



## Towards Liveable Low-cost Rental Flats Development in Jepara's Coastal Area of Java

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### Abstract

The problems in Kyai Mojo Rental Flats in Jepara, Indonesia, are building damages caused by the low-quality construction, weather/climate in coastal areas, and behaviors of occupants of rental flats that do not maintain and comply with regulations. This study aims to analyze the development form of liveable low-cost Rental Flats in Jobokuto, Jepara. This study applies a qualitative method of case study strategy with a single case design type. The validity of the data uses a triangulation approach obtained from a comparison between the results of field observations, interviews, and document review. The results showed that the construction of the Kyai Mojo Rental Flats to become livable could be done by (1) Improving quality through repairs and maintenance by the local government and managers; (2) Adaptation to climate changes that occur in coastal areas by planting vegetation and providing sunshade to minimize the impact of the coastal environment on building damage; and (3) Empowerment of low-cost rental flats occupants in managing and improving environmental quality through socialization.

**Disciplinary:** Architectural Sciences, Facility Management.

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## 1 Introduction

An increase in the urban population causes the need for adequate housing for its residents. Meeting the needs of housing and developing decent and sustainable housing is urban planning issues that need to be addressed immediately (Murbaintoro et al., 2009). Limited land in urban

areas impacts the difficulty of providing proper housing for the community. It increases the number of slum settlements in urban areas, one of which is in coastal regions (Pandelaki et al., 2015). Therefore, the development of low-cost rental flats is an alternative for completing the fulfillment of decent housing needs in urban areas, especially for low-income communities (Regulation of the Public Housing Minister Number 14, 2007), and as an alternative in the alleviation of slums in coastal areas (Damayanti et al., 2014). In this case, the Jepara Regency Government in Central Java, Indonesia, is also carrying out the construction of low-cost rental flats, one of which is the Kyai Mojo Rental Flats, to overcome slum settlements in the coastal area of Jobokuto Village, Jepara Regency. But in its development, Kyai Mojo Rental Flats paid less attention to the characteristics of the location and the impact of the coastal environment on the physical condition of the building a result, the rental flat's environmental conditions became a slum. The government's construction of low-cost rental flats is to reduce slum settlements and improve the quality of life with a good surrounding environment. It provides decent housing for low-income communities. The low-cost rental flats development instead creates a new slum environment that can improve slums in the area (Directorate General of Human Settlements, 2010).

Coastal areas have different characteristics from the others. Coastal areas have high humidity (Aghimien et al., 2018) results in physical damage to buildings in coastal areas more quickly than in other areas. Therefore, adaptation efforts are needed to develop low-cost rental flats in coastal areas to have the resilience to climate change that occurs in coastal areas. Low-cost rental flats development in coastal areas needs to pay attention to location characteristics and coastal environmental impacts (Aghimien et al., 2018) to minimize damage to buildings that make them look seedy and have an improper housing quality. The quality of houses is an important factor in housing provision because it can affect the quality of life for its inhabitants (Damayanti et al., 2014). Besides, everyone has the right to obtain adequate housing (Ministry of Public Works and Human Settlements, 2016). This study aims to analyze the development form of liveable low-cost rental flats in Jobokuto Urban-Village based on location characteristics and environmental impacts for the physical condition of buildings to create liveable low-cost housing in coastal areas.

## 2 Literature Review

### 2.1 Liveable Low-cost Rental Flats

Low-cost Rental Flats based on Ministerial Regulation No. 14/2007 (2007) concerning Low-cost Rental Flats is a multi-story building built in one environment, divided into several sections, structured functionally with each part used separately. Tenure status in the form of rent. The built using the State/Regional Budget functions as a residence. Low-cost rental flats provision is an alternative used to meet the needs of liveable housing, especially for low-income communities (Asian Development Bank, 2013). Low-cost rental flats that are liveable can benefit as a residential unit or support its inhabitants' economic activities equipped with social facilities and public facilities (Ministry of Public Works and Human Settlements, 2016).

