

# A Construction of The Ring Road And The Development of Land Use Changes in Masamba City of North Luwu Regency, South Sulawesi-Indonesia

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**Abstract:** The development of the city can support the land use changes, resulting in the growth of the number of occupants in sub-urban areas, if it is incommensurate to the increase of structure and infrastructure of transportation can cause the congestion in the arterial road. The aims of this research is to analyze the characteristic of land-use changes of the construction of ring roads in terms of change areas and price and value of land and to analyze the influence of the development of ring roads to the development of urban structure. This research uses primary data and secondary data. Primary data derived from the interviews and field observations, secondary data derived from relevant government agencies and google earth. Data were analyzed by qualitative descriptive and spatial analysis. The location of the research was conducted in Masamba Sub-district of North Luwu Regency, which is the developmental spaces along the ring roads and settlements that have direct access to the ring road. The results of the analysis indicate that the largest type of land-use that changed into settlements after the construction of the ring road is irrigated agricultural land and mixed plantation land. The construction of the ring road does not affect the city's developmental structure, as the fact is that the city of Masamba is a monocentric city in that it has only one service center which also serves as the center of the city.

**Keywords:** Ring Road, Land-Use, Urban Structure, Transportation

## I. INTRODUCTION

Land requirements in urban areas are increasing along with population growth and socio-economic activities. In suburban areas, land use conversion is more likely than agricultures or plantation land to the housing, meanwhile in downtown, land use conversion becomes commercial and service areas <sup>[1]</sup>. The conversion of the land use and utilization is often incompatible with predefined urban spatial plans and may result in negative, physical, environmental and social impacts. This happens because of the weakness of controlling the use of space in terms of licensing, supervision and control, or the preparation of spatial plans that do not receive to the dynamics of the rapid development of the city

The development of urban infrastructure such as road network can encourage the conversion of land-use so that can affect the increase of land value and the increase of residential needs. This can lead to the housing growth in sub-urban areas.

One of the road infrastructure that has been built by local governments in Masamba City is inner ring road with length 14,33 Km<sup>2</sup> and width 10 meters consisting of two road segment that is north ring road (7,1 km<sup>2</sup>) and the southern ring road (7.23 km<sup>2</sup>) serves as an arterial road. With the development of the ring road is feared will have an impact on the development of urban structures that are not regular so that conducted an analysis of the influence of the development of ring roads in Masamba city.

## II. METHODOLOGY

### 2.1 Location And Type Of Research

The location of this research was conducted in Masamba Sub-district of North Luwu Regency, which is the construction of the ring road of Masamba City. The location focused on the developmental space along the ring road and settlements that have direct access to the ring road which is divided into two segments namely segment I (north ring road) and segment II (south ring road). The type of research is descriptive with qualitative approach which is more understanding the phenomenon by using words and language in a specific context that is natural and describe problems and in process analysis [2]

### 2.2 Population and sample

The population of this research is people who build a house and live around the ring road, both people who build self-help and who live in the housing. The sampling technique used in this research is non-probability

sampling with purposive sampling [3].

In this study, the number of samples are taken from the head of the family who live around the ring road and who have direct access to the ring road either north circumference or the circumference of the south of 88 the number of samples.

### 2.3 Data collection

Primary data were obtained by field observation and interview. Data were collected by unstructured interviews on communities living in the research sites. The samples are in the form of land area changes and types of land use prior to the construction of the ring road, the price/value of the land before and after the construction of the ring road. The secondary data were collected in the form of some data of land change areas, development of road network, road network models, settlement development models and service center. This data is obtained from relevant agencies and maps are obtained from the Spatial Plan Areas and google earth.

### 2.4 Data analysis

The characteristics of land use changes of the construction of the ring road are evaluated by the change areas and the price of land is analyzed descriptively qualitative and spatial analysis with the indicator of land area change, prices of land before and after the development of the ring road. The influence of the development of the ring road to urban development structure is analyzed descriptively and spatial analysis with the variables of city structure and its indicators in the form of road network development, hierarchy of road network, road network pattern, models of settlement development and scalogram analysis for indicator of service centers.

