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Changes in Utilization of Land Use on the Aspect of Population and Accessibility and impact to Environmental Risk in Makassar City Indonesia

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Abstract: Changes in the use or function of urban land have an impact on the emergence of problems in urban space. Changes in land use are inseparable from the rapid population growth every year both as indigenous people and immigrants in the form of urbanization and migration of people from out of town to urban areas. So that the population growth every year has increased and consequently will have an influence on urban spatial planning. The purpose of the study was to analyze the influence of population and accessibility to problems of environment related with land use in Makassar City. This type of research was a descriptive analysis. The data were collected from population of Makassar City and the location of the study in 2 sub-districts, namely Panakukang Sub-district and Mariso Sub-district. The number of samples in this study determined the respondents as many as 250 samples. The method of discussion is a statistical approach with Structural Equational Modeling-Partial Least Square (SEM-PLS). The results showed that changes in land use in the population aspects of environmental risk have a coefficient with a positive direction. The calculation results show that the path coefficient is 0.593 or 59.3% with a t-statistic of 11.141 with a p <0.05 giving a decision that the population has significant effect on environmental risk. Accessibility to environmental risks has a coefficient with a positive direction. The calculation results show that the path coefficient is 0.143 or 14.3% with a t-statistic of 2.185 with a p <0.05 giving a decision that accessibility has a significant effect on environmental risk.

Keywords: Land use, population, accessibility, environmental problem, urban

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I. INTRODUCTION

Land is the whole environment that provides opportunities for people to live and settle [1]. Land is generally has an owner, both individuals and institutions. Based on these two meanings, it can be interpreted that land is part of space and an important element in human life as space and resources, because most human life depends on land that can be used as a source of livelihood, namely by earning a living through certain businesses other than as settlements. Land use is a tangible manifestation of the influence of human activities on some of the physical surface of the earth. The factor that causes changes in land use is the increasing of population. Population growth and the development of life demands increase the need for space as a container. This land function change is a transformation in the allocation of land resources from one use or function to other users due to internal and external factors. There has been an inverse population movement that is from the city to the suburbs which and already included in the village area [2]. The suburban area as an area that with a relatively wide space has an attraction for residents in obtaining a place to live.

The form of land use of a region related to population growth and its activities, the increasing number of people in a place will have an impact on the increasing changes in land use. In addition, the existence of high population growth and activity will experience rapid land use changes as well, so that land use planning is needed in accordance with the designation of the area. Land use planning is intended for a particular designation. A problem that might arise in determining the designation of a land is the land suitability factor [3]. Changes in land use are basically unavoidable in the implementation of development. Rapid population growth and the increasing demands of the community for land, often encounter conflict of interest over land use and the occurrence of discrepancies between land use and the planned allocation. The land is limited and cannot be added except with reclamation activities, so that the limitations of land in urban areas cause cities to develop physically towards the periphery of the city [4].

The periphery is a region that has undergone many changes in land use. Changes in the use of land that occur are mostly agricultural land use to non-agriculture due to the influence of nearby urban development. The decrease in the area of agricultural land in this region needs special attention, considering this will have a negative impact on urban life and rural life. Considering that this region is a region that will turn into a full city in the future, it requires commitment from policy makers to manage and organize the land uses to become an ideal city in accordance with the concept of a sustainable city [5].

Changes in land use occur due to population growth and the development of demands for life, housing needs, which require increasing space as a container. Inverted population movements, from cities to suburban areas including rural areas, suburban areas as areas that have relatively extensive space still have an attraction for residents in obtaining a place to live. Population density in general can be interpreted as a comparison between the population and the area of land inhabited in units of area. Population density by topographic factors, climate, water management, accessibility and availability of living facilities.

Land is an important element in human life both as a space and as a resource because most human life depends on land. Population growth both from the inhabitants of the city itself and the flow of people entering from outside the city resulted in an increase in housing, which meant a lack of vacant land within the city. So the city children become bigger, more and more schools are needed, shops, food stalls, and restaurants are increasing. So that the accelerating expiration of vacant land in the city. The city is the center of activities both economically, socially, politically, and culturally from a community of the city itself and the surrounding supporting areas [6].

