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IDENTIFICATION OF URBAN SPACE OF RIVERSIDE SETTLEMENT, CASE STUDY : 3-4 ULU PALEMBANG

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ABSTRACT

Riverside settlement has a unique characteristic because most of people activities are conducted on the wetland. As a traditional settlement, this settlement grew naturally, without changing the natural environment. In the traditional settlements, the development of urban fabric is unplanned and/or spontaneous. The development has been causing the interactions between people and their environment over decades and centuries. The buildings and urban public spaces were subject to the continuous changes and transformations that were undertaken by users, often in the absence of intervention of public authorities. According to the urban spaces, the people's needs of urban spaces in the settlement are similar with those in the dryland settlement. The question that is going to be answered through this research is what public spaces are there in the riverside settlements? This study will identify the types and usages of urban spaces in the riverside settlement, particularly in 3-4 Ulu Palembang, where the influence of the watershed is still visible. The research method is case study method which includes field observation and interview with the residents. The results show that there are some types and usage of urban public space in the riverside settlement that have distinctive characteristics. The limitations of the dry land make some urban public spaces are different from those in the dry land settlement. The identification of urban space in the riverside settlement is important for the consideration to set up the zoning regulations.

Keywords: Riverside settlement; Urban space; Wetland; Zoning regulation

1. INTRODUCTION

Urban space can be described as the external space in a town. It is seen as an open space for movement in open air consisting ofpublic, semipublic and private zones. The concept of urban space has been elaborated as the space between buildings in towns and other localities. According to Shirvani (1985) and Cuthbert (2007), there are several physical elements forming the city including the land use city, the building form and massing, the circulation and parking, the open space and the pedestrian ways.

The physical space is formed as a relationship between various kinds of objects and humans apart in a space. This concept emphasizes on the interdependence among others (Rapoport, 1977): (1) Process which specializes activity and functional relationships in a region; (2) The physical process that addresses the need for space such as form, shelter, transportation and communications; and (3) The process of creation and integration space between different parts, which placed the various activities at the space that contains various resources.

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The Palembang municipality is divided into two parts by the Musi River, namely Seberang Ulu and Seberang Ilir. Seberang Ulu has a flat topography and is below the maximum high-water marks of the Musi River. Some areas of Seberang Ulu have been reclaimed for the new building.

Kampoong 3-4 is located in Seberang Ulu I subdistrict, with the total area of 301 Ha. Total population is around 20.903 people consisting of 3.083 household labeled as poor. Most of the residents work as labours, employees and traders. Kampoong 3-4 Ulu is located along the riverbanks that formerly served as the main urban transportation. The building forms are stilt or raft houses which are influenced by the tide water. These stilt buildings are appropriate for swamp areas. Kampong 3-4 Ulu can still be seen as a traditional settlement whichconsists of many traditional buildings namely *'limas'* houses and *'gudang'* houses. The urban space pattern is formed and influenced by natural conditions (Lussetyowati, 2009).

According to the previous studies, there are two problems that will be studied in this work, they are: what kind of urban spaces in the wetland settlement and is there any relationship between the urban space pattern and the wetland area? This study aims at identifying the urban spaces in 3-4 Ulu settlement and analyzing the urban space pattern and its relationship with the natural condition as wetland settlement.

2. METHODOLOGY/ EXPERIMENTAL

The research method is the combination between the qualitative and the quantitative methods. The research strategy used is concurrent method which consists of case study and survey methods (Creswell, 2010). The concurrent method is a method in which the researcher converges the quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. The concurrent-mixed method is a procedure in which the qualitative research (case study) is performed together with the quantitative research (survey research).

The population is the residents who live in Kampong 3-4 Ulu, especially along the riverside. The samples are 100 households that represent the whole population. The sample selection is based on the spatial distribution that consists of 5 neighborhoods.

