

# Study on Ecological Design Concept of Buton Sultanate Cityscape Based on Local Culture

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**Abstract.** Buton Sultanate Cityscape was constituted of man-made landscape constructed in the era of Buton Sultanate in 1322. It is one of the Indonesian heritage networks proposed to be the world heritage city. The Sultanate cityscape should have the concept of traditional city and refer to the ecological principles. This research was conducted to analyze elements and spatial patterns of Sultanate cityscape based on the ecological principles (eco-design). Descriptive method was utilized in the research by conducting in-depth interviews with the local custom figures and experts of the local culture, literature reviews, and field observations. The main elements of Buton Sultanate Cityscape consisted of palaces, city square, mosque, cemeteries, and settlements, while the supporting elements located outside the city border include mountains, valleys, rivers, and forests. City square is located in the city center surrounded by the palace, cemetery, and mosque. The main pattern of city circulation pattern has formed a simple figure of human body. Ecological principles can be examined from the housing layout paralleled to the road, direction of most city gates facing the east and forests, and the city wall pattern which is closely related to the religious matter.

## 1. Introduction

The Buton Sultanate is a manmade city of the Buton Sultanate era in 1322. In a range of periods, this Sultanate city has been established as one of the networks of Indonesian Heritage Cities supported by the Ministry of Public Works of Indonesia. Its establishment was predicted to occur, for Buton Sultanate city offers wealthy historical artifacts and cultural life, some of which can be studied further; including city forts, sultanate palaces, houses on stilts, mosques, cemeteries, and etc. [12].

Heritage city along with its landscapes is an essential unification in city planning [5] [10], for it has considered nature in its planning since past times, which is currently known as the concept of ecological design [2] [3]. Cultural and ecological values in a traditional landscape are strongly attached to the community life [9]. A number of researches related to the heritage cities have been conducted, particularly regarding the sultanate cities [1] [6], however, a study on the ecological design concept on cityscape by referring to the cultural information has not been performed.

Subsequently, this study aims to: (1) identify the elements of the landscape and its layout, (2) analyze the spatial pattern to form the sultanate cityscape, and analyze its landscape characteristics in reference to the local culture as the indicators of current ecodesign concept.



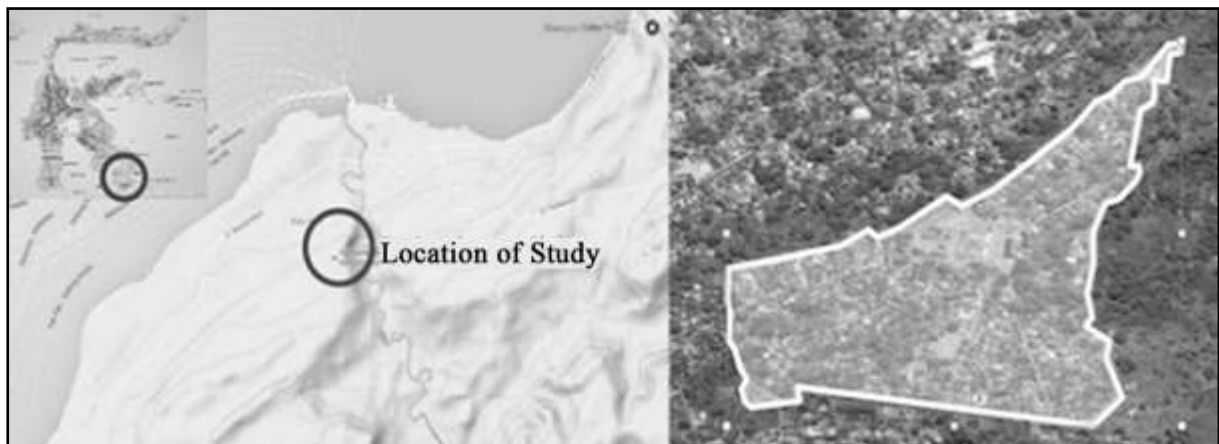
## 2. Research Methodology

### 2.1 Time and Place of Research

The research took place in Buton Sultanate cityscape in Baubau City, Southeast Sulawesi, which is commonly known as Keraton Fort with an area of 4.0 ha located at the coordinates of 5.21 LU – 5.30 LS and 122.30 - 122.45 BT (Figure 1). Thus, the research was conducted from May to September 2015.