Geography of the city is always developing which means that cities always experience changes from time to time, both changes from physical and non-physical (social), what is meant by physical changes is change in terms of residents occupying it. Urban development tends to increase followed by increasingly complex problems, because it requires data and information that can be used to solve problems that occur. Maps are one of the good tools in presenting data and information, through maps it can be known that information related to the face of the earth can also be used as a basis for analysis of land use planning. As is the case in major cities in Indonesia, Makassar City, which is one of the major cities in Indonesia, is also experiencing very rapid development. Geographically, Makassar City is located in the middle between other large islands from the archipelago, making Makassar City the center of spatial movement from the West to the East and North to the South of Indonesia. With this position, Makassar City has a strong appeal for immigrants from the South Sulawesi region as well as other regions such as provinces in Eastern Indonesia to come to find shelter and employment.

The rapid development of Makassar City was also followed by the development of residential and residential areas in almost all parts of the city, including in the Bumi Tamalanrea Permai (BTP) resident area. The development of housing areas was also followed by the development of other supporting activities, including the development of trade activities and commercial services in this residential area. The BTP began the construction phase in 1989, but these housings were open public in 1991, with a land area cover of ± 265 hectares consisting of 19 blocks. Where 19 blocks are divided into 13 first single alphabet blocks and also consist of 6 double alphabet blocks. The BTP is one of the biggest housing companies in Makassar City, even in South Sulawesi, which is located in Tamalanrea Sub-district, ± 12 km from the center of Makassar City.

Changes in land use or land functions cannot be separated from human intervention in the land, which aims to fulfill both material and spiritual needs of life. Changes in the function of this land will continue in line with the development and growth of the number and activities of the population in carrying out life on economic, social and cultural aspects. The city as a stretch of land based on its topography there will be an imbalance between the available area and increasing population growth every day, and this is the first major factor in land conversion or changes in the function of urban land.

Population growth which always grows every time, demands various things including land needs, economic and social needs and hopes for a better life. A better hope for the future can reverse the fact that population growth can put pressure on people to carry out activities that violate various provisions, especially in urban settings in order to fulfill the aspect of fulfilling a decent living needs in a sustainable manner.

As an agricultural country, of course Indonesia has a lot of agricultural or plantation potential that can be used as a source of the country's economy. However, along with the development of the economic system and increasing population, the need for land for interests in fields other than agriculture has also increased.

Most agricultural areas are located in rural areas. So that when there is a conversion of agricultural land which results in employment for some people being closed, then what happens next is that urbanization rates increase. People from the village will go in droves to the city in hopes of getting more decent jobs. Even though it could be that when they arrived in the city their situation did not change because competition was getting tougher.

Driving Factors for Agricultural Land Transfer.

Since long ago, the number of Indonesian agricultural land itself tended to decline from year to year due to the conversion of land to non-agricultural land. Transfer function or land conversion is defined as the change in the initial function of the land into other functions both in part and in whole land due to the presence of certain factors. The following are the factors driving the conversion of agricultural land:

a. Rapid Population Growth

With a fixed amount of land, the population continues to increase, certainly can cause various impacts on their living environment. One of them is the conversion of agricultural land into non-agricultural land in order to meet a variety of living needs that are also increasing.

b. Increase in Community Needs for Settlements

The existence of demographic growth, of course, also demands basic needs including residence. When land in residential areas is no longer sufficient to meet the demand, the conversion of agricultural land into a residential area is chosen as one of the solutions to the problem.

c. Substitution to More Promising Sectors

Along with the development of knowledge, technology, and the increasing insight of the owners of agricultural land, not a few of them deliberately divert the function of agricultural land to other business sectors. With the hope that the economy could increase, they began to establish industrial sites, farms, and other businesses on their farms

d. Weak Regulations for Control of Land Function Transfers

Namely the uncertainty of government regulations and officials regarding the control of land functions. Such indecisiveness includes legal force, firmness of law enforcers, and violation sanctions

II. RESEARCH METHODS

Judging from the type of data the research approach used in this study is a qualitative approach. What is meant by qualitative research is research that intends to understand the phenomenon of what is experienced by research subjects holistically, and by way of descriptions in the form of words and language, in a special natural context and by utilizing various scientific methods [7]. The type of approach to this research is descriptive. Descriptive research is research that seeks to explain the problem solving that is now based on data. The type of qualitative descriptive research used in this study is intended to obtain information about the extent of population and accessibility in relation to urban problems in the city of Makassar.

In accordance with the problems studied, in this study in terms of sampling classified as survey research. Survey research examines large and small populations by selecting and reviewing selected samples from the population to find relative incidence, distribution, and interrelation of psychological sociological variables [8]. Surveys that include definitions are often called sample surveys. In line with that, survey research in general is carried out to take a generalization from in-depth observations, but the generalizations made can be more accurate if used a representative sample [8]. While from its nature, the design of this study is descriptive and correlational. Descriptive research is a study that seeks to obtain information regarding the phenomena observed today [9]. In this study trying to describe data about objects or research variables that exist in changes in land use in the city of Makassar.

