The growth of Metropolitan Bandung Raya (MBR) and the increase of urban housing matters

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Abstract. The urban growth of MBR has rapidly occurred. The emergence of MBR’s urban settlements has started in Bandung city as the main urban center and it has spread out adjacent through some administrative region. These center urban growth has stimulated the development of urban housing in peri-urban areas forming a large-scale urban settlement and eventually bring the emergence of housing problems. This research specifically aims to explore the housing matters in the context of residential elements. The study was conducted using a quantitative method and a descriptive approach to show the trend of urban growth and the increasing problems of housing and basic infrastructure. The discussion of housing matters addressed to the physical condition of housing and the availability of basic infrastructure. The results show that the main problem of MBR housing is generally in the issue of increased density and the provision of basic infrastructure. Another problem that characterizes as the urban housing problem is the issue of the space adequacy of building, while the main issue in the regencies housing is the un-durable physical condition of the building.

1. Introduction

Metropolitan Bandung Raya (MBR) is known as one of the largest metropolitan areas in Indonesia. According to Provincial Regulation no. 12 of 2014, MBR includes 5 (five) administrative areas, i.e. 2 (two) municipalities and 3 (three) regencies. The center of MBR is Bandung City and together with Cimahi City has formed the urban center of MBR. Meanwhile, the peri-urban areas of MBR embrace almost half of the territory of Bandung Regency and West Bandung Regency and a few sub-districts of Sumedang Regency.

The establishment of MBR is generated from the development of urban activity in Bandung city and characterized by the expansion of the built-up areas. The urban development of MBR has started since Bandung city was set as gemeente (city) by the Colonial Dutch East Indies Government in 1906 with the built-up area of 240 Ha from the total area of 900 Ha. Following that year, the Bandung city has expanded into 2150 Ha with the built-up area of 300 Ha in 1911, and several other extensions until the year of 1987 the Bandung city has reached the total area of 16,729.65 Ha with the built-up area has hit the number of 11,896 Ha [1] [2].

The trend of urban development has also spread up to the surrounding areas located directly adjacent to the Bandung city. The growth of urban activity has embraced the development of the urban project through the periphery together with the enlargement of new neighborhood thus forming cross-border administration urban settlement. One of the reasons for expanding urban development to the regencies that still intense with the rural environment is due to residential needs [3] [4] [5]. The new urban settlement located in the periphery offering a better atmosphere with a better living environment for a residential neighborhood.
This immense land conversion has occurred in MBR in the mid-1990s together with some large cities in Indonesia [6] and it is still running until nowadays. Some of the areas in West Bandung Regency and Bandung Regency which located next to Bandung city have already transformed slowly but surely to be more urban in physic and activity. The increase of the built-up area in the center of metropolitan cities has continued to grow massively to the surrounding periphery and nowadays it starts to bring many problems, such as congestion matter, environmental degradation and the declination of the agricultural production area. Previous studies have focused on MBR settlements in a regional context [7], infrastructure access for low-income people [8], the peri-urban typology [9], hence this study will focus more on urban housing as the residential element.

Bearing this context in mind, this study will describe how the development of MBR and the dynamics of urban population growth have implications for the emergence of urban housing problems. The paper will illustrate the development of MBR and discuss different problems related to the increase in its urban housing problems. The discussion of urban housing problems in this article refers to housing in a micro-context, not in the macro context as a settlement. The remainder of this article will be divided into three parts. The following parts will illustrate the urban development process to describe the urban housing growth in MBR. The next part will discuss the emerging Urban Housing Matters in MBR and its turmoil impact. A final section will conclude the discussion.

2. Methods
The paper is essentially descriptive and explanatory. This study was conducted using a quantitative method. A variety of secondary data was collected to conduct this study, including the population and land use censuses (Central Bureau of Statistics, 1974 – 2016), housing and basic infrastructure (Ministry of Public Works and Public Housing, 2015) and some previous studies about the development of MBR region. Following this data collection, we conducted a quantitative approach by using bar chart analysis and illustrations to show the trend of changes related to urban growth and the increasing of housing and basic infrastructure problems.

3. Result and Discussion
3.1. The Urban Growth in MBR
In this paper, the discussion of the emergence of the MBR region is started in the early years of an economic boom in 1975. In the 1970s, the area of MBR coverage was only divided into 3 administrative regions, including Bandung city, Bandung Regency and Sumedang Regency. At that time, the Cimahi region has already existed as a part of the Bandung Regency and established as an administrative city.

The growth of MBR is inseparable from the increasing number of the urban population. Since 1970, the population in the MBR region has shown the trend of ever-increasing numbers. From the BPS data, it was known that in 1970 the total population of MBR was 3,666,782, while the population in 2015 had reached the amount of 9,370,865.