### 2.2 Research Method

This research was conducted on the basis of Buton culture and history, by using the content analysis to explore the cityscape elements and its siting, and cityscape ecological concept in reference to the local wisdoms. By adopting descriptive method, the research was conducted in three steps i.e. (1) reviewing literatures, (2) interviewing the local custom figures and experts of the local culture, and (3) observing the cityscape.



**Figure 1.** Location of Study

#### 2.2.1 Literature Review

Desk study was initially conducted to achieve the research objectives i.e. elements which formed Buton sultanate cityscape at its triumph period and location. In addition, the research also examined the pattern of city space with its respective functions in reference to the cultural information. The cultural information was collected from customary manuscripts, history and culture books, and journals related to Buton customs.

#### 2.2.2 Interview

The interviews with 23 key informants consisting of the leaders of indigenous organizations, religious leaders, cultural figures, historians, craftsmen, artists, manuscript guards, hereditary officials of sultanate era, and local governments were conducted. Furthermore, questions leading to confirm the results obtained in the previous stage, literature studies, whether it is appropriate or there is any difference and addition were then administered to them. In-depth interviews were also conducted to reveal the geomancy meaning and cultural functions of landscape elements.

#### 2.2.3 Field Observation

Field observation was performed in reference to the results of the research in the previous two stages i.e. literature studies and interviews. It was primarily conducted to verify the elements of the cityscape and its layout based on cultural information, and to examine cityscape space and characteristics at present time. Further, it was also performed by utilizing photo images downloaded from the google map.

### 2.3 Cityscape Analysis

Content dan descriptive analyses were used in this research. The former was conducted at the initial and second stages of the research while the latter was conducted at the third stage. The contents of the document were analyzed, and what kinds of elements and spaces contained in the cityscape of Buton sultanate during its glory were also analyzed. In addition to the presence of elements and spaces, their functions and philosophies were also examined further. In the third stage of study, the pattern of the cityscape was analyzed by adopting Lynch's approach in imagable city [7], covering the circulation paths, regional borders (edges), district parts, city activity center (nodes), and landmarks. The analysis was performed on the ancient maps, images, and field observations. The eco-design concept on the cityscape was observed in reference to the effect of element layouts and spatial patterns on the city environment quality [11].

## 3. Result And Discussion

In an overview, Baubau city has a convenient climate condition with city temperatures ranging from 19.8 to 37.4°C, wind speeds of 2.0 to 4.1 knots, and annual rainfalls ranging from 1,500 to 2,500 mm (Central Bureau of Statistics, 2015). Buton sultanate city is located in the southern part of Baubau at an altitude of 104 m above sea level and has undulating landform. Moreover, the sultanate city is surrounded by cliffs and valleys (northern and eastern sides), hills and forests (eastern and southern sides), ditches and settlements (southern and western sides), and cemeteries (western side). These characteristics of cityscape are primarily referred to the significant portion of cultural philosophy.

### 3.1 Elements of the Cityscape

Spatial cityscape elements and patterns were compiled in accordance with the on-going development of Buton culture at that particular time. The elements of sultanate cityscape cover the city borders (edges), settlement (districts), city square (node), roads (paths), mosques and palaces (landmarks) (Table 1). It corresponds to what Lynch called as imagability of the city. See this following Figure 2.