According to Winslow and the American Public Health Association (APHA) at the Directorate General of Budget, Ministry of Finance (2015), adequate housing can meet physiological, psychological needs, disease prevention requirements, and accident prevention requirements. Physiological needs are lighting, sufficient space, and avoiding noise. Psychological conditions include the safety and comfort of the environment, ensure individual privacy, and the community's social activities. While the disease prevention requirements can do this by providing clean water, sanitation, waste disposal, and a population density a which is not very high. Meanwhile, accident prevention requirements related to building resilience, vulnerability to disasters such as fire, and others. According to Ministerial Regulation of Public Housing No. 22/Permen/M/2008 (2008) concerning Minimum Service Standards for Provincial and District/City Regional Public Housing explain that livable occupancy is fulfilling: (1) Building safety requirements, namely having a building structure that is per the condition of the land/building; (2) has minimum area adequacy of 7.2 m<sup>2</sup>/ person, as well (3) can guarantee the health of its occupants.

## **2.2 Rental Flats Development in Coastal Area**

The Low-cost rental flats development in the coastal area needs to pay attention to the characteristics of the location and environmental impacts on the coast (Aghimien et al., 2018). It is because coastal areas have ecological conditions that are easily fragile than other regions (Djunaedi & Basuki, 2002). For example, Coastal has air containing salt and high humidity (Aghimien et al., 2018). The salt content in the air in coastal areas can cause physical and chemical damage to building materials in coastal areas (Aghimien et al., 2018). Therefore, to reduce building damage, adaptation needs to be done to develop low-cost rental flats in coastal regions. The social aspects can affect more severe damage to the physical characteristics of the building. Therefore, in developing a place to live, it is necessary to pay attention to physical and social aspects to create liveable housing for the community (Gultom & Sunarti, 2017). Adaptation related to social aspects can do through the followings:

Community empowerment in improving environmental quality, community initiatives need to better-managing environment quality (Sunarti et al., 2014). Commitment of managers and local governments to encourage community participation in maintaining environmental quality (Gultom & Sunarti, 2017) and routine care and maintenance of low-cost rental flats.

Community empowerment can provide socialization, understanding to inhabitants related to environmental impacts in coastal areas, and the importance of maintaining environmental quality to create a liveable environment (Sunarti et al., 2019). On the other hand, weak enforcement of applicable laws and regulations can result in continuous violations by occupants of the flat, leading to environmental problems (Ministry of Public Works and Human Settlements, 2016). Therefore, the development of the rental flats in coastal is paying attention to the physical and aspects of environmental (building quality and climate change/weather). But its social elements relate to the participation of inhabitants in improving the quality of the environment to create liveable low-cost rental flats in coastal areas. Also, improving the quality of a proper

environment requires environmental management that involves all relevant stakeholders from the community, government, and managers. So, environmental quality enhancement and improvement can be sustainable (Sunarti et al., 2014).

### 3 Method

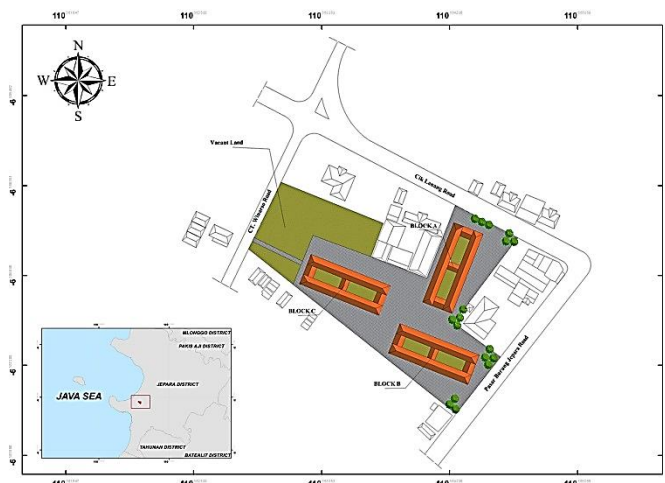
The method used was a qualitative case study strategy with a single case design type (Yin, 2009). A qualitative approach collects information from sources considered important to explain a phenomenon (Arikunto, 2006). The data collection technique uses three data sources, namely: (1) observation of the condition of the low-cost rental flats facilities and infrastructure; (2) Interview with the Head of the Department Public Housing and Settlement Areas of Jepara Regency, the Head of the Housing Sector, the Head of the Technical Implementation Unit of the Kyai Mojo Rental Flats, and the community. The interview was to determine the physical and social impacts of the environment and the socio-economic conditions of occupants in the Kyai Mojo Rental Flats. For the validity of the data using triangulation techniques, by comparing data from interviews with different data source documents and between interviewees (Torrance, 2012).