![Figure 1. Population Growth and The Number of Household in MBR [10].](image-url)
The number shows that over the past 35 years, the increase in the MBR population has increased triples. Similarly, the increase in the number of families in the MBR area in 1970 was recorded as many as 800,957 households, while in 2015 it grew to 2,395,371 households. It means in the MBR region the increased number of households hit the number of 3-fold during the three decades, slightly higher than the proportion of the increase in population growth. The illustration of population growth and the increasing number of households in all administrative regions of MBR can be seen in Figure. 1.

From Figure. 1 we can see that between 1970 and 2015, the three districts of the MBR show a fairly-rapid rate of population growth, while the two urban areas of MBR tend to increase more slowly. The unsteady proportion of population growth in Bandung Regency during 2000-2010, due to the extrication some territory of Bandung Regency into two new administrative regions namely Cimahi City and West Bandung Regency. The same trend has occurred to the increase in household numbers in the MBR region. Although it is different in numbers, the fluctuation symptoms of the increasing number of households in the region tend to have a similar proportion of the population growth.

The growth of the urban population in MBR followed by the increasing number of built-up areas. From 2005 to 2014, the increase of the built-up area in MBR has grown up 150% with the largest contributor to land development were occurred in Bandung Regency and West Bandung Regency. Along with the enhancement of the built-up area, the aggregate of agricultural land in the MBR region has decreased from year to year. Based on the data from BPS, during the period 1990-2015, there has been a decrease in the amount of agricultural land as much as 14.48%. It can be argued that in the MBR there is a considerable conversion of land from the agricultural to the built-up area. The significant decrease of agricultural land in Bandung Regency in 2005 and 2010 can be explained was not only caused by land conversion, but it was also due to the release of some area of Bandung Regency administration into West Bandung Regency administration when it was established in 2007. Figure. 2 shows the increase of the built-up area and the decrease of agricultural land in five administrative regions of MBR.

Figure. 3 indicates that in the MBR region, there are changes in some village status especially those located in the regency areas. In this region, there are many changes in village status from the rural become urban village. From the figure, as well as the number of populations and the built-up area, the increase of urban areas in the MBR region is very significant in the regencies. Central Bureau of Statistics defined the status of an urban area as a village-level administrative area that meets certain requirements in terms of population density, percentage of agricultural households, and numbers of urban facilities, such as roads, formal education facilities, public health facilities, and so on [11].

![Figure 2. The Change of Built-up Area and Agricultural Land in MBR [2] [10].](image)
From all the above descriptions, it can be said that the development of urban activity in the MBR region is still ongoing. Rapid population growth occurs evenly throughout the cities and regencies, although based on these figures, the rapid land conversion occurred in the administrative region of regencies. It can be argued that in the cities as urban centers, the urban growth leads to the increase of population density, while in regencies as the peri-urban region, the direction of urban growth leads to the widespread land conversion from agricultural land into urban used. The denser urban population ultimately leads to a decrease in the quality of settlements such as the emergence of slum settlements [12] [13] [14] [15] [16], while the uncontrolled expansion of the built-up in peri-urban areas ultimately leads to unstructured development and uneven infrastructure provision [17]. According to these core issues, the next section will be detailing housing matters referring to the discussion of residential quality and the provision of housing infrastructure in the MBR region.

3.2. The Emergence of Urban Housing Matters
The discussion of Urban Housing Matters in this study refers to the residential quality and the provision of housing infrastructure in the MBR area. The residential quality matters refer to the problems on the physical condition of the house. While the discussion of housing infrastructure matters refers to the problems in basic infrastructure provision. The analysis of residential problems in this study was using data sourced on The Indicators of People's Welfare in West Java and West Java People's Welfare Statistics issued by the Central Bureau of Statistics. The duration of surveillance is adjusted to the availability of existing data through the BPS website (https://jabar.bps.go.id/).

3.3. Physical Housing Matters
The physical housing matters in MBR are described in the three aspects, including property ownership status, housing space adequacy and the physical condition. The indicators for property ownership status are including land ownership and building ownership. Based on the BPS data from 2005-2015, it was known that during 2005-2010 there was a surge in land ownership status registered to the State Land Agency by almost 5000%, while in 2015, the number of land ownership increased by only 200% compared to 2010.
In the building ownership context, it is known that the percentage of the population whose living in the not owned building has fluctuated within the last 5 years. Although we can see there was no tendency of the building ownership trend direction, it can be said that the rental housing model is quite widely used in the urban areas of MBR. In detail, the property ownership chart in the MBR area can be seen in figure 4.

In the context of housing space adequacy, sufficiency categories can be explained based on indicators of floor area per capita and the number of households living in a house. In the category of the average number of families in a house in the MBR based on data from 2015-2017, it is known that there are two groups of trends. In urban administrative areas (Bandung City and Cimahi City) and one peri-urban area (West Bandung regency) showed fluctuating tendencies, while in other peri-urban areas (Kabupaten Bandung and Sumedang regencies) showed a decreasing trend in the number of people in a family as it can be seen in Figure. 5. Based on BPS data collected between 2013-2017 it is known that the percentage of population inhabiting houses with inadequate area with indicator less than 7.2 m² per person, tends to show fluctuating symptoms, even though on the average percentage of urban population whose living in a house with floor area per capita less than 7.2 m² is almost double compared to the population living in rural areas.

