

Function Quality Improvement of Mahakam Riverbanks as a Public Open Space

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Abstract. The increasing numbers of people and buildings that continue to grow and tend to be uncontrolled in the settlement causing some negative impacts one of them is the consistency of land allotment. This has resulted in some impacts such as ineffective utilities and environmental infrastructures, no mitigation system, and the unavailability of space for public spaces and other supporting facilities that supposed to be available within a settlement. Kampung Arab is one of a densely populated settlements located in the middle of business center area of Manado City, occupies the Mahakam riverbank. The limited space available in Kampung Arab has caused the settlements tend to be slummed and doesn't have public open space as one of the residential support facilities. In addition, this settlement expands riverbanks so the functions of riverbanks become disturbed, and these settlements are often at risk of flooding. The purpose of this research is to analyze the function of Mahakam riverbanks against flood risk and to analyze the possibility of public space and pedestrian ways availability at the location of Mahakam riverbanks around the Kampung Arab settlement. The research method is qualitative descriptive method. Primary data were obtained through field observation, documentation, and interviews. The research is located in Kampung Arab settlement which occupies the banks of Mahakam River. Further analysis is done: 1) analysis of existing settlement of Kampung Arab to the Mahakam River related to: building's orientation, river border, activity and behavior of society 2] analysis of public open space availability and its former elements, 3] analysis of settlement utility system and at the final stage conducted an analysis related to community activities and behavior. Expected results through this research are: improving function and quality of Mahakam River, restoring the function of riverbanks and public open space availability as social interaction space.

1. Introduction

The river banks is a part of waterfront area that have several advantages especially with more strategic functions and accessibility. By using the river, human can move around, get new settlements for them to grow and develop into bustling neighborhoods, become villages, and then evolve into towns. The function of rivers in Indonesia which has many benefits such as; Water resources, fish ponds, hydropower (PLTA), transportation media, and daily living needs that show how important it is to human beings.



In Manado City, along with the increase of buildings and human population, numbers of areas within the city that are not actually intended for buildings have been made settlements, including the river banks. However, the use of space in riverbank area generally experienced a tendency of uncontrolled distribution of buildings in the watershed which has an impact on the decrease of river quality and local area. (Figure 1).

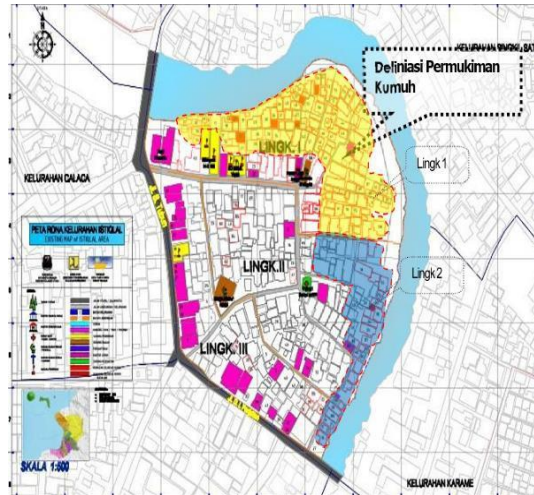


Figure 1. Maps of research object (Kelurahan Istiqlal)