Referring to problems in urban areas, in general, this research is seen in terms of the sample to be targeted, so the research is in the survey category. Survey research studies large and small populations by selecting and reviewing selected samples from the population to find the incidence, distribution, and relative interrelation of psychological sociological variables [8]. This kind of survey can be said as a sample survey. In this study will describe data about objects or research variables that exist for the Makassar City research area, including population and accessibility variables.

Population and Samples

The population in the study were residents of the city of Makassar. Based on the data retrieval plan, two sub-districts from 14 sub-districts, consisting of 21 sub-districts in 134 sub-districts, each sub-district was assigned as many respondents as community leaders and staff, including some residents in general as city residents. While to support the data deep interview conducted to informant, including students, educators.

Data analysis

After the research data is collected, the activities carried out are analyzing research data with data analysis techniques in accordance with the type of research. Data description used descriptive statistical analysis techniques. Data analysis used in inferential statistical methods in this study is partial least square (PLS). PLS

has several advantages compared to other analysis tools, namely: (1) can analyze complex models, (2) data does not need normal distribution, (3) able to use small samples and (4) possible to handle missing value. This study was analyzed using primary data collected through questionnaires using the survey method. The research questionnaire consists of questions about four variables or constructs measured by a number of indicators. Each respondent was asked to convey his perception of the indicators for these variables by choosing one number from a scale of 1 to 5. Therefore, each construct needs to be tested for validity and reliability.

The final stage of the analysis in this study is testing the hypothesis. The analytical tool used to test the hypothesis is the Smart Partial Least Square (SmartPLS) software version 3.2.7. The reason for using Partial Least Square (PLS) is that there are several research hypotheses that do not yet have a solid theoretical foundation. Another reason is that PLS is able to analyze constructs with reflective and formative indicators [10] (Hair et al., 2010: 776). PLS is a powerful analytical method, because it is not based on many assumptions, data does not have to be normally distributed, the sample does not have to be large, and is able to explain the relationship between latent variables [11]. Another advantage of PLS is that it can be used on data with different scale types, able to manage multicollinearity problems between independent variables, and the results remain robust even though there are abnormal and missing data [12]. The use of PLS as an analysis method requires several steps in structural equation modeling. The PLS steps can be explained as follows:

1. Designing a structural model (inner model) that is designing relationships between variables (constructs) based on the research hypothesis.
2. Designing a measurement model (outer model) that is designing the relationship between latent variables and indicators. This study uses formative indicators.
3. Constructing the path diagram.
4. At this stage a path diagram is made that describes the relationship between latent variables (constructs) both exogenous and endogenous.
5. Convert the path diagram into the equation system.

Equation system that shows the relationship between latent variables (inner model) and the relationship of indicators to variables (outer model).

Research sites

The research location is the area of Makassar City, South Sulawesi Province, and focused on two sub-districts, namely Panakukang Sub-District and Mariso Sub-District. The object of the research, is the change in problem that involves population and accessibility variables which cause problems in cities. The research subject is the data source that was asked for information in accordance with the research problem. As for what is meant by data sources in research is the subject from which data is obtained [9]. To support the information, it is necessary to determine the informants who have competence and are in accordance with the data needs (purposive). This study describes how the community responds as an object, seen from aspects of population, accessibility, infrastructure and behavior, its correlation with the problems of the city.

III. RESULT AND DISCUSSION

This study uses a PLS SEM model and is processed with SmartPL Version 3.2.7 to evaluate the research model. Testing the hypothesis through two stages, namely testing the outer model and testing the inner model. The outer model test aims to determine the value of the latent variable correlation, cross loadings, validity and construct reliability and R Square (R2). Inner model testing aims to determine the value of path coefficient, inner T-statistical model, and the total effect value that shows the level of variation in changes in the independent variable on the dependent variable [12].

Evaluate the Measurement (Outer) Model Description of latent variables along with manifest variables are as follows:

1) The exogenous latent variable changes in land use in the aspect of population (X1) have four manifest variables (indicators), namely, the indigenous population stated by X1.1; urban stated by X1.2; migration stated by X1.3; and community mobility stated by X1.4.

2) Exogenous latent accessibility variable (X2) has four manifest variables (indicators), namely, the distance stated by X2.1; the travel time stated by X2.2; the time stipulated by X2.3; and fluency stated by X2.4.