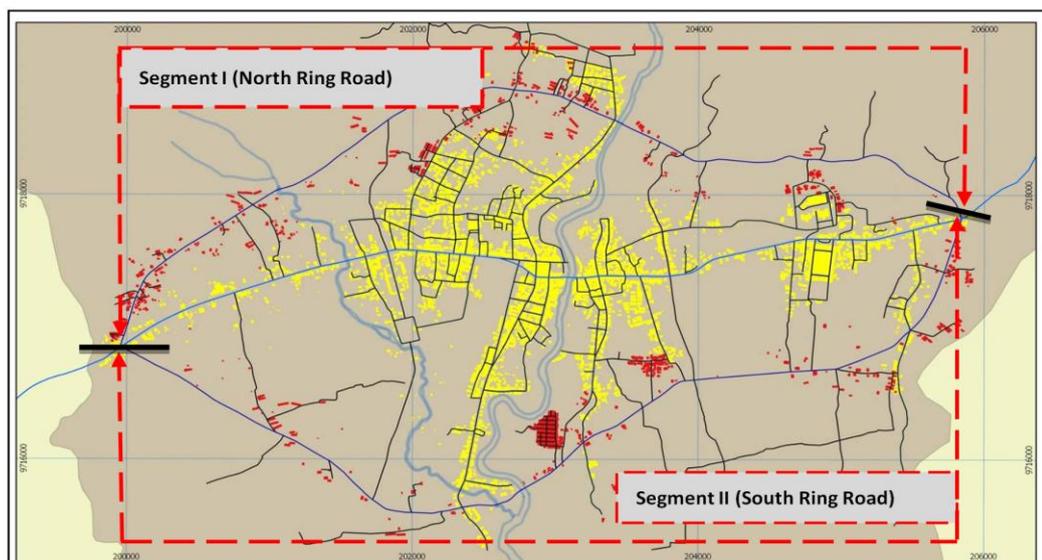
## III. RESULTS

### The Characteristics of the Land Use Changes

In the analysis of the characteristics of land use changes to the ring road is discussed the extent of land use change and the price of land.

#### 1. Area of the Land Use Changes

In the first segment (north ring road), the biggest land use changes are the mixed plantation which is 17%. This is due to the use of mixed garden land is greater than the use of agricultural land and bushes/empty land so that the opportunity to change the use of mixed garden land into larger settlements. In the second segment of the south ring road, land use changes become the largest settlement is the agricultural function that is 19%. This case is caused of the land use in the second segment is dominated by agricultural land is bathed with mixed garden land and bushes/empty land. The size of agricultural land use is due to the second segment, the topography is flat, causing many developers to be interested in investing because the land is flat and wide are very suitable for residential location (see in Figure 1).



**Figure 1.** Settlement after construction Ring road

**Source:** Results of the Analysis, 2016

### Land Price Changes

The land price changes based on the NJOP are differentiated according to the land type such as shrubs, mixed farms, agriculture and settlements. The highest increase in land prices occurred in the first segment

around the ring road for the land type with a settlement function of 236% within 11 years. The significance of increasing in land prices in the first segment in Kappuna Urban Village because this location is a flat area, has a good accessibility that is the distant location of the primary arterial road is very close and the establishment of educational facilities in the form of High School. In addition, the increase in land prices based on the NJOP for mixed farming in the segment I of the part of the village of Baliase also increased by 140% as influenced by the development of local government offices of North Luwu Regency. In other words, the ring road triggers the development of facilities that have an impact on increasing the land prices. The land price changes based on the market prices experienced a very significant increase in the second segment around the ring road for land types with settlement functions reaching 1500% within 11 years. Land change prices in Bone Tua sub-district and Baliase because it has a flat topography and development of the housing development in the areas.

The development of the housing location has an influence on the land prices. The process of developing the land prices begin with the development of the function and role of the areas. Such conditions can also affect the surrounding area. In this case it is known that the existence of the ring road construction can increase the attraction to build the housing so that it can affect the surrounding area.

**Table 1.** Land price changes by the market prices

Land Type	Price Changes Based on the Market Prices (IDR/m <sup>2</sup> )				Increase	
	Before <2005		After >2016		Segment I	Segment II
	Segment I	Segment II	Segment I	Segment II		
Bushes / empty land	12.000	12.000	180.000	180.000	1400%	1400%
Mixed Plantation	15.000	14.000	200.000	200.000	1233%	1329%
Agriculture	15.000	14.000	200.000	200.000	1233%	1329%
Settlement	25.000	20.000	250.000	320.000	900%	1500%
<b>Average increase</b>					<b>1192%</b>	<b>1364%</b>

Source: Primary data, 2017

### The impact of Ring Road constructions on the Developmental Structure of Masamba City

#### The development of the road networks

The development of road segment that has direct access to the ring road in the segment I (North Ring road) is 22 road segments and segment II (south ring road) of 20 roads since 11 years ago. The developments of roads in the segment I and segment II are secondary collector roads, local roads and environmental roads. Access roads that are directly related to the ring road must be collector roads in the form of both primary collectors and secondary collectors. Based on observations at the research site there are many local roads that have direct access to the ring road built by the government or by the developer of the housing (see in Table 2).

The increasing of the road is the length of the road also increases. In the segment I which initially has a road length of 3,705 m to 8,148 m while in segment II the length of the road before the construction of the ring road along 7,376 meters increased to 13,344 m.

