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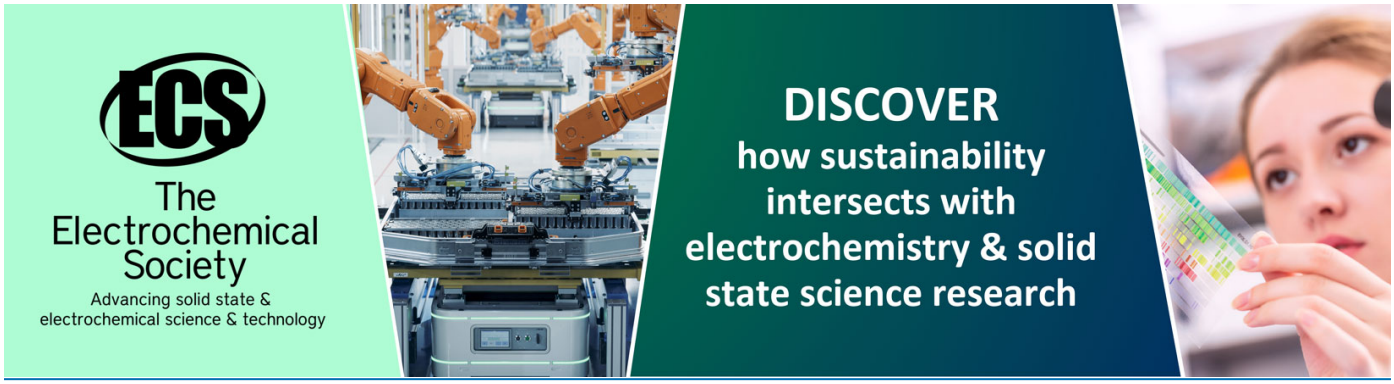


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# Local Wisdom in Malay Kampung Semarang as Representatives of Smart Environment

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**Abstract**. One of the smart city indicators is a smart environment. Smart environment is a setting which can be a catalyst for its citizens, support them to be aware of a local engagement in managing their existing natural resources. The local engagement is not only shaped by formal strategies, but also by local wisdom. Local wisdom is a community understanding that is used as a reference in daily life activities. Based on its history, the Malay Kampong (Kampung Melayu) Semarang which was formed in 1743 has strong local wisdom as a basis for arranging the district. Settlement patterns based on ethnicity and culture, building patterns that are sensitive to the floods and tidal ranges, multicultural-based district, make this region able to survive hundreds of years to maintain its existence and can be a representation of the smart multicultural environment in Semarang. The current environmental degradation in this area is the basis for the research. Is local wisdom still maintained here? Or is there a shifting meaning of local wisdom at this time? This study aims to explore the role of local wisdom of Malay Kampung Semarang as a representation of a smart environment. This study combines quantitative and qualitative approaches. To achieve this goal, it is necessary to identify the influence of local wisdom in Malay Kampung Semarang on flood resilience and tidal. The analysis of the smart environment model is based on the interaction of wisdom and influence on the district arrangement. The result of the study shows that local wisdom is an effort to improve the living place to be more sustainable in the event of flooding and tidal. Efforts made to elevate the floor of the building, height of buildings, elevate the street, build houses with a stage model, and make the second floor of the house represent a smart environment in the form of sustainable urban planning in the Malay Kampung Semarang.

**Keywords**: Local Wisdom, Local Engagement, Smart Environment

## 1. Introduction

Floods and tidal have become a threat of disaster for the city of Semarang. Handling floods and tidal has become a priority as stated in mission III of Semarang Mid-term Regional Development Plan 2016-2021. With the aim of the mission is to realize a strong, productive and sustainable city development. Moreover, the Land subsidence in some parts of the Semarang city and the location on the edge of the northern coast of Central Java make the city of Semarang facing flood and tidal.

