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Typology of livable waterfront settlement and how to manage the community.

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Abstract. Population growth will lead to the change in the city. The process of change and growth in the city will determine the level and size of the city, including Indonesia. The various processes of urban change show the value of global pressure on the local context in an effort to understand the complexity of the city changing forms. Research on waterfront settlements that have been carried out revolves around the characteristics and strategies of planning the sustainable settlement by studying the process of its formation toward sustainable settlements. The purpose of this literature research is to identify the typology of waterfront settlements and to find a livable waterfront settlement management strategy. The literature study was carried out related to the growth and development of the waterfront city, the phenomenon of waterfront settlement in Indonesia, and a comparative study of waterfront settlement management which became the best practice in developing waterfront settlement management strategies in Indonesia. The results of the literature study show that the transformation of the waterfront settlements causes a change in the character of the place. So we need innovations in the concept of waterfront settlement management that can be implemented in Indonesia.

1.Introduction

Indonesia is the largest archipelagic country in the world consisting of 17,499 islands from Sabang to Merauke. The total area of Indonesia is 7.81 million km² consisting of 2.01 million km² of land, 3.25 million km² of ocean. This condition causes the growth of settlements bordering water, both seaside settlements and riverside settlements. With the conditions of the settlement, the problem of waterfront settlement is a problem that requires serious handling for the Indonesian government. The urban growth of waterfront cities on almost every island in Indonesia, starting from the island of Sumatra to the island of Irian.

In addition, the conditions of climate change occurring the environmental damage are increased, raising questions, how can the growth and development of the waterfront city be sustainable? How can a growing urban population meet their needs for food, home, work, and safety?

The growth of population will lead the development and change in the city where you live. The process of change and growth will determine the level and size of the city, including Indonesia. The various processes of urban change show the value of global pressure on the local context in an effort to understand the complexity of the changing forms of the city. The results of the globalization process and the changes in the city produce [1] : (1). Changes to the urban system at the local, regional, national



and global levels. (2). Urban spread (3). Changes in the socio-spatial construction of city spaces. These changes and developments need to be anticipated, especially in waterfront cities in Indonesia.

The research of waterfront settlements that have been carried out revolves around the characteristics and strategies of sustainable settlement planning by studying the process of the growth and development formation in reaching sustainable settlements. The research of [2] examines the typology of waterfront settlements based on eight categories, namely (1) river dividing the city (2) the city is on the edge of the river (3) the city is divided by several rivers and tributaries (4) swamp town (5) the river divides the coastal city (6) the river divides the city in the mountains (7) the river divides the lake city and (8) the coastal city adjacent to the river. Then the method of analyzing waterfront settlement is carried out with an integrated model which is defined as the diversity of the formal and informal sectors is a natural/cultural integration formed from a village. Exploration analysis conducted summarizes three dimensions of integration, namely physical, economic and social.

Several strategies for planning and the structure of waterfront settlements toward sustainable settlements were carried out by several researchers by identifying potential conflicts in waterfront settlements as was done [3] in the form of land use conflicts and activity conflicts and evaluating waterfront settlements as study cases [4]. Unlike the concept applied by [5] in the form of the application of Green Architecture and by [6] in the form of sustainable planning.

Each settlement has its own characteristics and typologies so that by examining the typology of waterfront settlements can be found a strategy in planning and designing appropriate settlements to achieve habitable and sustainable settlement conditions.

2. Literature Review

2.1. Typology and the component of waterfront settlement

Characteristics of waterfront settlement areas are divided into physical and social characteristics. Physical characteristics are land use, landforms and the formation of settlements. While social characteristics are the number of population, age, gender, marital status, number of family dependents, level of education, ethnicity, religion, land ownership status, employment status and amount of income [7].