3) Environmental risk endogenous latent variable (Y) has five manifest variables (indicators), namely, pollution stated by Y1; flooding stated by Y2; slums stated by Y3; waste stated by Y4; and congestion stated by Y5. There are criteria in using data analysis techniques with SmartPLS to assess the outer model, namely through validity and reliability. Convergent validity of the measurement model with reflexive indicators is assessed based on the correlation between the item score and component score estimated by PLS software. The individual reflexive measure is said to be high if it correlates more than 0.70 with the measured construct. For the initial research phase of the development of a scale of measurement the loading values of 0.5 to 0.6 were considered

sufficient. In this study we will use a loading factor limit of 0.50 [11]. Evaluate the measurement model for data analysis techniques to assess the outer model, as follows:

1. Test Validity

Validity testing for reflective indicators is done by using a correlation between the score of the loading factor indicator and the value of the loading factor of the construct factor. Measurements with reflective indicators show there is a change in an indicator in a construct if other indicators of the same construct change. The following are the results of calculations using the smart PLS 3.0 statistical program in table 1 and figure 1 below:

Table 1. Output Result for Outer Loading

Indicators	Population (X1)	Accessibility (X2)	Environmental Risk (Y)
X1.1	0.864		
X1.2	0.776		
X1.3	0.799		
X1.4	0.656		
X2.1		0.823	
X2.2		0.838	
X2.3		0.712	
X2.4		0.806	
Y1			0.804
Y2			0.694
Y3			0.791
Y4			0.825
Y5			0.641

A correlation can be said to fulfill convergent validity if it has a loading value greater than 0.5 [11]. Output shows that the loading factor gives a value above the recommended value of 0.5. So that the indicators used in this study have fulfilled convergent validity because of the spread of loading factor values whose values have a loading factor above 0.50 which indicates that all loading factors are valid. The following is a diagram of loading factors for each indicator in the research model:

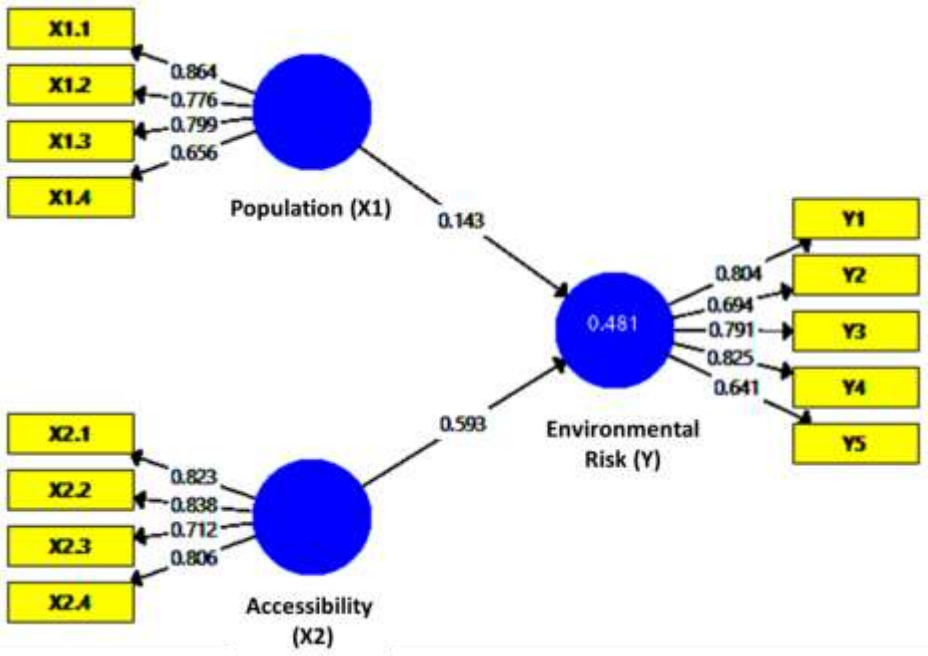

Figure 1. Output Modeling Loading Factor

2. Reliability Test

Table 2. Composite Reliability and Cronbach's Alpha

Latent Variables	Composite reliability	Cronbach's Alpha	Note
Population (X1)	0.858	0.791	Reliable
Accessibility (X2)	0.874	0.809	Reliable
Environmental Risk (Y)	0.867	0.812	Reliable

Table 2 above shows that the composite reliability value for all constructs is above 0.7 which indicates that all constructs in the model estimated meet the criteria of discriminant validity. The lowest composite reliability value is 0.858 in the Population construct (X1). Reliability testing can also be strengthened by Cronbach's Alpha, the recommended value is above 0.6 and in table 2 above showed that the Cronbach's Alpha value for all contracts was above 0.6. The lowest value was 0.791 in the Population construct (X1), so that it can be said that all latent variables are reliable and where the value is in the high category.