Strategic areas are usually prone to changes in land use, for example in cities along the post highway, or located in disaster-prone areas such as in Banda Aceh, Padang, Kotagede, north coast of Jakarta and Semarang. In "The geography of urban disaster" it is mentioned that colonial cities are as

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disaster-prone cities. Cultural heritage areas (urban heritage) are usually the core areas forming city structures, layers and the history of the city (based on the theory of Urban Tissue, Athens Charter 1943, New Urbanism Charter 1993). Flood and tidal disasters have an impact on cultural heritage sites. The existence of floods and tidal can lead to coastal erosion, seawater intrusion into artifacts and locations, permanent immersion in lowland areas, population migration, disruption of community activities, and result in the loss of rituals and social interaction of the community.

Semarang City has decided to implement smart city as a priority in the Mid-Term Regional Development Plan (RPJMD). One of the smart city applications is smart environment. Smart environment is a setting that can catalyze its citizens, support them to be aware of local engagement in managing their existing natural resources. The local engagement is not only shaped by formal strategies, but also by local wisdom. Local wisdom is a community understanding that is used as a reference in daily life activities. According to Rukmana (2010) Planning in Indonesia as a developing country, needs greater and more explicit reliance on local wisdom rather than end-rationality [1].

Malay Kampung is located in North Semarang District. This Kampung was established when Malay and Banjar traders landed in Semarang. Malay Kampung has been inhabited since in 1743 [2,3]. Since most people who inhabit the area are Malays, it is called Malay Kampung. At that time there were places in the old kampung to land ships and boats carrying merchandise, so it was not surprising that there was a section called Malay Darat. Its strategic location attracts people to stay there too. So that currently not only Malay people who live in the Malay Kampung but have become a multicultural region.

Currently, the Malay Kampung area is a cultural heritage area in Semarang. The uniqueness of strong local wisdom as a basis for regulating the area, settlement patterns based on ethnicity and culture, building patterns that are sensitive to flooding and tidal reach, and now have been strengthened by the plan of Malay Kampung Environmental Management. However, like other northern coastal settlements, the region has many problems, such as the problem of continuous flooding and the unhealthy living conditions. In addition, many old buildings were damaged and drowned.

Various efforts were made by the community to maintain their existence and become a representative of the smart multicultural environment in Semarang. Environmental degradation is the basis of this study. The issue arises is local wisdom still maintained here? Or is there a shift in local wisdom currently? The stages of analysis were carried out to achieve the objectives, namely: 1. Identify local wisdom as disaster resilience of flood and tidal. 2. Analyze smart environmental models that occur based on the interaction of local wisdom and their influence on district regulation.

## 2. Literature Review

### *2.1 Smart City Concept*

Smart City is defined as a city that is able to use human resource, social capital, and modern telecommunications infrastructure (Information and Communication Technology) to realize sustainable economic growth and high quality of life, with source management wise power through community-based government participation [4]. Meanwhile, According to Cohen (2013) Smart city is an approach that enhances integration and efficiency in conducting city operations by improving the quality of life and economy of its population [5]. Cohen emphasizes the environmental aspects by collaborating with ICT to save on the use of resources, energy, improve service quality and live the population and support innovation and economics that are environmentally friendly. Smart City is a leading city in the economy, human resources, government, mobility, environment, and community life, which is built entirely smart, independent and has awareness from the people. There are six main key indicators in the form of implementing smart cities are Smart economy, Smart people, Smart governance, Smart mobility, Smart environment, Smart living [6]:

The above main indicators are explained by Cohen (2013) through this following diagram (Figure 1):