The sampling method used is the non probability sampling technique. The non-probability sampling technique is more appropriate because it represents the population and the results could be generalized (Morisan, 2012). The Samples taken are selected samples or purposive samples, which includes 50 respondents, subjects or the selected elements with certain characteristics and qualities. In this study, the samples were selected based on the spatial distribution from the location. The study location consisted of 5 (five) neighborhoods that located in Kampoong 3-4 Ulu Palembang. Each neighborhood was represented by 10 samples. The data collections used several methods such as interviews, observation and questionnaires.

A community survey was conducted by the enclosed questionnaires using Likert scale. Each answer will be scaled 1 to 5 which represent five qualities: strongly agree (score 5), agree (score 4), less agree (score 3), disagree (score 2) and strongly disagree (score 1). The questionnaires include the landuse, building mass, circulation, open space and adaptation. The analysis method was descriptive analysis, which explained the data including the object of the research that has been obtained through the field observation and interviews.

3. RESULTS

3.1. The Overview of the Wetlands Settlements

Palembang Municipality area is a large swamp area. This area decreases due to thereclamation. The rapid development of the city leads to the necessity to build residence and more facilities on the land. It is also triggered by the change in the transport modal from the river transportation into the road transportation. Some wetlands started to be dumped and changed into the dry land for the construction needs. This reclamation often did not fulfil the technical requirements for wetlands reclamation, and caused some negative impacts for the city such as ponding of water during the rainy season and flooding in some areas.

In the wetland settlements, especially along the riverbanks, the type of the houses is usually the stilt houses. The settlements have unique characteristics since most of the people activities are carried out above the water. The human behavior and the daily activities are influenced and adjusted by the natural conditions. The development of the settlement also has its own characteristics; it grows naturally without giving a significant change in the natural environment. Leaving the swamp as it is. The people's needs for urban space in the settlements are similar forboth on the dryland and wetland.

The daily activities of the people in the wetland settlement, as well as in other settlements are done mostly inside the house and its surroundings. The activities such as showering, washing and defecating are still done in the river, especially by local people who live along the riverbank. In addition, people also do their jobs around the neighborhood to earn money; such as trading, fishing, boat building and others. These activities show the relationship between local people activities and the riverbank environment.

Outdoor activities in the public space can be divided into three categories; they are necessary activities, optional activities and social activities (Gehl, 1987). Necessary activities include those that are more or less compulsory such as going to school or to work, shopping, waiting for a bus or a person, distributing mail, in other words, the necessary activities are all activities in which those involved are to greater or lesser degree required to participate. The daily tasks belong to this group. Since the activities are necessary, the physical framework only slightly influences these activities. These activities will take place throughout the year, under nearly all condition and more or less are independent from the exterior environment. The optional activities include such activities as taking a walk to get breath of fresh air, standing around to enjoy life, or sitting and sun bathing. These activities take place only when the exterior conditions are optimal, when the weather and the place are suitable to do such activities. The social activities depend on the existing public spaces. The social activities include children at play, greetings and social conversations, various kinds of communal activities and as the most widespread social activities- passive contact, seeing and listening to other people.

3.2. Urban Space Patterns

Based on the field surveys, there are two orientations of settlements in 3-4 Ulu, they are the street and the river which have their own characteristics (Lussetyowati, 2014). The settlement with street orientation has the following characteristics: (1) The main road as the orientation of all the walkways; (2) The buildings are also oriented to the road; (3) The back yard of the buildings is connected to the road by wooden walkways (alley); (4) The urban space patterns mostly use the grid pattern combined with the linear pattern; and (5) Less of connection to the river especially in terms of the transportation.

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Meanwhile, the settlement which oriented to the river has following characteristics: (1) The river as settlements orientation; and (2) Each neighborhood usually has a small pier as a boat station.

3.3. Elements of Urban Space

Land use

Land use in this settlement is simlar to the other places because the need of space is the same. The land use consists of residential area, commercial areas, public facilities area such as for education, health and the mosque. The residential area is the most extensive area in this settlement taking approximately 80% of the total area.