Based on the function, waterfront settlement can also be divided into (1) Cultural waterfront which is characterized by cultural, educational and scientific activities, (2). Waterfront environment that seeks to improve environmental quality, (3). Historical waterfront in the form of development towards historical building conservation, (4). Mixed-used waterfront in the form of a combination of housing, offices, trade or culture, (5). Recreational waterfront that provides recreational facilities, (6). The residential waterfront is a residential area (7). Working waterfront is in the form of heavy industrial area and port function. Breen, 1996 in [8].

The typology of waterfront settlements research is preceded by the identification of the type of waterfront settlement based on its function. The process of forming a settlement environment is possible because of the process of creating an environment to accommodate all human needs based on the activity pattern and the result of the interaction between humans or community groups. Humans in occupying their residential environment understand the characteristics of nature and humans and their reciprocal relationships. This adjustment raises the concept of living which shows how people adapt to the environment and shape settlement patterns. [9].

The patterns of settlement can be broadly identified through four classifications, namely [10]: (1) Boundaries (boundaries), are the boundaries of the territory of a region (2). Types of facilities can be in the form of public facilities (public facilities) and social facilities (social facilities) (3). Spatial (zone) is

a division of the area of activity in a settlement that is regulated based on the structure of beliefs, customary rules or habits of the local community (4). Ornamental variety is the dominant elements found in many settlements, both natural and man-made.

Based on the previous research, the types of settlement patterns have a result in different interpretations from several researchers. But in general, the type of settlement pattern is divided into three groups, namely gathering, spreading and combination. [11] classify the type of settlement pattern based on the placement of settlement units and the activities on the settlement.

After recognizing the types of settlement pattern, several theories emerged about the development of waterfront settlements [12]. The initial stage is marked by the dominance of the waterfront service area as a source of water for life needs. When the city needs communication with other locations, the waterfront area is a transportation infrastructure so that settlement development tends to be longitudinal (linear). Subsequent developments are characterized by the increased of complex functional activities so that the intensity of activities on the water's edge is higher.

2.2. The development of waterfront settlement

The growth and development of waterfront cities today is in a transitional period, especially in the waterfront city located near the center of the metropolitan city. Many waterfront cities are growing and developing because of the migration of population who come to find a relaxed lifestyle that natural settings can offer. The form of migration of population in line with tourism growth as a result of environmental growth and social change. This growth and change are because of the transformation of the waterfront city characteristics. Data shows that more than 60% of the world's population of around 3.5 billion of the world's population now live at a distance of 150 km from the coastline, which is about 10% of the land surface area of the earth. And this number is predicted by 2020 will increase to 75% of the world population or 6.4 billion population.

Some of the transitions that occur in the waterfront city are [13]: (1). Changes in the population living on the edge of the water (2) Change in coastal phenomena, (3). Tourism and (4). Place character transformation. This transition resulted in several types of waterfront settlements such as waterfront settlements, small to medium sized waterfront towns, waterfront cities as lifestyle destinations, commuter waterfront settlements, and waterfront regional cities.

The transformation in the waterfront cities causes a change in the character of the place. The character of a place is usually described as an atmosphere of a place. The depiction of the atmosphere of a place is rather difficult to describe precisely because it is a phenomenon of intangible experience through tangible environmental conditions. Some places are described as having identities that are easily recognizable from other places because they have more expressive characters. To formulate the character of a place by finding the dimensions of the character of the place [13], namely: (1). Environmental aesthetics (2) Natural landscape (3). Social dimension (4). Changes and temporal dimensions (5). The uniqueness of a place (6). Symbolic meaning (7). The emotional response to the environment (8). Home environment and (9). Residential neighborhood. Changes in the character of places in waterfront cities affect the local population and visitors to the place. Likewise, with the effects of climate change such as rising sea level, more frequent major storms occur. But with a good waterfront settlement management will determine the shape and quality of a livable waterfront settlement in the future.