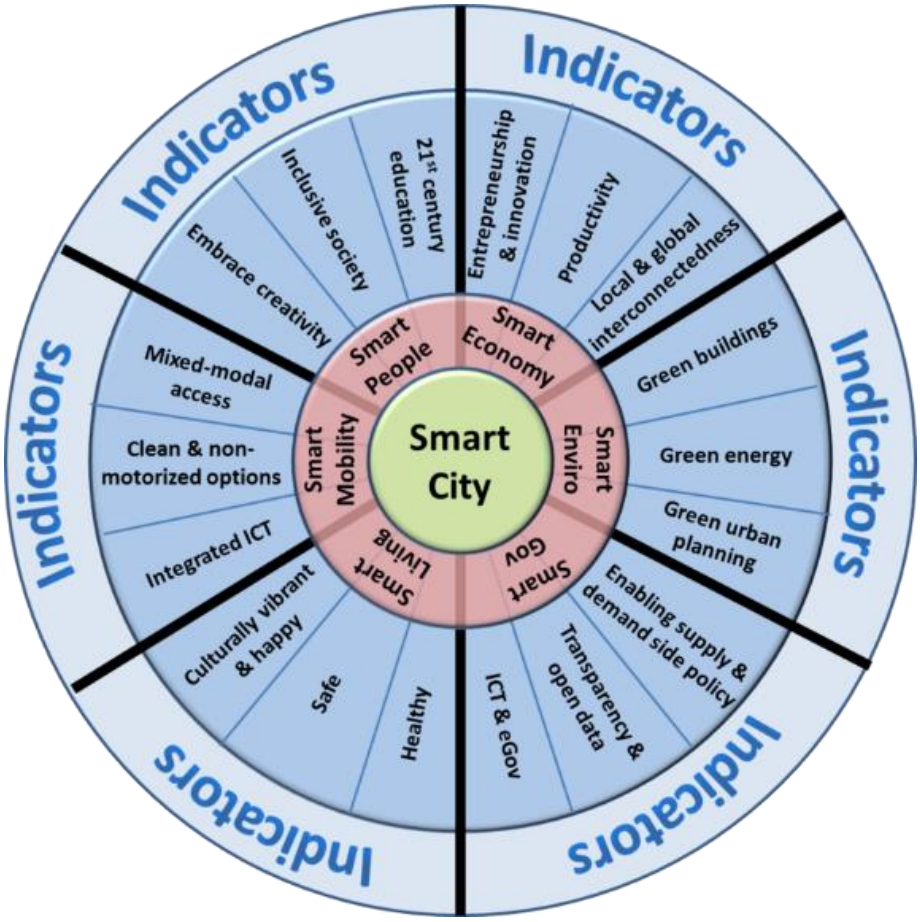


**Figure 1.** Smart City Wheels Cohen [7]

Smart city is one of the planning concepts used to solve urban problems that are getting worse with the increasing of population levels. Excessive use of natural resources and low quality of human resources. Declining environmental quality due to continuous development is carried out without considering the environment. The concept of smart city planning prioritizes public services and the use of technology to overcome problems that occur in cities. Using these six main indicators to overcome the city becomes more complex. The problem of each developing city is in the main indicator.

### *2.2 Smart Environment*

Smart environment is one of the main indicators of implementation in smart city. According to Hollands in Rachmawati & Pertiwi (2017), implementing Smart environment can be focused on natural environment and ecological implication on urban growth and development [8]. Therefore, smart environment can be viewed from attractive natural conditions (climate, availability of green open space, etc.), pollution, resource management, and also efforts towards environmental [6].

Creating a smart environment can be supported by a smart application that regulates policies in environmental management[9]. For example for measuring, controlling and monitoring natural conditions, renovating buildings and facilities, monitoring the use of fossil and renewable energy smartly. In the Cohen Smart City Boyd diagram, the implementation of Smart Environment to be sustainable can be applied in the scope of Green Building, Green Energy, and Green Urban Planning. This is the indicators table developed by Cohen (2014) in the Yogyakarta City Road Map towards Smart City by the PSPPR UGM Team (2016) (Table 1):

**Table 1.** Indicator Development of Smart Environment [10]

| Dimension | Working Area | Indicators |
|---|---|---|
| Smart Environment | Smart Building | Sustainability-certified Buildings |
| | | Smart Homes |
| | Resources Management | Energy |
| | | Carbon Footprint |
| | | Air Quality |
| | | Waste Generation |
| | | Water Consumption |
| | Sustainable Urban Planning | Climate Resilience Planning |
| | | Density |
| | | Green Space per capita |

There are many indicators are used to create a smart environment. In this study smart environment of the Malay Kampung can be identified based on existing indicators and later seen how local wisdom in a multicultural environment in the Malay Kampung faces natural conditions that cause floods and tidals in the Malay Kampung area.