Building Mass

The intensity of the buildings is very high, approximately 80% of building coverage. There are many crowded slums areas with the high intensity, especially around Jaya Laksana Street and the Yuching house. The height of the buildings mostly is one until two floors only. There are no high-rise buildings in this area.

Circulation

There are two main circulation systems; they are street and river channels. The street and the river channel is connected by alleys called *'jerambah'*. These alleys are the main path for the movement in the wetland settlement with the stilt structure above the tidal land. The height of the stilt is usually considered based on the highest tide in the area. The public facilities such as schools, mosques, offices, health centers, shops, etc. usually use the street side, as well as the parking area for cars or tricycles called *'becak'*, because of limitation of the dryland area. In order to reach the wetland neighborhood, the people only can walk through the pedestrians or use two-wheeled vehicles; The people who have a four-wheeled vehicle usually park their cars on the side of the street. The local parking regulation is needed so that the cars parked on the side of the street will not disturb the traffic movement.

Formerly, the river formerly is as a major transportation channel. The development of the dryland transport system makes this system only as the alternative paths (mainly the large river). The small rivers are no longer used as a transportation channel due to the sedimentation.

The meighborhood alleys are narrow alleys with approximately 1-2 meters width of the stilt plat called *'jerambah'*. *Jerambah* is made of wood and in some places is made using the reinforced concrete. The limited access causes some problems, especially regarding the fire hazard. The fire fighter trucks could not reach the site.

Figure 1 Alley on stilt structure (called *jerambah*)

Open Space

The open spaces include the movement path (road, *jerambah*, rivers) and the space between the buildings. Open spaces as public spaces primarily located in areas that can be stepped, it means that it is the space in which people can move (Lussetyowati, 2012). These spaces are formed by the dryland road or 'jerambah' (alleys on stilts). Other open spaces are spaces between buildings that turn into swamps during the tide flooded season and become dryland during the dry season. To fulfill the need of open spaces, the local people sometime try to widen the land by adding the wooden board on the stilts. Besides, the added wooden board is used as the veranda as an important part of the house to be a place to socialize with the neighbors.

In Kampong 3-4 Ulu, there is not any open space for children playground. However, the children have their own play patterns by adjusting the existing limitation spaces. Children can play everywhere at any place.

3.4. The community survey result

A community survey is conducted to see the public view of the spatial patterns in the settlements where they live. The respondents were selected randomly based on the spatial distribution in the study area. The number of respondents is 50 people consisting of32 male 32 respondents (64%) and 18 female respondents (36%). Based on the occupation, the respondents consist of 8 students (16%), 6 public sector workers 6 (12%), 14 private sector workers (28%), 10 self employers (20%), 6 house wives (12%) and others (12%). Based on the education, 8% of the respondents not completed primary school, 4% are the primary school graduates, 25% are the secondary school graduates, 52% are the high school graduates and the rest has a bachelor degree .

The results of the survey can be seen as follows.

Landuse

Based on the data processing, it shows that people consider the land use as an important element in structuring the settlement area (16% strongly agree and 40% agree). However, most people do not understand how to arrange the pattern of the land uses. The majority of the communities agree that the land use for open space does not fulfill their needs, because there is a very little open space. The land use for the education, health and worship is considered adequate, although not all are available in the area. They can use such facilities around the settlement.

About 58% of respondents agree that the mix land use is the most appropriate for structuring a settlement area. According to the people, they still use other land that has not been available for the community activities and the public open space.

Building Mass

A community survey in the building mass shows the facts as follows:

- The majority of respondents feel that the setting of the building is not good and not been regularly performed.
- The street back line is also considered inappropriate. The distance between buildings is considered too narrow and vulnerable to fire. The distance between building and the street does also not to fulfill the requirements.
- The building intensity is high (more than 75% respondents).
- The building orientation is mostly to street or alley, around 42% of respondents strongly agree and 52% of respondents agree.
- There is no clear pattern between the buildings and the open spaces according to the majority of respondents (80% respondents).

