

Available online at www.sciencedirect.com**SciVerse ScienceDirect**

Procedia Environmental Sciences 17 (2013) 401 – 407

Procedia

Environmental Sciences

The 3rd International Conference on Sustainable Future for Human Security
SUSTAIN 2012

Towards sustainable urban growth: The unaffected fisherman settlement setting (with case study Semarang coastal area)

Bambang Setioko^{a,*}, Edward Endrianto Pandelaki^b, Titien Woro Murtini^c

^{a,b,c} Department of Architecture-Faculty of Engineering-Diponegoro University.
Jl.Prof.Soedarto SH.Tembalang-Semarang 50255- INDONESIA

Abstract

This paper mainly focused on fisherman settlement setting's analysis and explored why the tidal flood did not change the settlement setting. This research was conducted in fisherman settlement named Kelurahan Tambak Mulyo which is located at the coastal area of Semarang - the capital of Central Java Province. The fisherman settlement located in coastal areas and river estuaries has long existed in Semarang. In recent decades these areas are frequently flooded by heavy tidal flood. Day by day the tidal flood's mean surface level becomes higher and inundation area expands. The activity system of the inhabitants gradually changes from the previous pattern. The changes in system of activity of the inhabitants usually affect its urban setting. However, the reality indicates that the fisherman settlement setting does not change significantly.

A series of analysis of the physical setting and the spatial setting has successfully revealed the phenomenon of the unaffected urban setting in the fisherman settlements of Semarang coastal area. Tidal flood that frequently hit this area did not alter the spatial structure. Inhabitant's trip pattern was changed only during the tidal flood time. However the trip patterns of people activities beyond the tidal flood time seem are not changed. As far as the spatial structure does not change, the physical setting is not affected.

The results of this study can be used as input for urban planning and urban design of Semarang's coastal areas. The policy of Semarang's growth should be synchronized with sustainability issues in its effort to establish a sustainable city.

© 2013 The Authors. Published by Elsevier B.V. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of SUSTAIN conference's committee and supported by Kyoto University; (OPIR), (GCOE-ES), (GCOE-HSE), (CSEAS), (RISH), (GCOE-ARS) and (GSS) as co-hosts.

Keywords: Settlement Setting ; Spatial; Tidal Flood; Trip Pattern; Coastal.

* Corresponding author. Tel.: +628122817062; fax: +62247470690.

E-mail address: keliek2000@yahoo.com.

1. Introduction

In the global context, sustainable urban growth has become a strategic issue. Sustainable Urban growth could be defined as a process to reach better quality of life by improving urban environment. It means through sustainable urban growth, future generations should be ensured can meet their needs by implementing proper urban policy and strategy. In these requirements, the understanding of how urban activities deal with urban setting and availability of natural resources is important. Thus every urban policy and urban strategy should refer to the goals of sustainable urban growth, realize the city can accommodate the various activities of its inhabitants.

People act according to their reading of the environmental cues, then set an adaptive container, which is appropriate with their spatial setting [3]. In certain situations the spatial configuration is difficult changed even though there are external influences. Strong relationship between man and environment interaction can be described as a spatial-symbolic system which are supported by habits and custom.

This research was conducted in fisherman settlement which is located at the coastal area of Semarang. Heavy tidal flood in recent decades hit the fisherman settlements. Recently the physical condition of fisherman settlement is getting worse. During the tidal flood period all of the local roads and pathways are inundated. Bad environmental condition caused changes in the system of inhabitant activities. According to Pipkin, cultural changes in society will be correlated with changes in the spatial organization (Pipkin John, 1981). The fish auction's building that has been a vital element of the neighborhood centre was moved into a new area away from fisherman settlement, in order to find a better location that are not inundated by tidal floods. However fisherman and traders are reluctant to use it and finally in a short period the building becomes damaged.

Having failed to move the fish auction building, the municipal government in early 2012, the previously mentioned fish auction building was starting to be formally revitalized. The trading activities conducted in this building become the impetus to attract people back to the previous neighborhood centre.

The objectives of this study are to identify the changes of urban setting on fisherman settlement in urbanizing coastal area. This study could improve our understanding of how the urban setting could withstand changes over the activity system of the inhabitants. The proper method to diagnose the problem of a city has to begin by recognizing the historical and social phenomenon and starting the perspective to respect for urban characteristics.