## 3. Methods

This study aims to identify local wisdom in Malay Kampung as a representative form of smart environment. Based on these objectives, this study used a combination of quantitative and qualitative method approaches. The quantitative method was used to identify the local wisdom of the Malay Kampung through facing flood and tidal disasters through the facts in the field and their influence in structuring buildings and the environment in the Malay Kampung. Data from the questionnaire containing questions about the condition of the village before, after and when the disaster occurred. Then qualitative method was used to identify the smart environment model that is carried out by the community as a form of interaction of local wisdom and its influence in its regional settings. The analysis presented is based on the results of in-depth interviews with several communities that still survive in the Malay Kampung area. Therefore, with the existence of kampung condition data and statements from Malay Kampung community, it is known that the smart environment that has been cultivated by Malay Kampung community.

## 4. Local Wisdom in Malay kampung

Malay Kampung (Figure 2) is one of the old kampung in Dadapsari sub-district and a small part of Kuningan sub-district, North Semarang Regency. Malay Kampung was originally the entrance and landing point of merchant ships belonging to Arabs, Malays and Indians. Traders carry out trade activities and then live and settle in the area because of its strategic location. From there, the Malay Kampung residential area emerged around 1743.

In the beginning, Malay Kampung was dominated by ethnic Malays, but in its development more migrants lived and settled so that the people in the Malay Kampung were multi-ethnic communities. Not only from ethnic Malays, but also there are ethnic Banjar, Chinese, Arab, Cirebon, Javanese, etc. which then with the existence of ethnic diversity affects the kampung toponym in it such as Kampung Pulo Petekan, Kampung Baru, Peranakan Kampung, Banjar Kampung, Cerbonan Kampung, Kampung Geni, Pencikan Kampung, Kalicilik Kampung, and Kampung Darat. The toponymical of the halls in Malay Kampung is also a local wisdom [11]. Each name of the hall in the Malay Kampung has its own history and it becomes very unique and thick with local nuances.

Malay Kampung is directly limited by Kakap Street in the north, Dorang street in the south, Semarang River in the east, and Petek street in the South. Most of the land in Malay Kampung is used for residential activities and trading activities. The resident activity spread in each area which is marked by the number of kampung which become a place for settling the community. While the majority of trading activities are in the corridor of Layur Street, but even so trade activities can also be found in the middle of residential areas. Most of the people in Malay Kampung work as laborers and traders so that they are categorized into middle to lower community.

**Figure 2.** Kampung Delineation in Malay Kampung Area [12]

The area in Malay Kampung is vulnerable to flooding and tidal. In general, the height of the puddle is 40-60 cm with duration of approximately 2-4 days. The flood is usually caused by the overflow of water in Semarang River which is due to rain descending with a high enough intensity, the Semarang River is no longer able to accommodate the volume of water so that it would overflow to the residential area. In addition, it is worsened by poor drainage conditions so that it will ease the increase in existing water. However, in some area like in Layur Street, Kakap Street and Petek Street are not only flooded but also often tidal floods. Usually tidal occurs every day with a short period, starting in the afternoon to night or day to night. This happens because as previously explained that Malay

Kampung is below the sea level so that it becomes prone to inundation when sea water begins to install. From this description, it can be seen that throughout the Malay Kampung region is the main zone of flooding, which is the most vulnerable and potentially affected by annual flooding and tidal.

The occurrence of floods and tidal that occur in Malay Kampung not only impact on physical aspects, but also the social and economic conditions of the community. The floods and tidal affect the resilience and sustainability of these three aspects in everyday life. Waterlogged residential conditions will certainly disrupt the social and economic activities of the community. Existing climate change results in a form of climate resilience from existing historical buildings. The following is a form of resilience carried out by the Malay Kampung community in facing floods and tidal (Table 2).