**Table 1.** Elements of Buton Sultanate Cityscape

No.	Cityscape Elements	Lynch's approach	Existence of the elements (on the basis of)		
			Literature	Interview	Observation
1.	Fortress	Edges	•	•	•
2.	Gates/Baluara		•	•	•
3.	Settlement	Districts	•	•	•
4.	Cemetery		•	•	•
5.	City square (alun-alun)	Node	•	•	•
6.	Green Corridor	Paths	•	•	•
7.	Street		•	•	•
8.	Mosque	Landmarks	•	•	•
9.	Palace		•	•	•



**Figure 2.** Elements of Buton Sultanate Cityscape

Out of the nine elements, fortress is the cityscape element which strongly indicates the uniqueness of the Buton Sultanate City. It is a city bordering element made of Stone Mountain (karst) on which bastions and gates stand. Thus, its construction was conducted during the era of Sultan Buton the fifth, Sultan Gafarul Wadudu (1632-1645). The fortress was built with an adjustment to the land contour and the edge of the hills reaching up to 2,740 m, and with varying dimensions; i.e. the height of 1 to 4.5 m and width (thickness) of 0.5-2 m (Makassar Cultural Heritage Preservation Center, 2013).

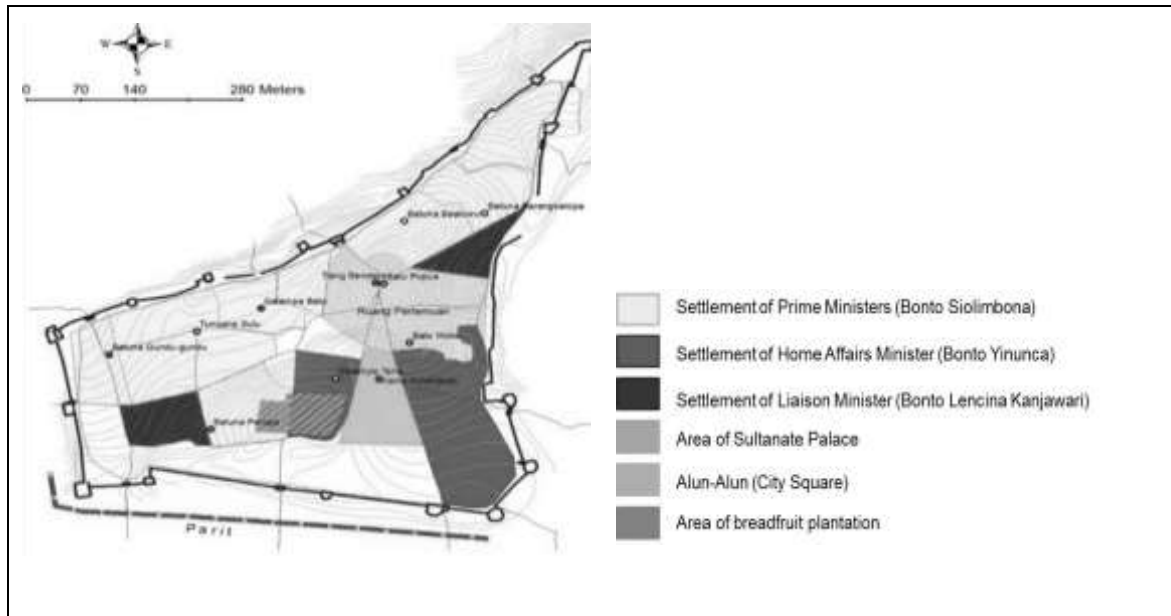
Furthermore, the fortress is the sultanate city border which was constructed to provide protection for the community from pirate encounters, the Dutch colony [12]. It mainly consists of 16 bastions and 12 gates. All of the 12 gates indicate the 12 entrances (holes) to a human body (interview with La Suluhu). This means that if there is something entering one's body illegally, the body will react to neutralize, destroy, or release the substance, and similar events occurred in the respective gates. In reference to the religious character of Buton Muslim community, they significantly uphold the prophet Muhammad SAW by carving his name on the fortress wall pattern and city shape. At the northend of the east wall, the Arabic letters of 'mim', 'ha', and 'mim' were written, while the city shape as a whole formed the letter 'dal', so that when they were combined, they formed the word of 'Muhammad'. The area which formed the first letter of "mim" is perceived as a 'sacred place' because it functions as the cemeteries of the sultan and his family (interview with Mujazi).