The only administrative region that shows a constantly decrease in the percentage of the population who live within the floor area less than 7.2 m² per person in West Bandung regency. This can be caused by almost half of West Bandung regency including the North Bandung area with the regulation of the building coverage ratio (BCR) is quite small. The implication of the small value of BCR goes to the high value of the land. It can be said that the ongoing trend of housing development in this area leads to the middle to upper-class housing segment which generally has adequate floor area for the occupants. Based on this graph, the provision of housing in the urban neighborhood should be no longer addressed to the landed houses but rather to the development of vertical houses.

In the term of the physical condition, we can see the condition of the houses by their construction and the durability of building material. BPS data describes the concept of durability in the context of roofs, walls and floors materials of houses. Figure 6 shows the graphics of the physical condition of the building in MBR during 2013-2017. Of the three categories of physical housing conditions, the highest average percentage of non-permanent material use in the MBR area is the floor element. The second position on the use of non-permanent materials is the wall element, and the last is the roof element. Referring to the data, it was only floor elements in which the average user of non-permanent material is less than 5 percent. Figure 6 shows that the greatest percentage of non-permanent roof material problems lies in urban neighborhoods. While the graphic of use of non-permanent wall material has shown a large percentage gap between the cities and regencies areas, where the greatest percentage of housing problems with non-permanent wall materials are generally in the regencies. As well as wall elements, the largest percentage of non-permanent material of floor in MBR areas is in the peri-urban areas of MBR. Overall, the main problem of physical housing conditions in the MBR area leads to the use of non-permanent materials in peri-urban areas, especially on the wall and floor elements (regencies) which can be found mainly in the rural area of the regencies.

![The Average Number of Families in A House In MBR](image1)

![Floor Area per Capita <7.2 m²](image2)

**Figure 5.** The Housing Space Adequacy in MBR [18].
3.4. Basic Infrastructure Matters

The provision of basic housing infrastructure covers several aspects. In this study, the discussion of basic housing infrastructure includes sanitary conditions, the availability of clean drinking water, electricity network and garbage collection services as it can be obtained on the website of the Central Bureau of Statistics.

Based on data from 2013-2017 as seen in Figure 7, it is known that the problem of basic infrastructure provision in the MBR region is still quite high, only the aspect of unavailability of electricity supply can be dispensed due to the very low percentage (the average is less than one percent). The other three aspects, including the unavailability of private toilets, the unavailability of clean drinking water sources and the lack of garbage collection service still at a fairly high percentage. In the aspect of toilet provision, Bandung City shows the highest percentage of unavailability of own toilet. While in the aspect of clean drinking water provision, the three regencies in the peri-urban region of MBR showed a higher percentage of lack of supply than the urban areas.

Figure 6. The Percentage of Housing Physical Condition Matters in MBR [2] [18] [19].

Figure 7. The Percentage of Housing Infrastructure Provision Matters in MBR [10] [18] [19].
In this case, West Bandung regency occupies the highest rank, followed by Sumedang regency and West Bandung regency. In the aspect of garbage collection service, most of the regions are evenly constrained. This is due to the waste disposal system in the MBR area is managed in a metropolitan waste management scheme with the same Landfills location. This means that the problem of garbage collection service in MBR is generally perceived by all administrative regions. Overall, the problems of housing infrastructure provision in the MBR area is generally quite significant.

4. Conclusion
The discussion of the development of the MBR related to the increase of urban settlement problems shows some notes that need to be considered and followed up. In general, urban settlements have problems with increasing populations and their density. In the context of housing, this can be seen from a quite high percentage of houses that do not meet the standards of space adequacy for the occupants.

To solve this problem, the model of urban housing should already shift to the vertical dwelling concept. In the regencies which are served as peri-urban areas of MBR, there is an ongoing process of urbanization, it must have a visionary and consistent spatial planning. Sooner or later, urban matters will be perceived by peri-urban areas referring to the rapid urban growth of MBR. Urbanization in peri-urban MBR also needs to be considered about the decreasing of productive land. Productive land not only acts as a food supplier, but it also plays an important role in maintaining ecological stability. In terms of the physical condition of housing, the regencies show the tendency of houses with undurable physical condition especially on wall and floor elements which can be found in many rural houses. It can be said, one of the main focuses of peri-urban housing improvement is addressed to the physical condition of rural housing.

In terms of basic housing infrastructure provision, the main problem in the MBR region is referred to as the low level of garbage collecting service. In peri-urban areas, the focus of other housing problems is about the provision of clean drinking water, while in urban areas the housing problem that needs immediately is the provision of own toilet facilities. The provision of basic housing infrastructure in the MBR area is fairly serious matters.

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