**Table 2** Forms of Disaster Resilience in Malay Kampung [12] (rewritten)

| Disaster Phenomenon | Location | Response | Adaptation efforts |
|---|---|---|---|
| Annual flood with height of 40-60 cm and the duration is 3-4 days | Kp. Darat Nipah<br>Kp. Pulo Petekan<br>Kp. Baru<br>Kp. Banjar<br>Kp. Peranakan<br>Kp. Cerbenon | Unable to survive, not a few who move to another place (evacuate) and tend to stop working for a while | • Elevated the street<br>• Backfill the building |
| Annual flood with height of 40-60 cm and the duration is 2-3 days | Kp. Geni<br>Kp. Bedas<br>Kp. Pencikan<br>Kp. Kalicilik<br>Kp.Ngilir | Stay and move as usual | • Elevated the street<br>• Backfill the building<br>• Provided the water pump |
| Annual flood with height of 40-60 cm and the duration is 2-3 days and tidal with daily frequency, inundation duration for approximately half a day | Layur Street<br>Kakap Street<br>Petek Street | There is still activity as usual | • Elevated the street<br>• Backfill the building<br>• Provided the water pump<br>• Construction of talud on the Semarang river |

The physical form of adaptation of the Malay Kampung community towards flood and tidal disasters does not change the local wisdom. The Malay Kampung area survives by transforming house buildings (Figure 3). Worsening buildings, lifting roads and various ways are done by people to survive. In terms of non-physical, the current economy of the people is not just a trader, some people work as laborers and others. In terms of social culture, Malay Kampung are still a kampung with multi ethnicity. The grouping of each ethnic group still survives today, even though there are many newcomers. So, the local wisdom of the Malay Kampung still survives its existence.

