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## Settlement adaptation by reshaping dwellings in the degrading area at Genuk District of Semarang City, Indonesia

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### Abstract

Research area is located in Genuk District, the North part of Semarang city, this area was degraded due to inadequate environmental support capacity. It is polluted, regularly flooded, and become worse due to land subsidence. However, people are still willing and interested to settle here. They perform varieties of adaptation to sustain their existence. This location does have a very good economical value. This paper revealed the adjustment they have made in addressing the environmental conditions. This research, approach emphasizing that living is a cultural process, a home is a place to socialize. The strategy used in this study is carried out through a survey or observation methods, conducted with the direct observation.

Result obtained that main function of the house is a place for dwellers to socialize. Next priority is that the house should be able to meet the security and comfort needs, marked by changes in the personal spaces such as bedrooms and bathrooms.

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### 1. Introduction

When we meet Semarang people, normally that would be a topic of conversation was about the flood, because Semarang is regularly flooded, especially tidal type. Semarang has been known for its flood, namely through Javanese song composed by Andjar Any in 1970, and the title is Jangkrik Genggong. History of flooding in the city

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of Semarang has occurred since the year 1913. Bodjong road, now known as Jalan Pemuda, which is the protocol also flooded those times. The great flood that occurred in 1990 killed 86 people. The west canal levee breached, approximately USD \$950,000 loss. Nearly this last century, people in Semarang are forced to live with floods during rainy or dry season.

Semarang is a city that consists of lowlands in north and hilly area in south, 350 meters above sea level. During Dutch colonial era, they built flood control system: West Flood Canal (BKB) in 1892 and the East Flood Canal (BKT) in 1900. Besides the water flows from upper part of Semarang every rainy season, southern part also suffered from tidal flood once in two months.

There are multiple processes underlying seawater overflow in informal settlements. For example, various meteorological and geological conditions such as storms and land subsidence can be considerable factors (Chaussard et al., 2013). Among highly significant permanent factors are gravitational forces exerted by the Sun, the Moon and the Earth.

Rising oceanic tide is the elevation of ocean or sea water level as a result of gravitational pull of both the Sun and the Moon. According to Day (2006), the highest tide occurs when the Sun, the Moon and the Earth are situated in a straight line and the lowest tide takes place when the Sun and the Moon formed a 90 degrees angle with the Earth at the central axis.

The distance between the Earth and the Moon, as with the distance between the Earth and the Sun, periodically changes during a year. Therefore, ocean surface may rise relatively higher at certain time of the year and lower at other times. The highest rise of oceanic tide takes place during a full moon, where the Earth is situated exactly between the Sun and the Moon, and at the end/beginning of the month (crescent moon). It is during those times that Semarang is inundated. This sort of oceanic tide has a significant impact for settlements near coastal areas. Global data suggest that in 2000 approximately 634 million people in the world were living in settlements near coastal areas and their vicinity; 360 millions among them were located in urban areas (Bicknell et al., 2009, p. 58).

A total of 466 million people are living in or near coastal zones in Asia and 238 million of them, or roughly around 50%, are living in urban coastal zones with a total area of 881 thousand square kilometers. Data from The World Bank (Bicknell et al., 2009; Bigio, 2003) about population in coastal zones, which are highly affected by rising tide, classified by their income.

Indonesia places itself among countries with large numbers of people directly affected by oceanic tides. China sits on the top with 143.880 million people and is followed by India with 63.188 million people, Bangladesh with 62.524 million people, Vietnam with 43.051 million people and Indonesia with 41.610 million people (Bicknell et al., 2009). From more than 41 million souls affected by seasonal oceanic tides, most of them are population in urban coastal area settlements.

The effects of rising seawater level in coastal area settlements are often made worse by the presence of relative rise of sea level caused by land subsidence. Semarang has areas suffering from land subsidence with an overall average annual subsidence rate of up to 8-10 cm. These lands are located in coastal areas, making them highly susceptible towards the harm imposed by both the gravitational and relative rising tide, and are where a substantial portion of the industrial activity of the city takes place. One of the locations suffering from environmental degradation caused by sea-water overflow is located in the eastern part of the city, a subdistrict called Genuk. Genuk is an important area of the city in that it houses a large portion of Semarang's industrial estates and considerable amount of land for housing areas. The district's land elevation angle is rather low (only an average of 5 degrees). It is also the location of an important Trans-Java main road connecting Semarang to Surabaya. It is easy to see that Genuk is regularly inundated with sea water overflow during high tides. Despite the apparent deterioration of the environment, the district does not seem to lose its appeal to new occupants. Pedurungan, a neighbourhood to which Genuk belongs, has the most rapid rate of population growth from migration. Genuk particularly has a high rate of population growth with three new arrivals for every one departure. It would seem that the environment deterioration by constant land subsidence and regular twice-a-month sea water overflow do not discourage new occupants from settling into Genuk.

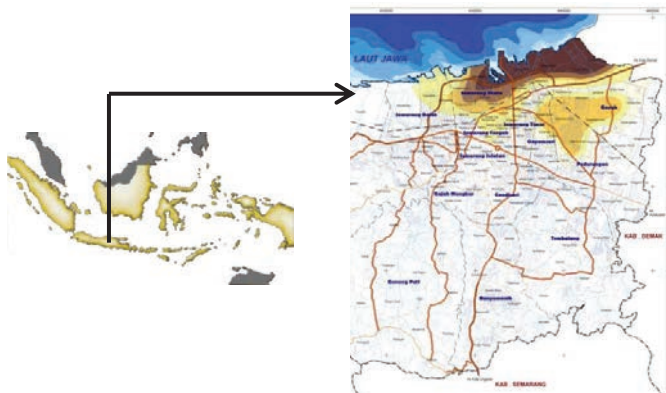


Fig. 1. Semarang INDONESIA Land Subsidence (Bappeda Jateng, 2010)

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