In this post-industrial era, where there are many urban agglomerations, the form of cities is controlled by multi-institutions so that the city expresses more economic and social pressures than the results of planning. Likewise, what happened to the waterfront cities. So that in the planning of waterfront cities, it should be remembered that the development of a waterfront city is prioritized to a humanist and livable city. So that the relationship between water and economic generators in the waterfront cities has

changed, which previously depended on industrial operations to be how to recreate the city's image by the waterfront area. Based on research [14] on the development of waterfront cities in the world there are four concepts of waterfront city development, namely (1) Connecting to the waterfront area (2) Re-creating the city image of the water's edge (3). Port and city relations (4). City on the edge of the historic water.

2.3. The relationship between living phenomena and waterfront settlements in Indonesia

The phenomenon of living is the experience of living in a residential area in the present which is carried out by a process from the background and past. The experience of living in the past was not immediately destroyed in this process. The experience has remained in the phenomenon of living in the present but has escaped attention. The experience of living in the past that remains today is what needs to be studied so that it becomes local wisdom that can be conserved in a waterfront settlement. [15]. The form of living in the waterfront river in Indonesia generally is in the back of the settlements so that the river becomes a place for garbage disposal and sanitation from residential areas. So it is necessary to change behavior by changing the settlement facing the river. Change in behavior is not something that is easy to do so it requires encouragement from various city stakeholders. [6].

Waterfront settlement development in Indonesia will produce multiple impacts such as better management of waterfront areas, strict supervision of illegal settlements, better flood control, healthier urban quality, improved water quality and indirectly increase environmental quality. Better management of the waterfront area will lead to improved water quality, environmental quality, and reduced flood problems.

Whether the development of waterfront settlements bordering rivers, lakes or beaches has at least three environmental values, namely the direct, indirect and inheritance values. Direct value is needed because we need a source of water to support urban life. Indirect value is also important for providing beautiful scenery and of course, we hope for future generations is also enjoy the existence of waterfront settlements as a historical legacy [6]. Therefore, the waterfront area, whether on the edge of the river, lake or sea, is the center of attention in the development of the waterfront city for property developers.

Waterfront settlements also become one of the compulsory elements to reach a sustainable city. Especially in the area on the edge of the river because the majority of rivers that flow in the city in Indonesia, have a position behind the settlement area so that more pollution occurs because it is always a waste disposal area and sanitation. The laziness and lack public awareness in maintaining hygiene, inability to process waste and the presence of streams behind the house are three key factors causing the decreasing environmental quality of waterfront rivers in Indonesia. For the case in Indonesia the achievement of a sustainable city, by implementing sustainable waterfront management will be able to conserve water resources, reduce water pollution and improve the quality of life of the community if implemented properly.

The problem of climate change in rising sea levels and the risk of tsunamis in waterfront areas is also a concern in developing waterfront settlements. At the concept of spatial planning, tsunami risk assessment cannot be separated from the assessment of the socioeconomic vulnerability of the population. The number of vulnerable groups and poor groups in an area will affect the ability of the region in handling disaster risk. So that in the process of structuring and developing the waterfront area, it is necessary to assess the socio-economic vulnerability of the population to the possibility of a disaster.[16].

3. Comparative study of management waterfront settlement

3.1. *The relation between city and the port*

The growth and development of the city in the postmodern era have a substantial change in the relationship between cities and ports. Major cities in Indonesia are waterfront city categories from the ports at the beginning such as Jakarta, Semarang, and Surabaya. With changes in the port and infrastructure operations, there has been a shift in location to deep sea locations to maintain port services. Historically, the administrative functions of the modern port and city have been separated, so the boundary between the port and the city center has become ambiguous. The construction of a new city center far from the port is a solution to solve this problem. The comparative study of cities in the world that developed the master plan document to solve the same problem was the Genoa port in Italy. The development concept of the Genoa Master Plan to improve port facilities is to maintain communication lines between the port and the city center. The master plan also shows the merging of port functions with the redevelopment of multi-functional areas as shown in Figure 1. [14]



Figure 1. Port of Genoa, Italy
Sourcer : [14]



Figure 2. The enhancement access to waterfront area in Malaka
Sourcer : [17]