### 4 Result and Discussion

#### 4.1 Profile of Kyai Mojo Rental Flats, Jobokuto Urban-Village

Kyai Mojo Rental Flats is in a coastal area located on the northern part of Java Island, Central Java Province, precisely on Kyai Mojo Street, Jobokuto Urban-Village, Jepara District, Jepara Regency (Figures 1 and 2). Jobokuto is directly adjacent to the Kali Wisu, dividing Jobokuto Urban-Village and Ujungbatu Urban-Village and directly borders the Java Sea. The distance between Kyai Mojo Rental Flats and Kali Wisu is more than 200 meters, while to the lip of the Java Sea coast is more than 700 meters. Land use around the rental flats is mostly slums, ponds, and swamps.

Kyai Mojo Rental Flats consists of three Twin Blocks, Block A, Block B, and Block C (Figures 1 & 2). Each block consists of 5 floors, with the 1st floor intended for elderly and disabled housing and commercial/business areas and 2nd to 5th floors used as dwellings. The floor area of each flat housing unit is 24 m<sup>2</sup> consisting of one living room, one bedroom, one bathroom, one kitchen, and one place to dry clothes (clothesline) with room conditions (Figure 3).



**Figure 1:** Site plan of Kyai Mojo Rental Flats (processed results of Google Earth imagery map data, 2020). (Geolocation -6.5883292,110.6595861).