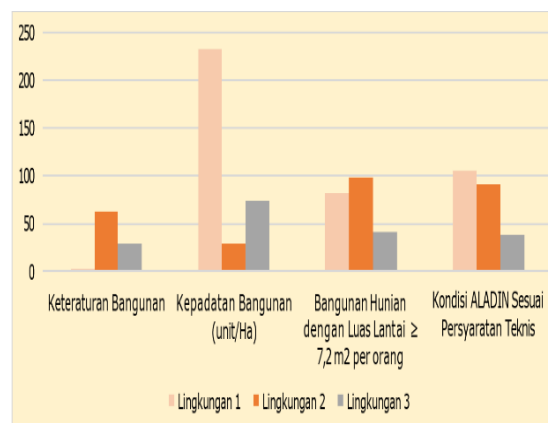


Figure 2. Orderliness, density and appropriateness of buildings

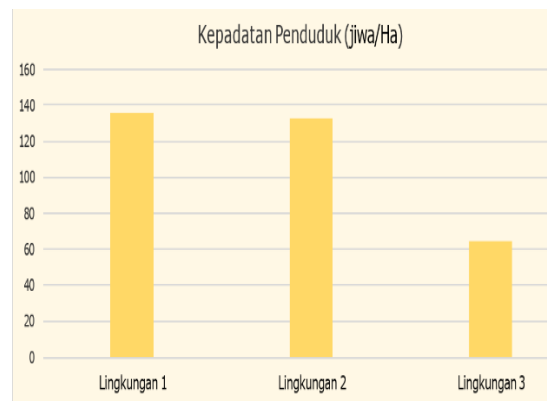


Figure 3. Kepadatan Penduduk per Lingkungan

Kampung Arab is one of a densely populated settlements located in the middle of business center area of Manado City, occupies the Mahakam riverbank. The limited space available in Kampung Arab has caused the settlements tend to be slummed and failed to provide some facilities that supposed to be in it as a residential area. In addition, these settlements expand the river banks so that the functions of river banks become disrupted, and these settlements are often at risk of flooding because this area is one of the affected areas in Manado city every year. Until now there are still many residents who refuse to be relocated. Based on the problems above it is necessary to study the condition of settlements quality in the Kampung Arab in order to be able to provide a concept of how to improve the quality of river bank along with the settlement around it.

The aim of this research is to analyse the factors that affect the quality of sustainable settlements that are good and have a flood disaster management system for settlements that occupy the river banks Mahakam of Manado city.

2. Method

The method used in this research is descriptive qualitative research method with observational participatory technique, which is by interpreting the facts that occur during the observation to describe the existing condition of settlement in arab village of Manado city, identify the problem that happened, and then give solution to the problems mentioned.

3. Analysis And Interpretation

Based on the results of studies, now we are able to described the condition of river banks in the Arab village of Manado City. Existing analysis of Arab village settlements against mahakam river is related to: building orientation, river border, community activity and behavior

3.1. Density And Distance Between Buildings

The condition of the distance between buildings of the residential area on the arab village riverbank is very close one to another. Distance between building is around 0 to 1 meter from several sides of the building. Building density resulted in the loss of water catchment areas and green open spaces in the area and the absence of disaster evacuation routes. In addition, the bulding orientation is not very good due to its sporadically development. (Figure 4).



Figure 4. Arab village settlement area

3.2. Structure and Construction

The condition of the building in the Arab village of Manado City is diverse. There are semi-permanent buildings as well as permanent. Most semi-permanent buildings lie in the border of rivers while permanent buildings are largely inward in the city. The result from the study above, it can be proposed to relocate existing buildings on the border of a semi-permanent river to be moved or renovated in accordance with the standard structure of safe and feasible, because it can endanger the residents whenever the weather is in bad situation or natural disasters occur.

The majority of people in this region are Muslims (Moslem) that is why this area is called "Kampung Arab". The people who live in this region are diverse, some are from Java, Gorontalo, Mobagu Town and Tondano villages, gathered from different ethnic cultures but united in the same belief. Some people work as Fishermen because this area is the estuary of Mahakam River. Analysis of public open space availability and its former elements.

3.2.1. Availability of Public Open Space

The limited space available in Kampung Arab has caused the settlements tend to be slumed and failed to provide some facilities such as public open space that supposed to be in it as a residential area.

The activity in a urban neighborhood is relatively more diverse and higher intensity. One of the factors is the social cohesion is still quite massive. Activities that take place formal activities (work) and non-formal activities (play, gather). This activity is conducted in public spaces both in the form of linear (road space) and centralized (field) activities in public spaces that are informal has become a basic necessity even routine.