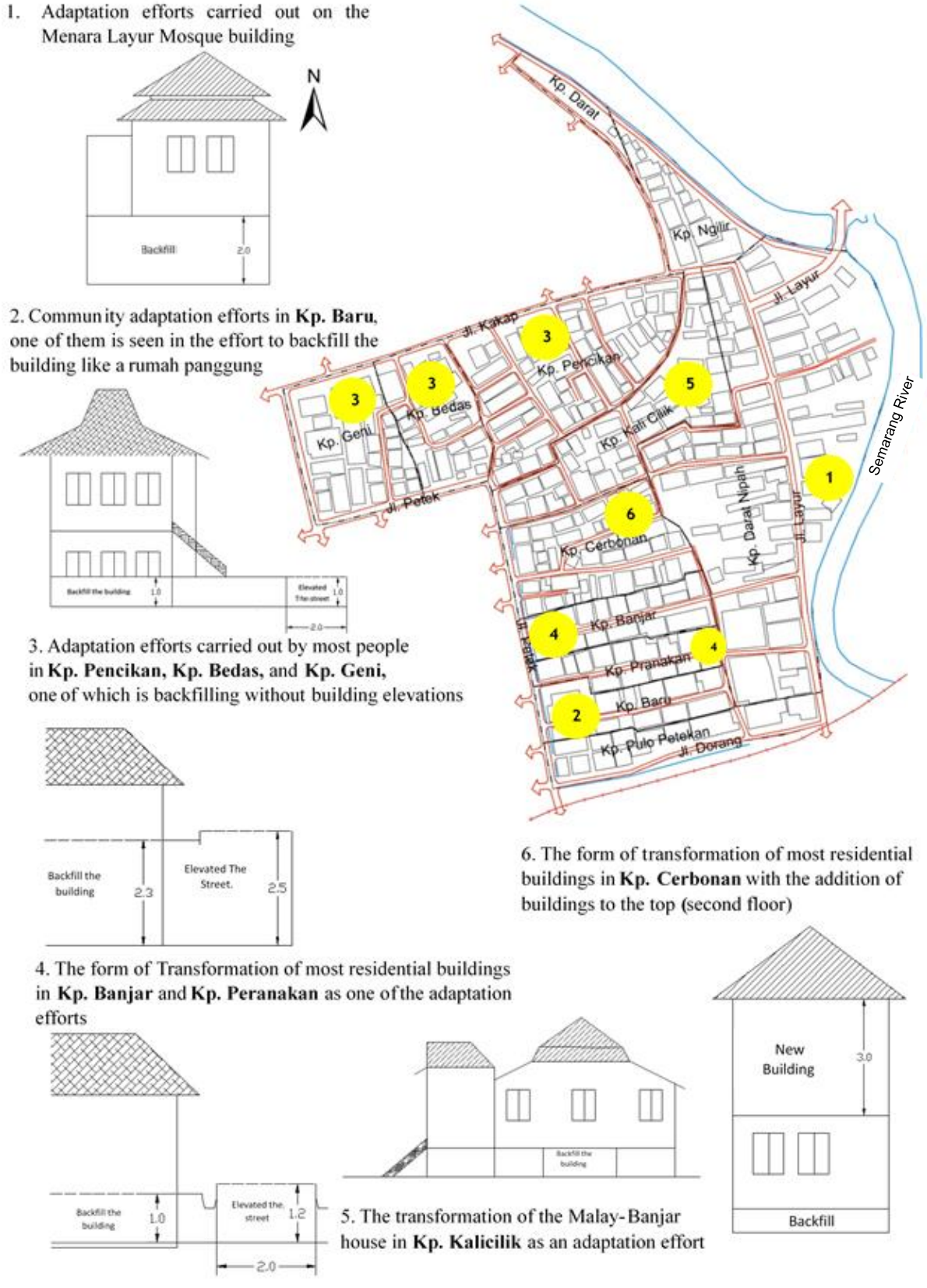


**Figure 3.** Building Transformation in Malay Kampung [13]

## 5. Smart Environment Representative

Smart environment according to Cohen is divided into several indicators that can realize the objectives of the smart environment concept. Creating a smart environment means creating an environment that can provide comfort, sustainability of resources, beauty of physical and non-beautification, for the community and the public. Basically the purpose of smart environment is for a sustainable city.

Malay Kampung, with its floods and tidal problems, can survive to this day and still maintain its existence as a multiethnic old kampung. Some ethnic cultural groups still survive in the Malay Kampung area. Although there are many newcomers, the location where people live is still in groups based on their ethnicity.

Community in Malay Kampung has various efforts for the sustainability and comfort staying there. The existence of cultural heritage in Malay Kampung can still be maintained today by the local community. Various efforts to elevate roads, height of buildings, increase the floor of the building is one of the local wisdom of the Malay Kampung community in an effort to survive the disaster. Smart environment that is carried out by Malay community is clearly seen in the smart building section. The Malay Kampung community strives to change their homes to avoid disaster while still maintaining their cultural characteristics. So it can be said that local wisdom is one of the smart environment support in an area.

Explanation of the smart environment section in Table 3, indicators of resource management in Malay Kampung are same with the other kampung, so there is no unique feature for Malay Kampung. Indicators of sustainable urban planning in terms of climate resilience plans, planning systems carried out by Malay Kampung in the form of incremental planning are not yet comprehensive planning. So that the efforts made by the community are only temporary and if occurrence of a disaster again it will be planned for handling again. Malay Kampung is also an area with a high density so that the availability of open space has not yet reached the per capita requirement standard.

**Table 3** Smart Environment in Malay Kampung

| Dimension | Working Area | Indicators | Condition of Malay Kampung |
|---|---|---|---|
| Smart Environment | Smart Building | Sustainability-certified Buildings | Indigenous people who stay have long lived and still maintain their culture |
| | | Smart Homes | Local wisdom in there with efforts to height of building to avoid disaster |
| | Resources Management | Energy | Management system like in general so there is no different from other kampung |
| | | Carbon Footprint | |
| | | Air Quality | |
| | | Waste Generation | |
| | | Water Consumption | |
| | Sustainable Urban Planning | Climate Resilience Planning | Local wisdom is still incremental planning and not comprehensive planning |
| | | Density | High Density |
| | | Green Space per capita | Per capita needs are not enough because of high density |

## 6. Conclusion

Local wisdom of Malay Kampong has its own adaptation to the problems it has. Malay village adaptations are representative of Smart environment dominate in Smart building. That caused by various efforts to elevate roads, height of buildings, increase the floor of the building to survive the disaster. The efforts made did not eliminate the existence of Multi ethnic cultures in there. This was proven by existence of ethnic cultures still persists to this day. Therefore, it can be said that local wisdom is a factor in the realization of the smart environment, although in Malay Kampung its only be present in the field of smart building as an effort to survive the disaster.

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