Circulation

Circulation is an important aspect in supporting the daily activities of people living in the study area. Based on these survey results, it is obtained that:

- The majority of respondents agree that the road conditions are adequate (50% respondents) and partly disagree.
- The neighborhood streets are less connected with the street, causing the less structured circulation. Most respondents disagree that the settlement was connected with major roads (76% respondents).
- The food path is inadequate (68% respondents).
- The majority of respondents consider the circulation patterns are still not well-organized (52% respondents).
- There is a need for a boat station (52% respondents).

Open Space

Open space requirements are still needed by the population, for daily activities, recreational activities and community activities. The results of open space survey are as follows:

- The open space is not fulfilling the needs of local people (84% respondents).
- The green open space is also inadequate ((78% respondents).
- The open spaces along the riverbanks (waterfront) do not work properly (68% respondents).
- The waterfront is not as the building orientation (70% respondents), while the riverbanks have high potential to be public open spaces.
- The open space that already exists can be accessed easily by the people (86% respondents).
- There are no open spaces for children's playground (64% respondents).

Adaptation

The results of the relationship between urban spaces and the adaptation process in the wetland area are as follows:

- Part of respondents (46%) agrees that the wetland area is less favorable for settlement but the majority of the respondents (54%) disagree about this.
- The stilt houses are suitable for this wetland area (52% respondents), while the rest of the respondents disagree to this.
- The reclamation is considered less appropriate in the wetlands (68% respondents).
- There is a linkage between the people's daily activities and the wetland (56% respondents).
- The people are able to adjust to the natural conditions that are influenced by the tide (92% respondents).

4. DISCUSSION

4.1. Urban Space Pattern

The pattern of the residential units in the settlement of the neighborhood of marsh area can be divided into several kinds of patterns, namely a linear pattern, a grid pattern and the pattern of clusters (Lussetyowati, 2014). The third pattern formation is much related to the organic growth patterns of settlement and unplanned. The residents build their houses in layers starting from the main transport line. The third pattern is already known in some residential areas, although it is still in a mess condition because it is influenced also by the wooden material that is used to make the walkways (path). The wooden

walkways lead to the formation of a straight pattern and it is connected one to another to form a linear pattern, a grid pattern, a cluster pattern or a combination of all.

4.2. Urban Space Elements

Land use

The land use in this settlement has no difference with other places because the need of space is the same. The land use consists of residential area, commercial areas, public facilities area such as for education, health and the mosque. The residential area is the most extensive area in this settlement occupying approximately 80% of the total area. The local people agree that the land use is the important element in structuring the wetland settlement; it means that re-structuring the land use can improve the quality of the settlement.

The problems in land use are the lack of open space and the lack of regulation that is based on the wetlands regulation. The needs of open space can be fulfilled by using and improving waterfront, and also designing the space between buildings to be a usefull open space.The land use regulation has a major impact to natural resources including water, soil, plants and animal. The land use degradation has been exacerbated where there has been an absence of any land use planning.

Building Mass

The distance between the buildings is very narrow and less environmentally health. The sunshine could not reach the area under the stilt houses. Thus, it becomes moist and invite many mosquitoes. It is also worsen by the unhealthy lifestyle of the people, such as throwing the trash or household waste to the area under the house.

Formerly, the river was in front of the building and then it turned into the back yard for years and tends to become slump. The building expansion made the riverbank become unclear and many buildings were built unstructured along the riverbank. This condition will cause the river quality to decrease. The transformations of the wetlands cause the reduction of water catchment areas. The loss of the wetlands will reduce the water flow into the soil through the infiltration process and will increase the surface water. Water will flow into the river and into the sea without any infiltration process to the soil. Another consequence is the reduction of flora and fauna habitats in the wetland.

