Assessing scenic beauty of culture-based landscapes in North Toraja Regency

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Abstract. Toraja is a popular tourist destination in the sacred highlands of South Sulawesi, Indonesia. It has been widely known for its unique traditional culture. The combination of nature, agriculture, and culture is landscape beauty as area potential tourism. However, the management of tourism objects and attractions has not given much attention to the quality of the landscape aesthetic. This paper shows the results of scenic beauty assessment of culture-based landscape in the North Toraja Regency. Field survey and analysis using Scenic Beauty Estimation (SBE) were used as the method of this research. The results showed that the SBE score represented by 40 landscape pictures ranged from -42 to 234. The landscape that achieved the highest SBE score of 234 was Lolai To’tombi, while the landscape with the lowest SBE score of -42 was Limbong Agrotourism. The preferred landscape has a unique characteristic, in order, having a harmonious blend of hardscape elements and vegetation, and the presence of green open space or blue sky in the landscape. Managers of tourism objects need to consider the character of the landscape in developing tourism objects and attractions to improve the quality of landscape beauty.

Keywords: landscape characteristic, perception, sacred highland, SBE, tourism

1. Introduction
Toraja is a tourist destination located in the highlands of South Sulawesi, Indonesia, that has a unique landscape and community culture. Toraja people have a cultural grandeur that continues the teachings of their ancestors. This ancestral tradition is well preserved and practiced in communal societies that are reflected in traditional custom house buildings, unique burial sites or graves, and traditional ceremonies. Destinations in Toraja include Tana Toraja Regency and North Toraja Regency as a single tourism destination. North Toraja Regency was established in 2008 by Law Number 28 which is a district division of Tana Toraja Regency.

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Tourist destinations depend on physical, environmental, and social-cultural attributes or characteristics [1] as tourist attractions. North Toraja Regency has a potential landscape that needs to be maintained and preserved so that it becomes an attractive tourist destination. The combination of nature, agriculture, and culture is the landscape beauty as area potential tourism. A cluster of mountains with the beauty of clouds and hills or beautiful dunes is one of the potential landscapes that can increase tourist attraction in the North Toraja Regency. Besides, North Toraja Regency also has a beautiful landscape of rice fields and arabica coffee plantations as a tourist attraction.

The visual beauty of the landscape and its elements is one of the most important natural resources although it is objectively difficult to measure [2] [3]. Assessment of the quality of landscape beauty can be performed with two approaches, i.e. an expert-based approach and a perception-based approach. Both approaches have a basic concept that landscape quality is originated from interactions between biophysical features of the landscape and processes of perception/human experience. The difference between the expert approach and perception is in translating the biophysical features of the landscape and the role of the observer/human experience in determining the level of landscape quality [4]. The assumption used in an expert-based approach is the aesthetic quality of a landscape is independent of the observer. Assessment is based on expert experience and predetermined criteria [5]. Perception-based assessment is the result of subjective assessment [6] which considers that certain landscape elements and characteristics are stimuli that induce relevant psychological responses in the form of sensory perceptions and/or perceptions arising from cognition [4]. The expert-based approach is more efficient in the aspect of cost and time compared to the perception-based approach. However, the reliability and validity of the perception-based approach are more easily verified using statistical methods than the expert-based approach [5].

The landscape beauty is one of the driving factors for tourist visits to the North Toraja Regency. However, the management of tourism objects and attractions has not given much attention to the quality of the landscape aesthetic. Therefore, the assessment of the visual quality of the landscape is important for a tourist destination. This paper aimed to show the results of scenic beauty assessment of culture-based landscape in the North Toraja Regency. The assessment of landscape beauty was performed as a consideration in the management of tourism objects and attractions in the North Toraja Regency. The visual and/or landscape quality is an important factor in the practice of planning and management strategies [4] [7] in the tourism industry [8]. Tourist destinations that have high aesthetic value can certainly be more visited by tourists so it can increase regional income from the tourism sector.