Block A

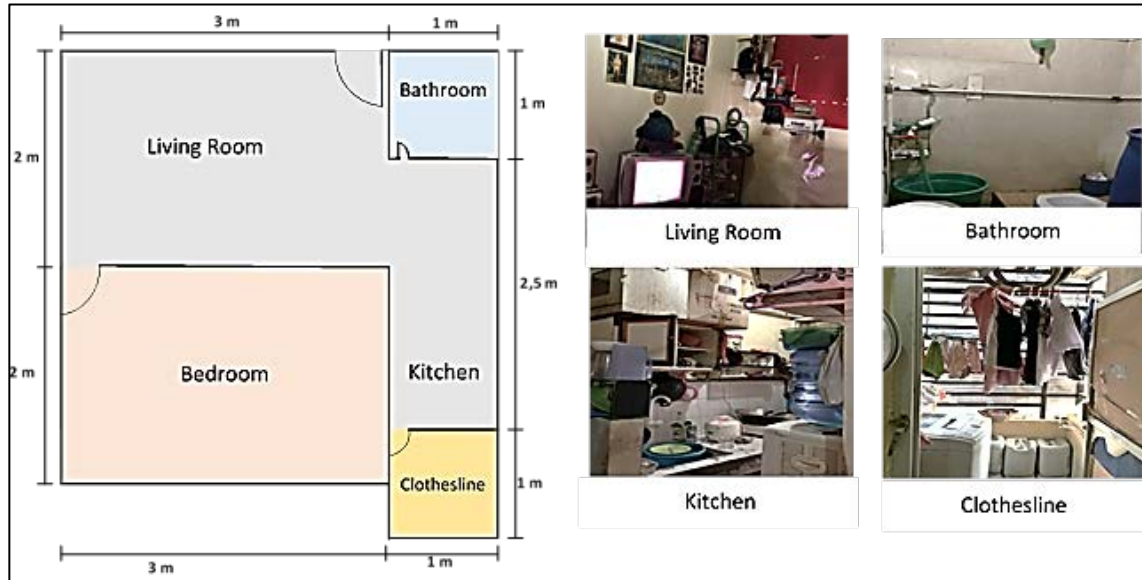


Block B



Block C

**Figure 2.** The Building Condition of Kyai Mojo Rental Flats



**Figure 3:** The residential unit condition of Kyai Mojo Rental Flats.

Kyai Mojo Rental Flats development is carried out by the Directorate General of Cipta Karya of Jepara Regency for slum communities in the coastal areas of Jobokuto Urban-Village, as an alternative effort to overcome the problems of slums in the coast of Jepara Regency. Kyai Mojo Rental Flats is managed directly by the Technical Implementing Unit of the Simple Rental Flats Management Office and Special Rent Flats of the Jepara Regency. Based on the results of an interview with the manager of Kyai Mojo Rental Flats, the requirements to apply for rent in Kyai Mojo Rental Flats are for native Jepara, married, do not have a house, have a financially unable statement from the urban-village government, have a Resident Identity Card and Family Card. Based on these needs, as many as 240 families live in the Kyai Mojo Rental Flats, consisting of 91 in block A, 70 in block B, and 79 in block C, which Jobokuto Ujung Batu Urban-Village dominates. The occupants of low-cost rental flats are predominantly fishermen and traders/ entrepreneurs. For more details about the monthly rental price for each unit and each floor, see Table 1.

The maximum rental period for Kyai Mojo Rental Flats is five years. However, in reality, the ownership status of rental flats seems to be private flats because occupants can extend it without a time limit. This is caused by the low economic level of occupants and the comfort factor of living in rental flats, so they do not want to move or try to be independent of having a permanent residence. Therefore, the purpose of the procurement of Rental Flats is as an intermediate dwelling until the dwellers can independently buy and have liveable housing.

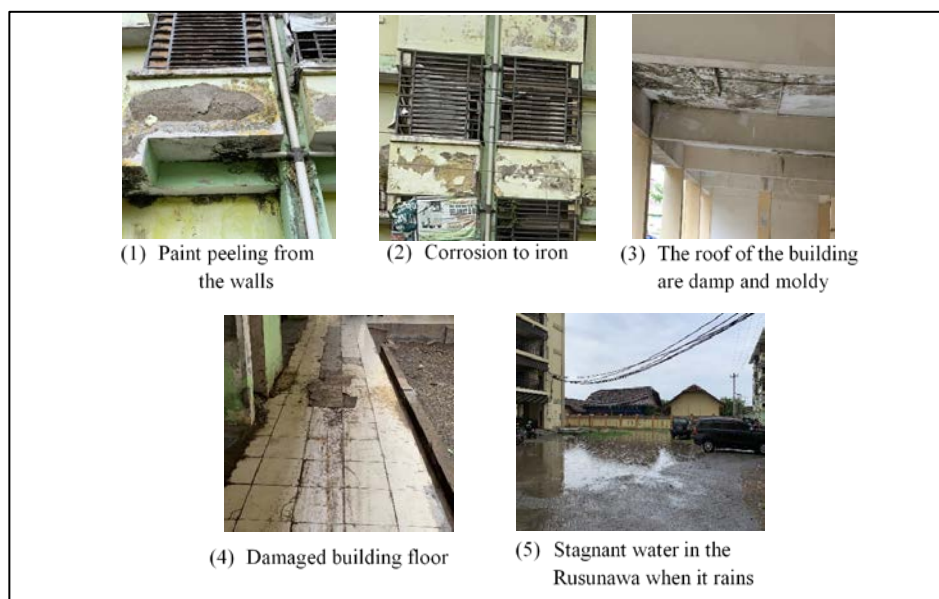
**Table 1: Unit and Rental Price Details of Kyai Mojo Rental Flats.**