2. The growth of Semarang Coastal Areas

Semarang city is the capital of the Central Java Province. It is located in the North Coast of Java Island. In 2010, Semarang consisted of 1.592.632 inhabitants, and had growth rate 1.90 % per year. Administratively Semarang comprises 16 sub districts and 177 villages. With the municipal administrative area at 37.366 hectares and the gross density is 43 inhabitants per hectare, Semarang does not have a high level of growth rate (Figure.1-4). The built up area was only about 42% of the entire municipal administrative area. The coastal area of Semarang has 13.6 km length [4].

Semarang flourished as an enter pot of imported and exported commodities from outer island and hinterland as well. This fact indicates the role of Semarang city mainly as port city. Urban settlements are spreading not only at plain and coastal areas in the North but also at hilly areas in the South; the favorite place for the affluent society. On the year of 1977 Semarang municipal administration area is expanded, but the coastal area seems not expand significantly.

There is no record when the fisherman began dwelt in the coastal area of Semarang. This area was estimated since 1950s has dwelt by fisherman. The figure-ground diagram shows the growth of fisherman

settlement from the year of 1970 until 2010 (Figure.5a). The settlement configuration adjusts to the physical conditions of ponds and river.



Figure 1: Map of Indonesia

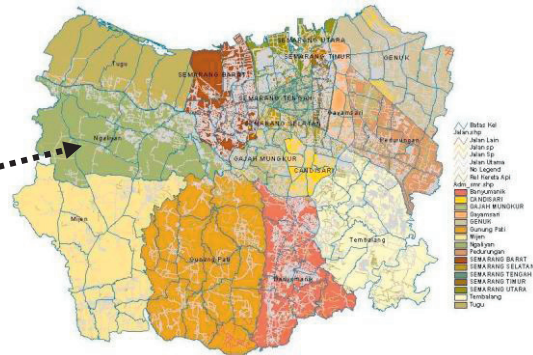


Figure 2: Map of Semarang Municipal Administrative area. 2005
Source: Semarang Municipal Planning Development Board

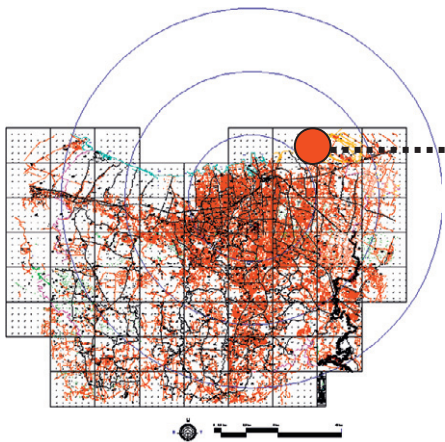


Figure3: Locus of the research
Source: Semarang Municipal Planning Development Board.

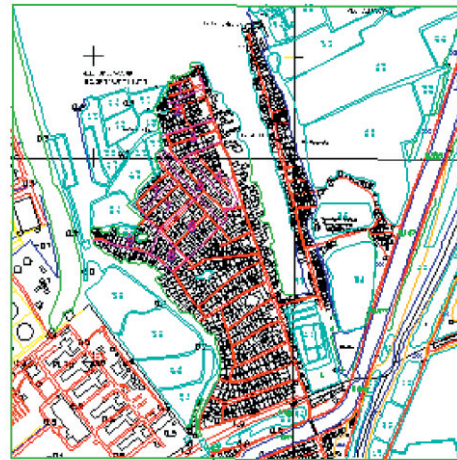


Figure 4: Map of Kelurahan TambakMulyo
Source: Semarang Municipal Planning Development Board

At the initial phase of the fisherman settlement growth, its physical configuration could be classified as an un-planned settlement. The fisherman settlement configuration is characterized by parallel routes, with double access (front and rear). Front is a direct access from the sea/river and rear is an access from the local road. This was a spatial practice that was familiar used on the vast land.

In 1970s fish production had fast growth in line with the population growth. Buying and selling transaction can no longer be done in front of the houses, but taken place on the river side. The growing trading activities have stimulated the emergence of a fish market. After traditional trading process running for several years then the municipal government build fish auction building next to the fish market. The presence of fish auction corroborates area surrounding becomes the neighborhood center.

Even though the numbers of new dweller are increased, the initial spatial pattern is not transformed significantly. The double access houses are not longer possible exist (Figure.5b). Most of the single access houses facing towards the street. On the early 1980s the municipal government control and

improve the basic environment infrastructure, such as pathways, sewer, and garbage disposal. Afterward the neighborhood has a better growth and categorized as a planned settlement. In early 1990s because of a great number of new migrants come and the weakness of law enforcement, the other side of the riverside was inhabited illegally by fisherman coming from other region (Figure.5c).