3.2. *Historic waterfront city*

Historical waterfront areas in the future provide an opportunity for cities to be reconnected with water. At the same time, the replacement of the water line as part of the concentration of activities in the city space will provide an opportunity to change the old function into a new function. In this day more attention oriented in culture and recreation towards waterfront activities with the use of historic buildings as tourist activities. This concept is applied to the waterfront area in Malacca, Malaysia. The implementation of this concept requires an understanding of the historical role of the development of waterfront areas, regional characteristics and other factors that influence development. In present-day Malacca, historic waterfront areas have become the focus of a special value on historic architectural buildings, food, lifestyles which are reflected in the city's morphology in several periods of residence from its historical footprint as shown in Figure 2. [17]

3.3. *Livable settlement*

When livable become the keyword for settlement planning, the most effective way to solve various problems is to find a strategy in planning the policy. The plan has to form the livable settlements for the

future, but also meet the satisfaction of residents in the present. The living experience that shows the quality of life in a residential environment that is closely related to access the infrastructure (such as transportation, communication, water, and sanitation); food, clean water, affordable housing prices and open spaces. Livable settlements mean that they are a link between the past and the future. Preserve markers on site, buildings and historical traces. Eradicating pollution and waste that endanger the human environment. Therefore, livable settlements also mean sustainable settlements that meet the satisfaction of their inhabitants. Public space is the center of the social life of the settlement. The settlement cannot become sustainable settlement if it is not livable. Livable settlements must be built or formed as a sustainable network where pedestrian and road networks are mutually binding which supports the social quality of its inhabitants. [18], [19].

3.4. Management of livable waterfront settlement

The development of water resources leads to a front view policy known as the waterfront. This policy is in the form of making water resources is in the front area for regional development. The concept of front view was originally developed with the aim that the community could see the function of water resources as well as being useful. In addition, the concept of front view is also one way to build active interactions in communities around the water resources. [20]. Very often in the redevelopment of the riverside area, horizontal conflicts always emerge, but with the concept of front view they are united by common interests, the conflict can turn into togetherness in various systems, structures, and social activities.

The stages of livable settlement management that can be applied in Indonesia are [6] :

1. To prioritize public spaces and the connection.
2. To ensure that the main purpose of redevelopment of the waterfront area is for public functions.
3. After ensuring the main purpose of redevelopment and public functions in the region, the arrangement of the existing building assets begins. The arrangement begins with the historical form and function of the waterfront area to conserve local identity. The environment around the area must be integrated with the waterfront area to strengthen relations between destinations.
4. To create a vision of the community to achieve new possibilities for the development of waterfront areas.
5. Creating a multifunctional destination in the waterfront area rather than just an open space or garden and clarifying the functions and activities that will be seen in each place.
6. Connect between destinations along the waterfront area.
7. Maximizing opportunities for access to public spaces along the waterfront area.
8. Creating close relationships between humans and the environment, for example by planting vegetation that will improve water quality and improve fish habitat.
9. Start from a small area first to produce a big change because the management of the waterfront area is a long-term project.

4. Conclusion

The typology of waterfront settlements consists of several types when viewed based on function, characteristics, settlement patterns and development concepts. Each type of waterfront settlement, whether on the riverbanks, lakes or sea will be influenced by the geographical location and topography of the land. Transformation of the waterfront settlement causes a change in the character of the place. So we need innovations in the concept of waterfront settlement management that can be implemented in Indonesia.

Climate change and the environmental damage also requires the adaptation of waterfront settlements. Because the phenomenon of human settlements since time immemorial is living near water. The origin of the growth of settlements is mostly on the edge of the water, then it develops into the land area. So the concept of developing livable waterfront settlements is needed to reach sustainable settlements.

A comparative study of the growth and development of waterfront cities as best practices in drafting the concept of waterfront settlement management shows that a vision from the community is needed to

achieve new possibilities for the development of waterfront areas. This new vision will unite all stakeholders in building and developing livable waterfront settlements.

5. References

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