Generally, a good residential area should have a spatial pattern that is intended to accomodates these informal activities.

To fulfill this matter, it is strived to provide linear public open space in the form of multi function of riverbanks pedestrian or road or alley can be modified so that it can accommodate the activity. Then at certain points in the settlement area can be pursued a public open space, although with small size for activities or commercial facilities of the village.

Analysis of the settlement utility system and at the final stages, there would be an analysis related to community activities and behaviour.

3.2.2. Utility

The drainage system in the urban arab environment of Manado city has a quite good construction quality. For the drinking water consumption, communities served by clean water for drinking, bathing and washing (piping or non-piped protected areas) account for 88% of the total population in this neighborhood and 98% of the population are great served by drinking water, , wash at least 60 liters / person / day. For the wastewater management in this environment, communities have access to family latrines and latrines together in accordance with technical requirements (connected to septi-tanks). While the sewerage of household waste is not separated from the environmental drainage that directly leads to the river resulting an environmental pollution. (Figures 3 and 4).

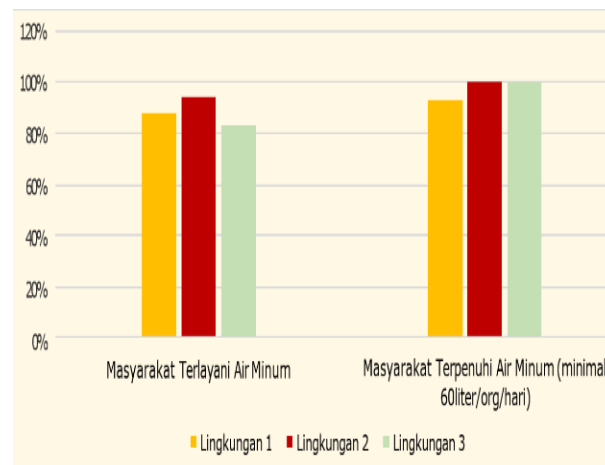


Figure 5. Percentage of residents served with great drinking water quality

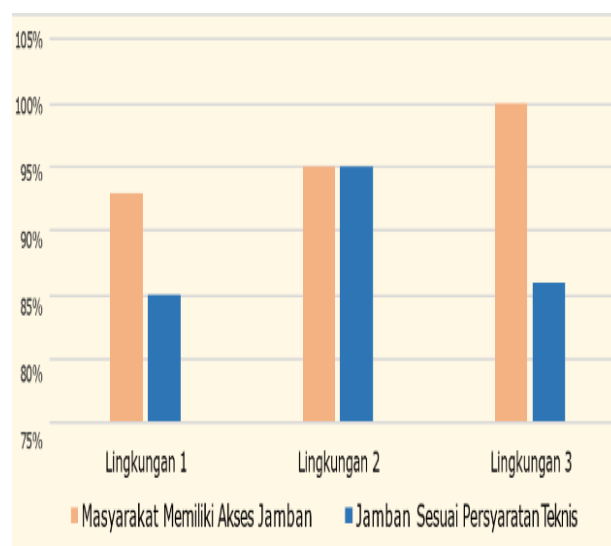


Figure 6. Percentage of residents with proper toilet

4. Discussion

Based on numbers of existing analyses, will be proposed a concept for improving the quality of settlements to overcome any problems in the object of research:

1. Land use arrangements could be done through controlling / rearranging of riverbank areas referring to Ministry of Public Works Regulation No.63 / PRT / 1993 about boundaries of rivers, river areas that can be used, river basin areas determined based on conditions and locations. The regulation is followed up through RTRW Manado 2011- 2031, that the Tondano river (Mahakam River) includes a river in a urban area that should have a border at least 3 meters from the right and left side of the river.
2. Relocation of population areas (Buildings) that stand along the river border line. Relocation which also refers to allotment of RTRW of Manado City Year 2011-2031 about prohibited to build building along river border line, because it is not intended for residential function but for green open space (RTH).
3. In addition to border arrangements, river normalization can be carried out by applying the riverfont / waterfont settlement concept. This is so that the river can be kept clean. (Figur 7).