In addition to the cemeteries of the sultan and his family mentioned above, there was also another sultan cemetery located in the city center, at the border of the city square. The city square was an open space in the city center where the sultan gathered his people. It is the unifying element of the city as proposed by Lynch [7] to be referred to as the 'node'. Hence, the city elements in the forms of pathways included the roads and green lanes. What referred to as green lanes were the lines of the coconut trees alongside the fortress, which were practically planted as the requirement for the newlyweds obliged to plant three coconut trees. Meanwhile, elements which served as 'landmarks' in this sultanate city were the Sultanate Palace and Mosque. Both buildings are perceived to be highly significant compared to other city elements. During the glory of sultanate, the house roof belonging to the common people could not be higher than that of the sultan's, for it was believed that if its height exceeded the sultan's house roof, it would not give any blessings (results from the interviews).

### *3.2 City Land Uses*

The spatial pattern of Buton sultanate city formed the Arabic letter of 'dal' which, according to the result of interviews with local custom leaders, symbolized the unity within the human physical body. The existing land uses in the city at the sultanate era covered the city square, settlements, sultanate palace, and plantation (Figure 3). It is discovered that the settlements highly dominated the land uses in the city; including the settlements of the Prime Ministers (Bonto Siolimbona), Home Affair Minister (Bonto Yinunca), and Liaison Ministers (Bonto Lencina Kanjawari). Subsequently, Bonto Siolimbona region, located in the northern part of the city, became a shield for the sultanate area. Thus, its area location was surrounded by each settlement of the ministers, precisely in the city center, close to the city square and plantation. The city square in Buton sultanate city was similar to that of commonly found in Java, although the spatial use of its surrounding was not exactly the same. It is presumed that there was an influence of Majapahit kingdom in its glory period. Furthermore, a plantation is one of the land uses serving as a green area of the sultanate city, with breadfruit as its main commodity.





**Figure 3.** The Cityscape Land Uses

### 3.3 City Pattern

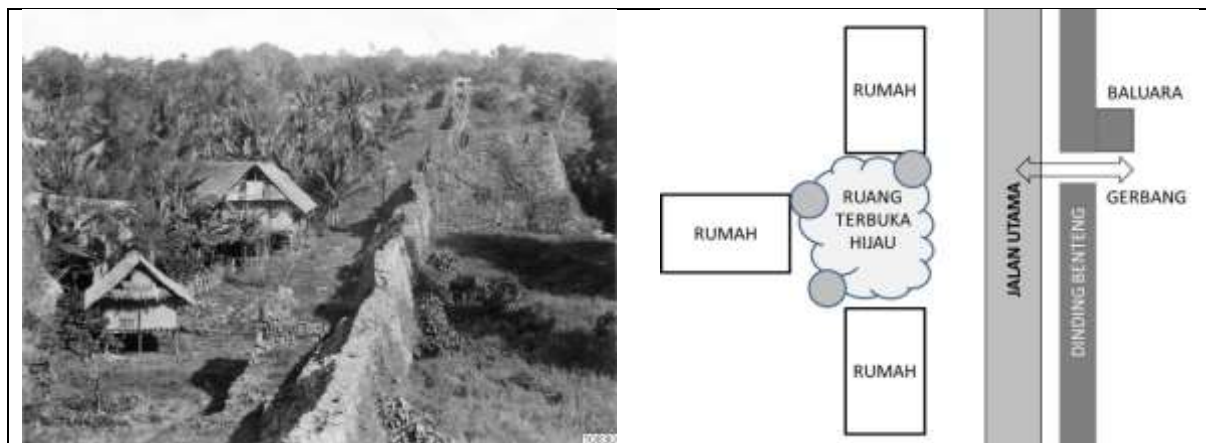
The city pattern could be formed by lanes or river pathways [8]. Lanes in Buton sultanate city indicated a unique pattern i.e. the pattern of human skeleton. The geomancy of Buton Sultanate cityscape referred to the philosophy of human body and spirit. In addition, the geomancy of fortress wall elements referred to the philosophy of human body identical with Arabic letter philosophy. The respective pattern was generated from a combination of Arabic letters described earlier i.e. "mim", "ha", "mim", and "dal" (Figure 4). These letters were written in the traditional manuscript, and the pattern of human body was attached to the main circulation pattern of Buton sultanate city at that period. The head part was the palace area and connected by road to the city center, or city square. In the body part, lanes were identified moving across the east and the west, as parts of the arms. Lastly, the leg part in the pattern resembled lanes moving to the north side.