2. Methods
The quality of landscape beauty was assessed using the Scenic Beauty Estimation (SBE) method. Scenic Beauty Estimation is a quantitative measurement method for an object that has aesthetic value. The scenic beauty measurement aimed to describe the development of natural aesthetics through consideration of perceptions. This method consisted of three main steps, i.e. landscape photography, landscape evaluation, and aesthetic quality analysis. Assessment in this study used a perception-based approach to investigate respondents' preferences in a particular landscape.

2.1. Landscape photography
This stage was begun with the determination of the vantage point, which is the point of shooting the landscape. The determination of vantage points was based on landscape types, i.e. nature, agriculture, and culture. Photoshoots were carried out in 22 tourist areas in North Toraja Regency which represented landscape types. The type of natural landscape was represented by mountainous regions, natural pools, waterfalls, and dunes. The type of agricultural landscape was represented by rice fields, plantations, and animal markets. The type of cultural landscape was represented by traditional customary houses, menhirs or standing stones, baby graves, stone graves, hanging graves, and museums. Photoshoots activities in the field were carried out in the morning or evening with landscape format and camera height to the level of an adult's eye [9] to avoid bias between images. Taking pictures horizontally made...
it easy for observers to get the impression of the landscape beauty [10]. Photo selection was performed to select 40 photos based on image quality and representation of landscape types.

2.2. Landscape evaluation
The results of the photography consisting of 40 landscape pictures that had been selected were assessed by respondents using a questionnaire. Landscape pictures evaluation by respondents was carried out by presenting a slide of landscape pictures in front of respondents. Respondents consisted of students interested in Landscape Architecture, Faculty of Agriculture, Hasanuddin University and members of the Indonesian Society of Landscape Architects (ISLA) professional organization with a total of 50 people. Slide presentations were carried out with a duration of 8 seconds each slide with a rating scale of 1 to 10. The number 1 showed that it is very unpopular, while the number 10 showed a very popular landscape. Instructions were given to respondents to use photos to get an overview of landscape types rather than paying attention to the graphic quality of the presented photos [11].

2.3. Aesthetic quality analysis
Aesthetic quality was analyzed based on the average z value (normal distribution) for each landscape type. The analysis was performed by calculating the value of frequency (f), cumulative frequency (cf), cumulative probability (cp), z value, and average z value. Landscape pictures with an average z value closest to zero were specified as standard landscapes. Scenic beauty analysis was obtained by calculating the SBE score using the following formula:

\[ \text{SBE}_x = \left( \frac{Z_{Lx} - Z_{ls}}{} \right) \times 100 \]  

(1)

with SBE\(_x\) is the SBE score of x-landscape (x = 1,2,3, ..., n), Z\(_{Lx}\) is the average z value of the x-landscape, and Z\(_{ls}\) are the average z value of the standard landscape. The calculation results of the SBE score for each landscape obtained were grouped into three categories of beauty quality, i.e. high, medium, and low qualities. The grouping was done using the quartile method. Quartiles are values that divide a group of observations into four equal parts, 25% each [12]. The group was the SBE score of all landscapes sorted from the lowest to the highest. The high quality was 25% of the highest SBE score group, while low quality was 25% of the lowest SBE score group. Medium quality was 50% of the group that had a value between the two previous qualities [13]. SBE score ranged from 42 to 234 so that the landscape with high-quality landscapes has an SBE score of \( \geq 160 \). Landscapes with medium aesthetic quality are landscapes with an SBE score of 59 – 159. Furthermore, landscapes with an SBE score of \( \leq 58 \) are landscapes with low aesthetic quality.

3. Results and Discussions
North Toraja Regency has a beautiful landscape that is one of the tourist attractions. The analytical results of the quality of the landscape beauty showed that the SBE score of 40 landscape pictures ranged from 42 to 234 (Figure 1). The landscape that achieved the highest SBE score of 234 was Lolai To'tombi, while the landscape with the lowest SBE score of 42 was Limbong Agrotourism. The landscape with the highest SBE score is the most preferred or most beautiful landscape. In contrast, the landscape with the lowest SBE score is the most unpopular or least beautiful landscape [14].