Source: Department of Public Housing and Settlement Areas of Jepara Regency (2018)

Twin Block	Number of Floors	Type	Number of Units		Rental Price	Income
A	Five (5) floors	24 m <sup>2</sup>	1 <sup>st</sup> floor	3	Rp 190.000/ mth Rp 165.000/ mth (disabled, elderly)	Rp 570.000/mth
			2 <sup>nd</sup> floor	24	Rp 165.000/ mth	Rp 3.960.000/mth
			3 <sup>rd</sup> floor	24	Rp 145.000/ mth	Rp 3.480.000/mth
			4 <sup>th</sup> floor	24	Rp 130.000/ mth	Rp 3.120.000/mth
			5 <sup>th</sup> floor	24	Rp 115.000/ mth	Rp 2.760.000/mth
B	Five (5) floors	24 m <sup>2</sup>	1 <sup>st</sup> floor	3	Rp 190.000/ mth Rp 165.000/ mth (disabled, elderly)	Rp 570.000/mth
			2 <sup>nd</sup> floor	24	Rp 165.000/ mth	Rp 3.960.000/mth
			3 <sup>rd</sup> floor	24	Rp 145.000/ mth	Rp 3.480.000/mth
			4 <sup>th</sup> floor	24	Rp 130.000/ mth	Rp 3.120.000/mth
			5 <sup>th</sup> floor	24	Rp 115.000/ mth	Rp 2.760.000/mth
C	Five (5) floors	24 m <sup>2</sup>	1 <sup>st</sup> floor	3	Rp 190.000/ mth Rp 165.000/ mth (disabled, elderly)	Rp 570.000/mth
			2 <sup>nd</sup> floor	24	Rp 165.000/ mth	Rp 3.960.000/mth
			3 <sup>rd</sup> floor	24	Rp 145.000/ mth	Rp 3.480.000/mth
			4 <sup>th</sup> floor	24	Rp 130.000/ mth	Rp 3.120.000/mth
			5 <sup>th</sup> floor	24	Rp 115.000/ mth	Rp 2.760.000/mth
Total			297		Rp 41.640.000/mth	

## 4.2 Problem Analysis in Kyai Mojo Rental Flats

Kyai Mojo Rental Flats is a residence located on a coast that has different characteristics from other areas. Coastal areas have air with high salt content, and high humidity (Aghimien et al., 2018) can impact the physical condition of buildings in coastal areas. This air content can accelerate the physical damage to buildings (Aghimien et al., 2018).