**Figure 4.** The City Pattern

### 3.4 Ecodesign Concept

Buton sultanate city was constructed in reference to cultural and religious approach adopted by the Sultan and his people. Such approach is consistent with the eco-design concept which is currently echoed and becomes a trend in city planning and design. It primarily covers the concept-based approach to the issues, principles, and process of eco-design [4] [11]. Thus, the pattern of Buton sultanate city forming the Arabic letter of "dal" enabled the city at the north side to border diagonally from the northeast to the southwest with the longest side of the fortress. The longest side faces the sea and settlements outside the Sultanate palace. In reference to the palace position on high ground, the palace was able to observe and secure situation from enemy encounters at the coast and examine the condition of the people outside the palace. This notion is significantly consistent with the concept of eco-design proposed by VanderRyn and Cowan [11] stating that 'solutions grow from place'. At the eastside of city wall, there is a spread of forest and hills. This condition is perceived to be beneficial to provide fresh air surrounding the palace. Such design concept combines the power of nature with the city needs, which is later referred to as the eco-design concept of 'design with nature' [11].



**Figure 5.** Open Space Between The Houses

The housing layout towards the street at the sultanate era can be examined in Figure 5. Three houses were facing one another with a green open space in the center. Two houses were bordered with roads while facing the open space. This was a common pattern in the neighborhood of the palace. The open space could serve as grounds and community spaces. Although the road had not produced harmful pollution at the sultanate era, if the pattern was applied to the present conditions, it is capable in helping to avoid or reduce smoke and dust pollution in the road, which is considered to be an important eco-design issue as argued by VanderRyn and Cowan [11].

Natural elements, e.g. mountains or hills, are the symbols of high status. Subsequently, the Sultanate Palace was situated on top of a hill. In addition to its symbolism, in reference to its function, the position was suitable in monitoring the whole city from the palace, and the music sound of traditional procession performed in the palace could be heard clearly by the community within and around the keratin fortress. The palace was oriented and designed eastward, for it captured the sunlight from the morning to noon symbolizing notions of youth and glory. These matters were efforts to design an ecological city at the sultanate era which can be adopted as a city design reference at the present time. Ecodesign formulation proposed by VanderRyn and Cowan [11] was also in accordance with the concept of Buton city at the sultanate era.

### 4. Conclusions

The Buton sultanate local culture was significantly concerned with the ecological environment of the cityscape. This is reflected from the city-forming elements and city space and circulation patterns. The main elements forming the sultanate cityscape identified in reference to the local culture include (1) the

city fortress covering the fortress walls, gates, and bastions; (2) settlements and cemeteries; (3) city square; (4) roads and green lanes; and (5) palaces and mosques.

The pattern of sultanate cityscape is considered to be unique with a significant influence of religious belief held by the sultan and his people i.e. Islam. Thus, the geomancy form of Buton sultanate city shapes the Arabic letter of "dal", while its main circulation pattern resembles a human body derived from the Arabic letters as well.

The eco-design concept in the Buton sultanate was indicated on the city layout in an environment supporting the ecological system of the city, settlement patterns, and location of the palace which supports the city monitoring and information system

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