services on the cultural landscape function (mean = 0.75664). Relationship between landscape function on social cohesion ( $\beta = 1.54429$ ), sense of place ( $\beta = 0.99818$ ) and local business ( $\beta = 0.87418$ )

are stronger compared to cultivation ( $\beta = 0.29743$ ) and recreation ( $\beta = 0.13245$ ). For cultural landscape functions, the significance of the relevance to social values is more vigorous for social cohesion, sense of place, and local business ( $p < 0.01$ ) than for cultivation and recreation ( $p < 0.05$ ).

**Table 5.**  
Significance Level of the Six Social Values

Independent variable; Social values (sub)type	$\beta$	R <sup>2</sup>	t-value	p-value
Cultivation	0.29743	0.1009	0.18	0.6359
Social cohesion	1.54429**	0.4541	3.76	0.0004
Recreation	0.13245	0.0028	0.84	0.7674
Sense of place	0.99818**	0.1742	2.89	0.0081
Spiritualism	0.69332*	0.1393	2.27	0.0350
Local business	0.87418**	0.3002	3.83	0.0007

\* (\*\*) The level of significance of  $p \leq 0.05$  ( $p \leq 0.01$ ).

## DISCUSSION

This section focuses on the function of the cultural landscape ecology that provides spaces to support activities in the aspect of social values. The results of the observations show the characteristics of the landscape’s social values, how humans create specific patterns of land use with distinctive landscape features, and how the need for social bonds and a sense of place motivates the presence of residents in each landscape feature.

Many studies have discussed the effect of urbanization on reducing the ecological quality of urban landscapes. This study contradicts the statement of Li et al., 2019 that changes in land cover cause a decline in the function of the cultural landscape. The results of the land change analysis in Table 4 show that the increase in the number of green areas from 2010 to 2020 affects the ecological sustainability of the regional landscape and the function of the cultural landscape in this region. The carrying capacity of the Dendeng river and riparian forest for many years has become one of the landscape features that have an important role for residents of settlements in Airmata. For the people in Airmata, riparian forests have a bigger role than

agricultural areas (Table 5) due to the limited availability of land for agriculture. It is in contrast to (Dou et al., 2019) that stated study on the role of agricultural land is more important than forest in the area of cultural landscape function.

Several local culinary businesses use complementary ingredients taken from riparian forests in this area with a significant income value, which shows the close relationship between the local economy and cultural landscape features. It contradicts the statements of Cheng et al., (2019); and Petway et al., (2020) which state that the cultural landscape function has a low economic value. Several specific benefits can be derived from the functions of the urban cultural landscape, such as social bonding and well-being, place attachment, and a sense of identity (Casado-Arzuaga et al., 2014) which are consistent with this study. Social bonds between residents and a sense of place are the two main factors that dominate the perceptions and behavior of residents of informal areas in managing landscapes. Most of the community has occupied this area since the 1960s.

In this study, the value of social ties, sense of location identity, and local business

shows a stronger relationship to the landscape of settlements in this area because the development of this cultural area is strongly supported by these three things. This is in line with Darmansyah et al., (2019) that the factors that encourage changes in informal settlements in coastal cities in Makassar are cultural landscape space, changes in the circulation of fishermen in and out of the dock, domestic activities, utilization of the bale-bale, informal activities of fishermen, and the existence of a lively business space.

Landscape features can provide more than one service. For example, the riparian forest is the most cited because it serves aspects of recreation, a sense of place, local economy, and cultivation. Most respondents acknowledged mosques as a place that can strengthen social cohesion and increase the sense of place and spiritualism. This is in line with Muhamad (2014) that the good quality of natural landscapes and community activities affect the level of concord and beauty of the area. The ecologically good quality of the landscape and its social activities will increase the motivation to visit the landscape. This evidence can be understood as the nature of the features that are interrelated to the function of different cultural landscapes (Ko & Son, 2018). Therefore, it becomes a separate note for future studies to emphasize how to clarify social values and landscape functions.

City managers who oversee slum areas in developing countries only focus on basic infrastructure services, such as public toilets, but ignore facilities related to the social value of the landscape. Related to this, we also examine the relationship between cultural landscape functions and landscape features in urban parks to see human social relationships on cultural landscape service indicators (Xin et al., 2020). This study differs in that it provides a richer perspective on the relationship between the six social values of society and the landscape features present in urban informal settlements. We hope that this research is useful as a consideration in landscape management from the aspect of eco-

logical and cultural conservation in informal urban areas in a sustainable manner.

Aspects of social values such as social ties, sense of place, and spiritualism are admittedly difficult to measure. This study attempts to bridge it by implementing a mix of quantitative and qualitative methods with spatial mapping, observation, questionnaires, and interviews that complement each other in revealing nuances of social value in the function of the cultural landscape and its considerations in practical implementation.

## **CONCLUSION**

This study aims to analyze the role of six social values (social bonding, recreation, cultivation, sense of place, spiritualism, and local economy) in informal settlements in two urban villages by linking their relationship with landscape features in both regions. In achieving the objectives of this research, an approach was developed using the methods of observation, questionnaires, and interviews. The conclusions are (1) the most used landscape features in Airmata are rivers, mosques, forests, and settlements, while in Manutapen are ponds, churches, settlements, and dams. (2) The value of social cohesion, sense of place, and local business shows a stronger relationship to landscape functions. We encourage future research to assess the role of selected landscape attributes/features such as rivers, mosques, forests, and settlements in Airmata, as core areas for integrating these concepts into landscape conservation practices.

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