The landscape with the highest SBE score is classified as a natural landscape type. This landscape was the tourist attraction Lolai To'tombi which has the attraction of a cluster of mountains with the beauty of a cloud cover around the mountain peaks known as "the land above the clouds" (Figure 2). The tourist attraction of Lola To'tombi has a cool climate because it is located at a high altitude area. Tourists can visit Lolai To'tombi in the early morning to enjoy interpreting the landscape beauty in the form of views of the spread of clouds. Besides, tourists can also enjoy waiting for the beauty of the sunrise. The charm of the landscape beauty of Lolai To'tombi is the main attraction that influences the perception of respondents so that respondents give a high value to this landscape picture. This landscape is dominated by pavement elements with a background of white clouds. The use of clean pavement elements with garden chairs and bench as a focal point gives a good visual impression that affects the
quality of the landscape beauty. Besides, respondents chose the landscape because of the dominance of blue color from the sky as a background. The blue sky is indirectly used as a component forming the outer space of the wall and roof. The blue color on the wall and roof space gives the impression of being cold, cool and calm [15]. Respondents considered that the Lolai To’ombi landscape feels cold because blue is a soothing, relaxed and comfortable color [16].

Figure 1. SBE score for each landscape pictures.

The landscape that was the most disliked by respondents was Limbong Agrotourism (Figure 3). Limbong Agrotourism is the type of agricultural landscape in the form of the thorny palm or salak (Salacca edulis) plantations. This landscape is dominated by salak plants with irregular planting space. Salak plantation is strongly influenced by elements of vegetation that have a rough impression of plant texture. The plant texture is a visually rough or smooth impression of any part of the plant [17]. The texture of the plant has a specific visual effect and plays an important role in the composition of the landscape. Salak plants are a type of palm-shaped shrub that has many long-sized spines on the midrib and leaves. Plants classified as palms are usually used as a point of interest in landscape design because they have attractive shapes and colors. However, this function is obtained if plants are planted singly, not in groups. The texture of salak plants with an irregular arrangement gave the impression of narrow space so that the respondents were least liked. Therefore, the manager of the tourist attraction should arrange this Limbong Agrotourism area to improve the quality of landscape beauty. The planning and design of agrotourism landscapes can take into account the character of the landscape following the function of agrotourism. Area management is carried out by zoning, planning for tourist circulation routes, planting arrangements, and planning for tourism support facilities.

Landslapes classified as high quality, for example, Lolai To’ombi, Kalimbuang Bori’, Sumalu dunes, Lo’ko’omata, and Ke’te’ Kesu. Kalimbuang Bori’ with SBE score of 207 is the place for conducting high-level funeral ceremonies for Toraja people called rante. This tourist object has a menhir or standing stone that stands tall as a marker for the performance of every funeral ceremony (Figure 4). Menhirs have the same custom value even though their sizes are different. The sacred value of the menhir is that it can only be installed if the deceased is a community leader. Besides, funeral ceremonies are carried out at the Rapasan level by cutting at least 24 buffaloes. The landscape beauty of Kalimbuang Bori’ tourist attraction was seen from the menhirs that are arranged against the background of vegetation. The existence of grass and shrubs, especially tree vegetation has a positive effect on preference [18]. The size of different menhirs also appends to the uniqueness of this tourist landscape. The green color of vegetation, the same as blue, also gives the impression of being cold, cool and calm so that it was favored by respondents.
Figure 2. Lolai To'tombi, "the land above the clouds" as the most preferred landscape (SBE score of 234).

Figure 3. Limbong Agrotourism as the most unpopular landscape (SBE score of -42).

The landscape that was also liked by the respondents was the Sumalu dunes with an SBE score of 200 (Figure 5). This landscape is a stretch of sandy hills that has a hilly shape with elongated plots that follow asymmetrical curves and valleys. The sandhill or dune looked unique because it presents a vista view that is open in a vegetated place. The combination of various physical components of the ecosystem with surrounding vegetation creates beautiful panoramas as part of the tourist attraction [19]. Landscapes with dunes and vegetation cover have high scores for natural parameters so it needs to be protected and preserved [20].

Figure 4. Kalimbuang Bori' tourist attraction.

Figure 5. Sumalu sand dune tourism object.