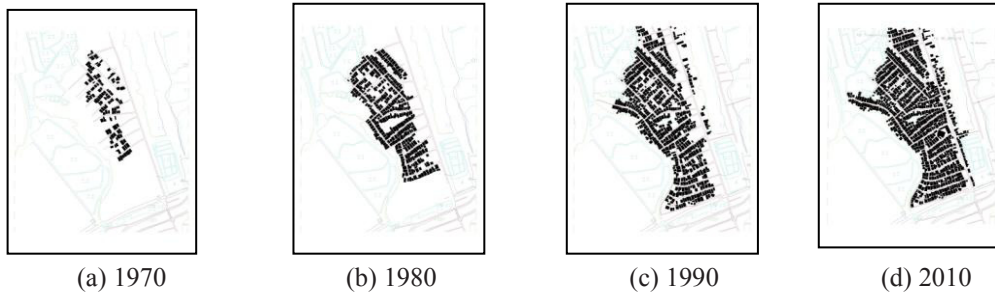


Fig.5a, b, c, d.: Figure-ground diagram of the growth's fisherman settlement, 1970 -2010
Source: Setioko.*et al.* 2012 [4]

Due to the new regulation the fisherman were under compulsion has to sell their fish through fish auction. The fast growth of settlements on the riverbank and new regulation triggers illegal fish trade. From the fisherman point of view selling fish through fish auction perceived less getting gain. Illegal trading fish conducted on riverside increased. For several months the local government could no longer control it. The longer the illegal fish trade became more frequent and the amounts of transactions are increasing. In an effort to force fisherman sell their fish at the fish auction and anticipate the tidal flood inundated the building; municipal government closed the old fish auction building and build new ones. However, fisherman and fish trader are reluctant to use it. Trading activity is still being done along the riverside and around the fish market.

In 2011, municipal governments realized the wrong policy to move the fish auction building to other location and separated with the fish market. The building eventually was revitalized (Figure: 5d). The activities conducted in this building become the impetus to attract people back to the previous neighborhood centre that are located in its surrounding area.

3. Fisherman settlement setting in Semarang Coastal Area

The discussion about settlement setting requires focus on an understanding and mutual interaction between man and environment. Referring to Rapoport (1977) [3], built environment can be seen as a container of settlement setting. Generally speaking fisherman settlement setting can be interpreted as a spatial configuration which acts as urban container and serves as the place for the activities associated with the traditional life of fisherman.

According to Alain Bertaud (2004), setting of a built environment depends on its spatial structure. The spatial structure of a built environment can be defined by two complementary components: [1] the spatial distribution of population and [2] the pattern of trips. The spatial distribution of population is therefore a static representation of the city when its inhabitants are at home. The pattern of trips is a schematic view of the complex trajectories that these same people will follow during the time they are not at home. The settlement setting also correlated with urban activity system which is different in each group. Different groups, have different setting.

Based on the theory that has been discussed before, it can be concluded that the settlement setting should consider three aspects: Physical setting, Spatial setting and the Trip pattern of inhabitants.

[1] Orientation, shape and structure of the building are an essential element in a physical setting. Based on the field observations we did not encounter the house or building changed the orientation or model, in order to adjust to the tidal flood. Only a few inhabitants change their house into two storey's building. To overcome the tidal flood, most of the inhabitants with a very simple way elevate the local roads and the surface of their house.

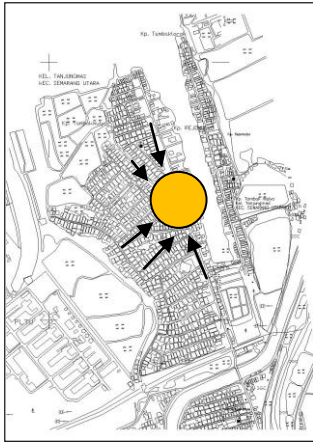


Fig.6: Centre of Gravity
Source: Setioko.*et al.*2012



Fish traditional market



Activities in fish auction building



Fig.7: Figure-ground of Neighbourhood Centre
Source: Setioko.*et al.*2012



Traditional Jetty

[2] Population distribution and building density are essential element of spatial setting.

From a spatial distribution point of view, the population density and building density of the fisherman settlements increased, but the spatial configuration did not change significantly. The group of fisherman settlement is still dominates the north part area and on the riverside, while the mixed groups (fisherman and non fisherman) inhabit in the South part.