**Figure 4: Problems of physical conditions and environmental quality in the Kyai Mojo Rental Flats.**

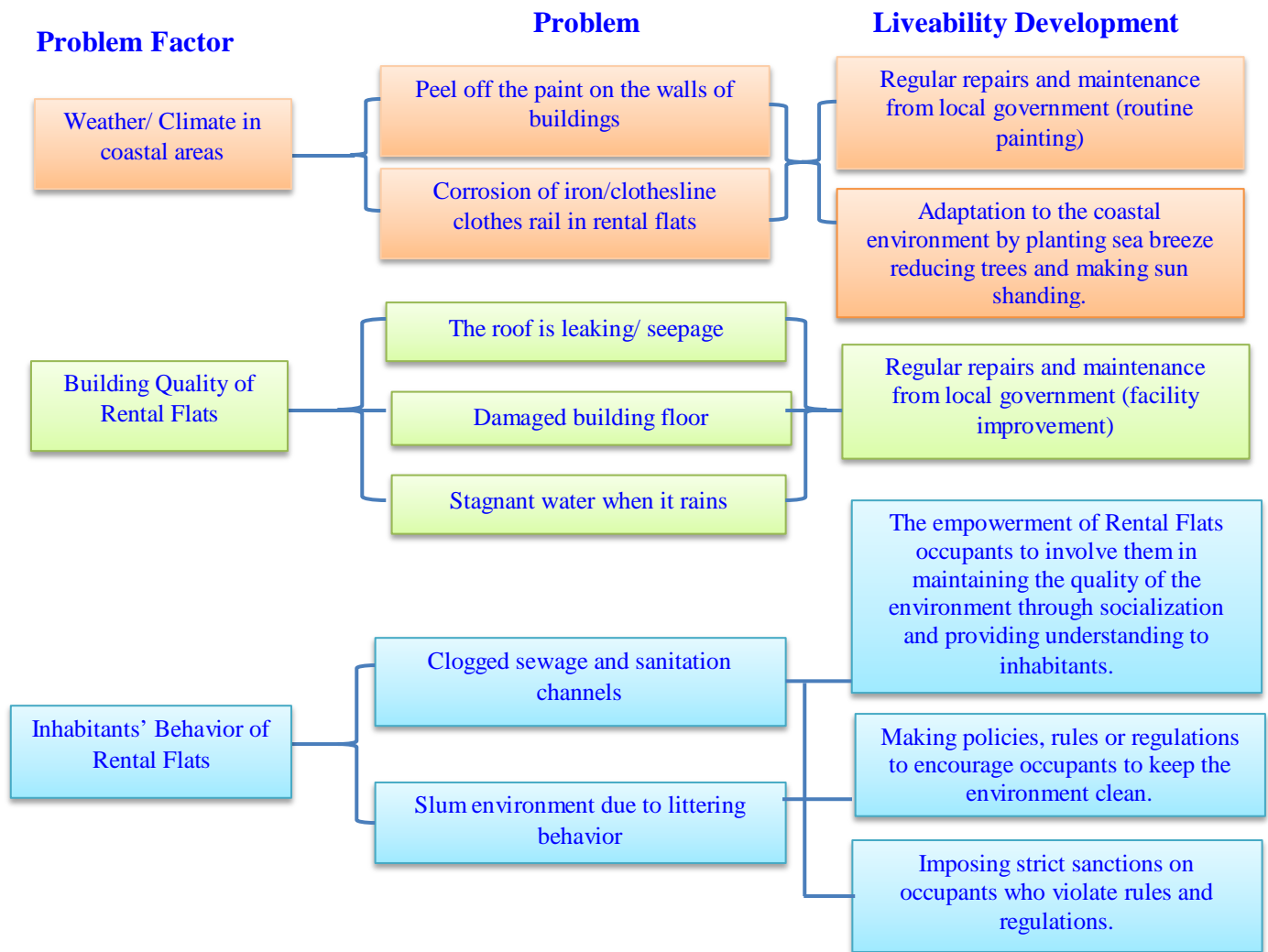
Physical damage in the Kyai Mojo Rental Flats is, on average, influenced by the location factor located in the coastal area. The problems of physical conditions and environmental quality in the Kyai Mojo Rental Flats (Figure 4) consists of (1) peeling paint on the walls of buildings, (2) porous building made of iron, (3) leakage of the roof of shared facilities, (4) damage to the floor, and (5) blockage of drainage which results in standing water when it rains.

The peeling of paint in the Rental Flats is caused by high humidity in the coastal area, so the paint color is used to absorb moisture, which results in damage/peeling of painting from the walls of buildings (Aghimien et al., 2018). This condition also happens to buildings with iron material, where the humidity and high salt content in coastal air cause the corrosion process in iron to occur more quickly (Aghimien et al., 2018). The atmosphere in coastal areas has a higher corrosive nature than others (Aghimien et al., 2018). It can do by coating iron using paint to minimize the corrosion process or using materials other than iron that is more suitable to the climate/weather in the coastal area. While related to roof problems and is caused by air factors in humid coastal, it is also influenced by the poor construction of buildings, so that water can seep into the roof cause the roof of the building to be moist, moldy, and look dirty. In addition, the building floor damage is affected by the quality of building construction. Therefore, problems in Rental Flats can affect the quality of the environment look dirty and improper besides that clogged drainage that results in standing water when it rains exacerbates the environmental quality, especially during the rainy season. The low quality is due to the lack of awareness by the inhabitants in caring for it. Habits of inhabitants who often litter and do not maintain existing facilities make the quality of housing increasingly dirty and unfit.