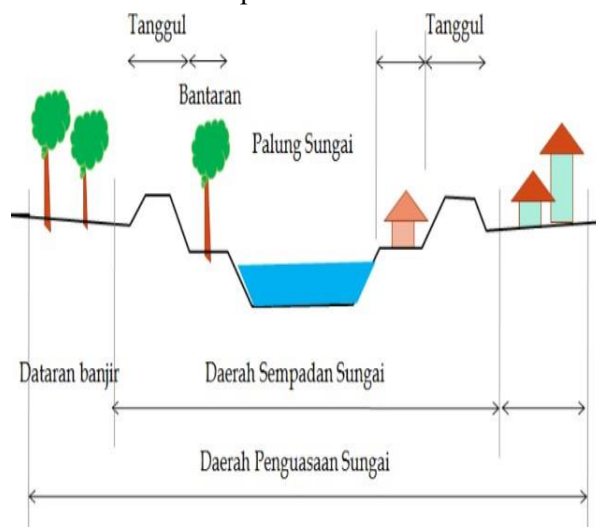


Figure 7. River Border line

4. Patterns of arrangement of this researched object, conducted to regulate the regularity and feasibility of the building in the Arab village. The orientation of the building must follow the pattern of the circulation to be well ordered which also can be used as disaster evacuation path in this particular area. (Figure 8).

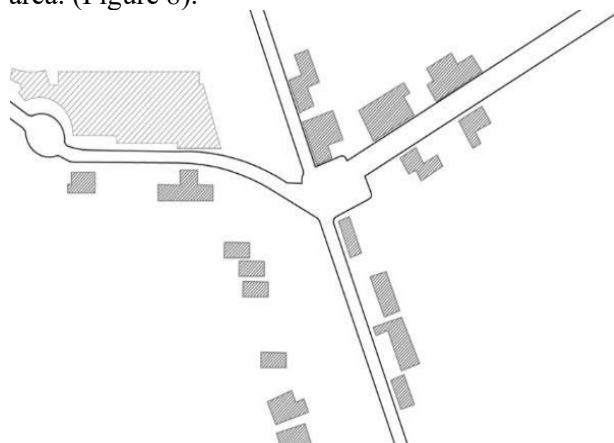


Figure 8. Patterns of building arrangement

5. On the researched object that is settlement occupying the area of mahakam river banks, it is necessary to strive the availability of public open space to accommodate the social interaction activities of local communities. Based on the analysis that has been done, the public open space can be presented in the form of linear as the pedestrian along the riverbanks could be multi functioned also as a public open space, or in the form of small spots on the pedestrian in the settlement itself. (Figure 9).



Figure 9. Quality improvement of pedestrian way as public open space

6. Establish a network system to anticipate flooding and puddle, especially the drainage channels towards the River.
7. In the area of arab village which is categorized as densely populated, a closed drainage system is being used. Make small holes to drain the excess water if the volume of water discharge rises. (Figure 10).



Figure 10. Utility System

8. The house wastewater network should be separated by a rain drainage network. However, when combined with drainage of rainwater, the filters on the sewage drain on each unit of the house and other buildings have to be done first, in order to anticipate the solid waste joined.

5. Conclusions

The limited space in Kampung Arab settlements cause the settlements tend to slum and do not have public open space as one of the settlement facilities. In addition, this settlement expands the river banks so that the functions of river banks become disrupted, and these settlements are often at risk of flooding.

In this research, there are numbers of analysis that had been done such as, the analysis of river bank functions, analysis of the existing settlements of the kampung arab to mahakam river related to: building orientation, river border,, public space availability analysis and public open space former elements, analysis of settlement utility system and in the final stage conducted an analysis related to community activities and behavior. Expected results through this research are: improving function and quality of mahakam river, restoring river border function and public open space availability as social interaction space.

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