Circulation

The linear form in traditional settlements in Ulu 3-4 is formed by the circulation pattern. This pattern has actually been used since the formerly settlement in the wetlands, because the settlement growth follows the path of an existing road or connect the existing roads. The building orientation is to circulation path, street or footpath. A linear pattern shows the connection between the main road and the river with footpath called '*jerambah*'. Usually at the meeting point between '*jerambah*' and the river someone could find a dock.

A grid pattern is formed by the combination of several linear circulations (main roads and footpaths). The grid pattern of traditional settlement in the wetlands is an irregular form. In the wetland settlement along the riverbanks, the grid pattern connects the main road to the river. There is also a small pier at the meeting point between the '*jerambah*' (footpath) and the river. Cluster pattern in the traditional settlement is usually formed based on the family relationship. This pattern is usually found in a small neighborhood unit. Some houses build around an open space as a building orientation. Usually, these houses are owned by one big family.

Open Space

The problems of open space in this settlement are the lack of space for open space, the existing open spaces did not fulfill the people need, waterfront as public space is not working properly and there is not a space for playground.

According to the World Health Organization, the living conditions in the urban environment are the key to the health and well-being of its inhabitants. Evidence from the literature consistently indicates that there is an association between the built environment, health and well-being, and levels of physical activity (Lestan, 2014). The lack and poor quality of open/green space in urban neighborhoods can be a serious restriction for the wellbeing of the inhabitants as it does not support developing healthy life-styles, including spending time outdoors, walking, playing, *etc.*

Zoning Regulation

To protect the wetlands, it needs a special regulation, such as zoning regulation. The zoning regulation currently only regulates the dryland, and the wetlands use the same regulation. The dryland-oriented regulation will reduce the wetlands area faster because people build their settlements without considering the natural condition as a wetland. One of the content of zoning regulation is urban space that includes land use, building mass, circulation and open space. Urban space regulation is also important to conserve the urban wetland area. To protect the urban wetland, the wetland oriented regulation based on the natural and local people characteristic is needed. The traditional settlement in the wetland area, especially in the riverside, shows how the wetland can be protected. The harmonious relationship between natural environment, local people and the built environment is important to be considered in the wetland planning and development.

5. CONCLUSION

1) Land use
   - Settlement patterns have three patterns, they are linear pattern, grid pattern and cluster pattern. The pattern formation is much related to the organic growth and unplanned.
   - Land use is an important element in structuring the settlement and the mix land is most appropriate for structuring the land use.
2) Building mass
   - The setting of the building is not good and irregular, the street back line is also not eligible and the distance between buildings is too narrow and vulnerable during fire. There is no clear pattern between the buildings and the open spaces.
   - Intensity of buildings in some parts is very high and the buildings height in almost all the area is 1 until 2 floors only. The building distance is very tight and it causes a less healthy environmen.
3) Circulation
   - There are two main circulation, they are street and river channels. The alley is usually a path between 1-2 meters width, situated on the stilts called *'jerambah'*.
   - Circulation in the wetland settlement is a combination between river, street and footpath circulation. At the meeting point in the edge of footpath beside the river, usually we find a small pier for the boat station.
4) Open space
   - Open space as a public space primarily located in areas that can be stepped, it means spaces in which people can move.

- There is no open space for children's. But the children have their own games by adjusting to the limitations of space.
- Open space requirements are still needed by the population for daily activities, recreational activities and community activities. In this settlement, the open space did not fulfil the local people needs. Open space along the riverbanks (waterfront) is not working properly and there is no open spaces for children's playground.

5) Zoning regulation
   - Urban space regulation is also important to conserve the urban wetland area. To protect the urban wetland, the wetland oriented regulation based on the natural and local people characteristic is neede. The traditional settlement in wetland area, especially in the riverside, shows how the wetland can be protected. The harmonious relationship between natural environment, local people and the built environment is important to be considered in the wetland planning and development.

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