Thus, the main problems in Kyai Mojo Rental Flats are physical damage to buildings caused by the low building quality, weather/climate in coastal areas, and the behavior of inhabitants of Rental Flats. Problems related to physical damage to buildings kept ignored, in addition to causing slums, can create uninhabitable occupancy for inhabitants of Rental Flats, which can also result in more severe damage to construction failures (collapsed buildings) (Aghimien et al., 2018).

### **4.3 Analysis of Rental Flats Development in Coastal Areas**

The problem shows that it is necessary to improve the physical quality of the building to create suitable housing for its inhabitant - analysis of the liveability of low-cost rental flats in the Coastal areas (Figure 5). The purpose of developing liveability is to create rent flats in coastal areas that are liveable. Liveability development related to physical problems in Rental Flats tends to be the responsibility of the local government and managers, especially those caused by the quality of buildings and the environmental impact of climate/weather changes in coastal areas. Other related problems can also be resolved by reducing the environmental impact of physical damage to Rental Flats. Physical damage caused by the behavior of inhabitants can do through the empowerment of Rental Flats occupants.



**Figure 5:** Low-cost rental flats liveability development chart in the coastal area

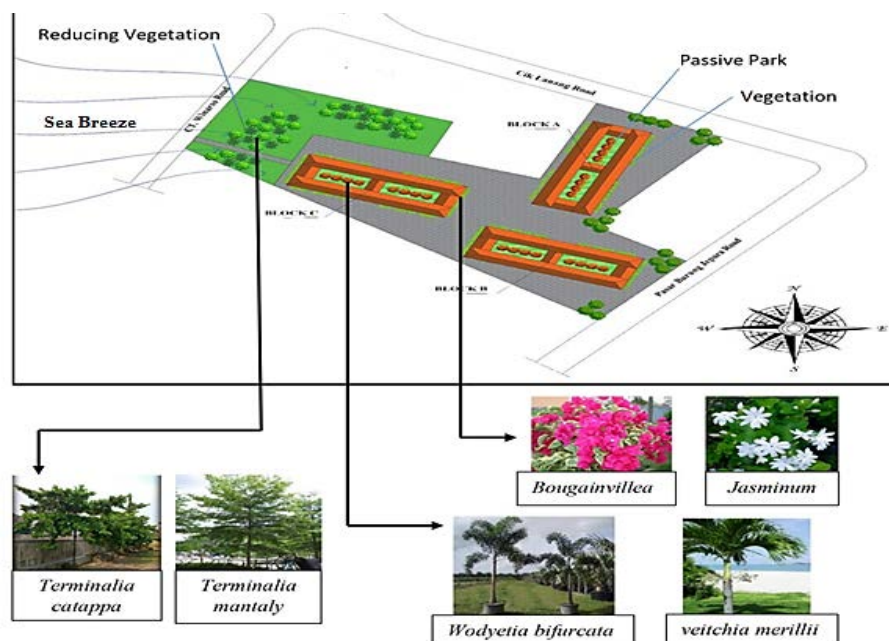
The development, therefore, is necessary to pay attention to the location characteristics and environmental impacts found on the coasts (Aghimien et al., 2018). It is important to carry out the appropriate planning stages so that the construction of buildings and the quality of building materials are used per the coastal environment conditions to increase building resilience. The choice of quality building materials suitable to the coastal environment preserves the quality of the construction (Aghimien et al., 2018). It can minimize physical damage due to environmental impacts in coastal areas and reduce maintenance costs rental flats. Therefore, in developing feasibility for problems caused by climate/weather factors in coastal, including repairs and maintenance, one of them is painting and repairing facilities using building materials resistant to climate change in coastal areas. Also, adaptation is needed to impact the coastal environment by planting trees/vegetation to reduce the flow of sea breeze directly to the building is also necessary to minimize the effect of sea breeze instantly on the towers (Pradika, 2014). An alternative to reduce the flow of sea breeze at an altitude equivalent to the height of the plant. Also, planting vegetation is used as greening, shade, adding aesthetic value and beauty, and providing comfort in the rental flats environment. The manager notified that he plans to plant *Bougainvillea* and *Jasminum* plants to add aesthetics and beauty based on interviews. Besides, he said that he is