3] The trip pattern will reflect the inhabitant's activity. Since the initial fisherman settlement growth, the area around the fish market and fish auction building becomes neighborhood centre, and lately it is grown into social place (Figure.6) .The inhabitant's activities either in the morning, afternoon and evening took place in this area. In the point of view of inhabitant's activities throughout the fisherman

settlement, neighborhood centers also became centers of gravity. In the year of 2008 the fish auction building was built on the new area, far away from the fisherman settlement. In this area the tidal flood expected could not inundated.

The new building had never been used by the fisherman and the fish traders although had a better facilities. The new activity was not emerged on the new area so the trip pattern remains as before.

4. Conclusion

A series of analysis of the physical setting and spatial setting has successfully revealed the phenomenon of the unaffected urban setting in the fisherman settlements of Semarang coastal area. This study could improve our understanding of how the urban setting that has been established for a long time could withstand changes over the activity system of the society. This research has revealed the fact that the spatial setting is unaffected if the spatial structure remain unchanged. In the case of relocation of fish auction building, the building only is viewed as a city's artifact and does not viewed as a part of the centre of social activity [1]. Since the initial phase of fisherman settlement, the fish auction building had acted as a "center of gravity". Dismantling and removing one element of the main activities will affect the balance and the existence of spatial structure (Figure.7).

In the view point of physical configuration the spatial structure, the fisherman settlement remains relatively unchanged although lately inundated by tidal flood. The centre of gravity more than 30 years still remains exists on surrounding fish auction and fish market. Spatial characteristic of the fisherman settlement in TambakMulyo can be described as the initial manifestations of the spatial-symbolic systems which are depend on habit and custom. Fisherman settlement produces its own space of their social life. Therefore it has discrete spatial setting.

This illustration proved that spatial structures have an important impact on the configuration of built environment. Base on various analyzes that have been made lead to the conclusion that the tidal flood did not affect significantly to the settlement setting. The facts that the level of tidal flood mean surface becomes higher and inundation area expand, affect the economic activities. But it seem not destroy particular forms of family organization and disrupt social network. Tidal flood by most inhabitants no longer regarded as a "disaster" but considered a "disorder" that has temporary characteristic.

5. Challenges for sustainable urban growth in Semarang

In the global context, sustainable urban growth has become a strategic issue. As mentioned in the previous chapter sustainable urban growth relates to the assurance for the next generation to meet their own needs, by managing current development and resource use. Thus every urban policy and urban strategy should refer to the goals of sustainable urban growth, to make a city able to accommodate the change process in accordance with habit, custom and activities of its inhabitants. However the municipal government of Semarang, currently still does not demonstrate proper policy and strategy to facilitate the basic need of urban growth, especially on the coastal areas.

How policy and strategy of Semarang urban growth able to accommodate the needs of its inhabitants, it is becomes a challenge for Semarang. Currently the urban growth policy which is done without public participation approach, thus it is estimated impossible able to meet the needs of inhabitants. Due to the weakness in law enforcement of the municipal government, using the persuasive approach becomes a feasible approach.

The phenomena of unaffected settlement growth ensure do not impede the economic development and without causing damage to the environment. Therefore it is strongly associated with urban policies and strategies which lead to the sustainable urban growth. Because of the strong impact of the change spatial

structure on its physical environmental performance, urban planners and designers should constantly monitor its evolution. The policy of Semarang's growth should be synchronized with sustainability issues in its effort to establish a livable and sustainable city.

References

- [1] Madanipour, A. *Design of Urban Space-An inquiry into a Socio-Spatial Process*. John Wiley & Sons Ltd, England. 1996
- [2] Matthew C, et al. Public places – Urban space. *The Dimensions of Urban Design*. Architectural Press.USA. 2003.
- [3] Rapoport A. *Human Aspect of Urban Form-Towards a Man-Environment Approach to Urban Form and Design*. Pergamon Press Ltd., Headington Hill Hall, Oxford, England. 1997
- [4] Setioko B, et al. Conceptual spatial model of coastal settlement in urbanizing area, Case Study on Fisherman Settlement, Tambak Mulyo-Semarang City. *International Journal on Architectural Science*, 2008;**8(3)**:60-66.
- [5] Sullivan, C. (Eds). *Time-Saver Standards for Urban Design*. The McGraw-Hill Companies, Inc. 2003.