Attractions of Lo'ko'mata with SBE score of 163 (Figure 6) and Ke'te' Kesu with SBE score of 160 (Figure 7) are among the preferred landscape of respondents. Both of these landscapes are classified as sacred objects and have cultural uniqueness. Lo'ko'mata is a tourist attraction in the form of large stones containing corpses. The large stone has many holes that each hole can contain more than one corpse. Ke'te' Kesu tourist attraction is a tourist village that has the attraction of a traditional house (tongkonan) with a granary (alang sura'). The uniqueness of tongkonan is the form of a stilt house with a roof shaped like a boat. Besides, tongkonan has carvings on the wall with four basic colors, i.e. red, white, yellow and black. These four colors have their meanings. Red symbolizes life, white symbolizes purity, yellow symbolizes grace, and black symbolizes death. Another uniqueness can be found on the front of the tongkonan there are buffalo horns, on the left facing west there are buffalo jaws, and on the right facing east, there are pig jaws.
Low-quality landscapes that were not favored by respondents, for example, Limbong Agrotourism, Pala'tokke attractions, and the baby grave. Pala'tokke tourism object is a tourism object that has the attraction of hanging graves (Figure 8). Cultural elements in the form of graves are generally considered to be less attractive and less important [5] so it was not liked by respondents. The same goes for baby grave attractions (Figure 9). The baby grave is a special grave for babies on a living tree. For the Toraja people, babies who die before their teeth grow have a soft body that must be buried in a living tree so that it can become one unity with a tree. Besides, trees are also considered as the second uterus for babies who feed body fluids [21].

The type of landscape is divided into nature, agriculture, and culture. The SBE score grouped by the quartile method shows that all landscape types have three landscape qualities, i.e. high, medium and low (Figure 10). However, respondents preferred natural landscape types compared to cultural and agricultural landscape types (Figure 11). Naturalness factors [22] and landscape features are factors that greatly influence landscape preferences [23] [24]. North Toraja Regency is a destination known as cultural tourism objects such as traditional houses (tongkonan), burial sites and death ceremonies (rambu solo'). In recent years, natural attractions such as the Lolai region have also begun to be known. Lolai region is known for its promotion through social media so that it attracts tourists, especially domestic tourists to visit the region. The increasing number of tourists visiting Lolai then encouraged the development of several other tourism objects in the Lolai region, including Tirotiku, Lempe, Nato, and Pongtorra. These natural attractions need to be planned and managed properly so that the placement of landscape elements do not reduce the quality of the landscape beauty. Placement of the hardscape element needs to consider the composition of the landscape in the foreground, center, and background so that it does not block the good view in the landscape. Scenic beauty is conditioned visually by the composition and pattern of the entire landscape so that if scenic beauty is low or decreases, it will affect the attractiveness of tourism area [25].
Landscape characteristics and scenic beauty must be considered in planning, designing and managing tourism areas. Tourism objects and attractions with a high quality of beauty will contribute positively to tourism development. Emphasis can be given to factors that influence preferences, i.e. uniqueness, regularity, harmonization of hardscape elements with vegetation, and color elements in the landscape. Cultural attractions in North Toraja Regency that are already popular with tourists such as the traditional village of Ke’te Kesu and Londa burial sites must be enhanced by the quality of their landscape beauty by taking into account the factors that influence the aesthetic perception of the landscape. The local government of the North Toraja Regency and the community as managers of tourism objects need to consider the landscape character in developing tourism objects and attractions to improve the quality of landscape beauty.

4. Conclusions
The landscape beauty of tourism objects in the North Toraja Regency ranged from -42 to 234. The most preferred landscape with the highest SBE score of 234 was Lolai To'tombi, while the least preferred landscape with the lowest SBE score of -42 was Limbong Agrotourism. The notable findings are landscapes that were preferred to have unique and regular characteristics, with a harmonious blend of hardscape elements and vegetation, and the presence of green open space or blue sky in the landscape. The uniqueness of the culture-based landscape is a preferred character as found in the attractions of Ke’te Kesu and Lo'ko'mata. This result is the potential to be implemented in planning, designing and managing tourism objects, especially related to the landscape beauty. Therefore, the management of tourism objects needs to consider the character of the landscape in developing tourism objects and attractions to improve the quality of landscape beauty.

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