**Table 2.** The development of the Access road to the ring road

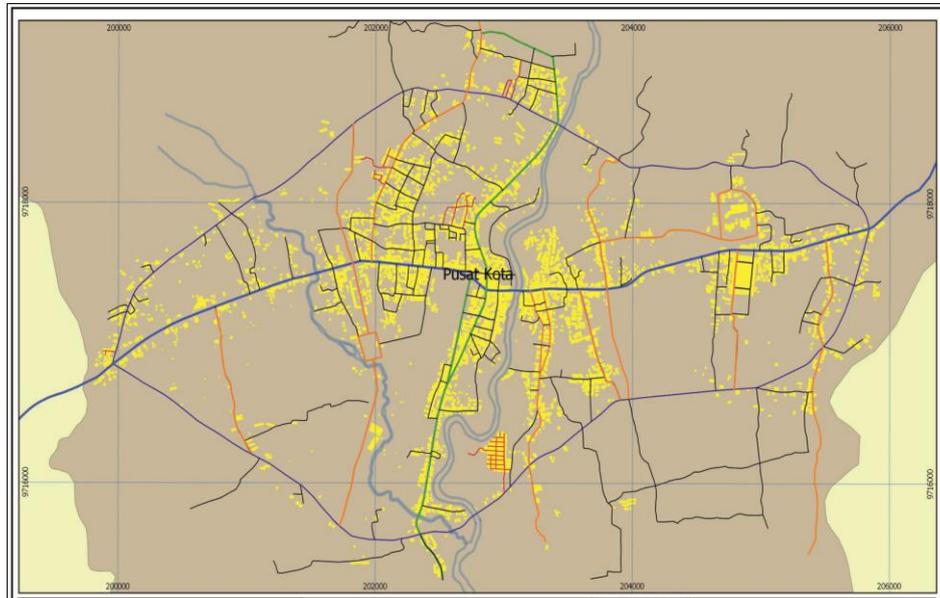
	Segment I		Segment II	
	Before Construction (2005)	After Construction (2016)	Before Construction (2005)	After Construction (2016)
The Increase of Road Segment	2	22	3	20
Road Segment classification	Primary collector (1 segment)	Primary collector (1 segment)	Primary collector (1 segment)	Primary collector (1 segment)
	Secondary Collector (1 segment)	Secondary Collector (3 segments)	Secondary Collector (2 segments)	Secondary Collector (7 segments)
		Local Road (15 segments)		Local street (10 segments)
		Street Alley (3 segments)		Street alley (2 segments)

Source: Primary data, 2017

#### Road network hierarchies

The hierarchies of road network in Masamba City are: 1). Arterial roads connecting between provinces should not be disturbed by local traffic and local activities [4]. 2). Road collector connecting the capital of North Luwu Regency with other sub-districts 3). Local road is accessed from the residential to street collector 4).

Neighborhood Road is in the housing. But the fact that there is not hierarchy of structured road networks because of the local road network and the road environment directly connected with the arterial road.



**Figure 2.** The hierarchy roads in Masamba City

### **Road Network Models**

The models of the road network those are formed after the construction of the ring road is: 1) The road network model resides in the housing, generally located in the area of South Ring Road which has flat topography, 2). Irregular models occur due to local roads and neighborhood roads connected directly to the ring road, 3). Spinal path model (spine) resides in the housing that is directly connected to the ring road and the construction of the road is not continuous, 4). The culdesac road model is located in an office area that enters a residential neighborhood of the ending in a round <sup>[5,6]</sup>.

### **The model of settlement growth**

Before the construction of the ring road, the settlements are generally developed linearly by following the road networks, but after the construction of the ring road there is a linear settlement development and jumping. This jump model is caused by the start of construction of small-scale residential clusters around the ring road. The growth that are not designed the macro level can have an inefficient impact on the provision of facilities and infrastructure of the city

### **Service centers**

The shape of urban structure is viewed from the service centers that are the form of monocentric city because the city of Masamba is a city that has not developed rapidly the population is not much and only has one service center which also serves as the city center [6]. Based on the analysis of scalogram is known hierarchy I of the service center is in lower of Bone, Bone Tua and Kappuna sub-district. The different of mileage to the service centers is very well known the society, for example, living in the Baliase to access the health facilities before the construction of the ring road is 3.499 km and after the construction the mileage reduced to 2.77 km.

## **IV. CONCLUSION**

Types of land use were changed to settlements after the largest ring road construction was irrigated farmland of 19% (segment II) with land price based on the NJOP IDR.20.000,00 / m<sup>2</sup> and the market price IDR. 320.000,00/m<sup>2</sup>, mixed plantation land by 17% (segment I) with land price based on the NJOP IDR. 24.000,00/m<sup>2</sup> and the market price IDR. 250.000,00/m<sup>2</sup>. The construction of the ring road does not affect the urban development structure. The development of the ring road does not affect the city's developmental structure, as the fact is that the city of Masamba is monocentric in that it has only one service center which also serves as the center of the city.

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