planning to plant *Wodyetia bifurcate* (foxtail palm), *veitchia merillii* or mango fruit trees, guava as greening, and planting *Terminalia catappa*/*Terminalia mantaly* plants as shade plants and reducing sea breeze. Figure 6 shows the illustration of plant provision location in the Kyai Mojo Rental Flats environment.

Besides, adaptation to the coastal environment can also do by making sun shading on buildings useful to reduce the amount of solar heat received by building in the coastal area (Thojib & Yatnawijaya, 2016). Coastal areas have hotter temperatures than land areas influenced by topography and marine activities (Pradika, 2014). Thus, planting vegetation and providing sun shading is an adaptation effort that can reduce the environmental impact in coastal areas to the physical condition of rental flats and increase occupant comfort to create liveable low-cost Rental Flats on the coast. Then, building mass orientation can minimize building damage due to environmental impacts in coastal areas. Determination of the correct building mass orientation can reduce the brunt of sea breeze and sunlight directly to buildings (Kustianingrum et al., 2012). However, this can only be done at the construction stage, whereas the orientation of the building mass at the development stage is already difficult to do.

Empowerment of rental flats occupants can do by providing socialization, understanding to citizens related to environmental impacts in coastal areas, and the importance of maintaining environmental quality to create liveable housing (Sunarti et al., 2019). The making regulations and strict sanctions for violators. It is intended that occupants feel cared for and protect the physical environment of their dwelling so they are liveable. The form of sanctions against occupants who break the rules and do not maintain the towers, for example, the manager can not extend the lease time for violators.



**Figure 6:** The Alternative of Vegetation Provision to Protect Buildings from Heat and Reduce the Impact of Sea Breeze in Kyai Mojo Rental Flats

The funding for redevelopment is need for repairs/maintenance, with a need for financing commitment and responsibility of the local government. Also, firmness in giving sanctions to occupants who violate the agreed rules is importing in this regard. However, the rental income charged at affordable rates to the tenants is low, approximately 500 million rupiahs. This amount is not sufficient to use for the flats' maintenance and repair costs. The local government budget of Jepara Regency is also not possible to meet the funding needs of all low-cost flats repairs and maintenance of the physical housing conditions. Based on interviews with the Jepara Regency's settlement and public housing agency, the maintenance standard of the 5-story building is around 1.5 billion /year/building, while the financing from the local government budget is only 1.5 billion for 5-story buildings in 1 year. Thus, the empowerment of rental flats occupants is needed to keep and maintain the quality of the rental flats environment, minimize the costs of repairs and maintenance of the rental flats, or cooperate with the private sector for mutually beneficial.

## 5 Conclusion

From this study, physical damages to buildings are caused by the low quality of buildings, weather/climate in coastal areas, and the inhabitants' behavior of rental flats. Thus, the development of liveable low-cost rental flats has to pay attention to location characteristics and environmental impacts on coastal areas climate change.

The development of liveable Kyai Mojo Rental Flats can be done by (1) Quality improvement by carrying out routine maintenance by local governments and managers to ensure physical conditions such as painting and repairing facilities using building materials resistant to climate change in coastal areas; (2) Adaptation to weather/climate changes in coastal by vegetation planting and making sun shading; and (3) Empowerment of rental flats occupants through socialization and making strict rules and sanctions to increase occupants' awareness in maintaining the quality of the rental flats' environment.

## 6 Acknowledgement

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## 7 Availability of Data and Material

All information is included in this study.

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