Testing of Structural Models (Inner Model)

1. Significance Test

The structural model in PLS was evaluated using R2 for the dependent variable and the path coefficient value for the independent variable which then assessed its significance based on the t-statistical value of each path. The structural model of this research can be seen in Figure 2.

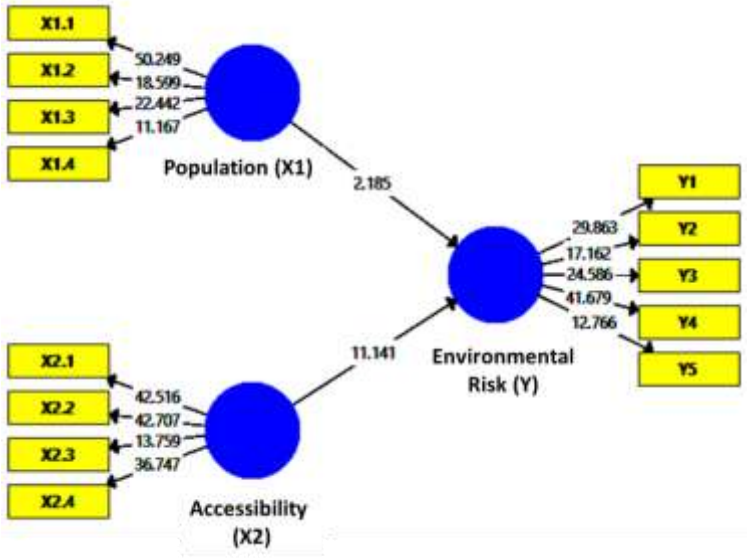

Figure 2. PLS Boothstrapping results display

To assess the significance of the prediction model in testing structural models, it can be seen from the t-statistical value between the independent variables to the dependent variable in the Path Coefficient table at the Smart PLS output below:

Table 3. Path Coefficient

Direct Effect	Endogenous Variables	Original Sample	Standard Error	T Statistics	P Value	Significance 5% Cut off>1,96
Population (X1)	Environmental Risk (Y1)	0.593	0.053	11.141	0.000	Significant
Accessibility (X2)		0.143	0.065	2.185	0.029	Significant

Based on Table 3 shows some direct effect coefficients between exogenous variables to endogenous variables. Hypothesis models are calculated using SmartPLS version 3.2.7 to determine the significance of path path coefficients that exist in the model or the significance of hypothesis support [10, 11]. The path coefficient is significant if p is less than 0.05, a summary of the results of the inner model is explained in Figure 2 and Table 3. The interpretation of the tables and figures explains the relationships between variables as follows: 1) Changes in land use in the population aspects of environmental risk have a coefficient with a positive direction. The calculation results show that the path coefficient is 0.593 or 59.3% with a t-statistic of 11.141 (t-

statistics> t-table) with a large P Value 0.000 (P value <0.05) giving a decision that the population aspect has a significant effect on environmental risk.
2) Accessibility to environmental risks has a coefficient with a positive direction. The calculation results show that the path coefficient is 0.143 or 14.3% with a t-statistic of 2.185 (t statistics <t table) with a P value of 0.029 where (the value of P Value <0.05) gives a decision that accessibility has a significant effect on environmental risk.

2. Coefficient of Determination

The determinant coefficient (R2) essentially measures how the ability of the model to explain the dependent variable. The determinant coefficient ranges from 0 (zero) to 1 (one), If R2 is greater, it can be said that the influence of exogenous variables (X) is large on endogenous variables (Y). This means that the model used is stronger to explain the influence of exogenous variables studied on endogenous variables. Conversely, if R2 gets smaller (close to zero), it can be said that the exogenous effect on endogenous variables is getting smaller. This means that the model used is not strong to explain the influence of the independent variable (exogenous) studied on the dependent variable (endogenous). The value of the determination coefficient (R2) is explained in table 4 below.

Table 4. R Square Adjusted

Variable	R Square	Adjusted R Square
Environmental Risk (Y)	0.481	0.478

Based on Table 4, it explains that the value of R2 that environmental risk (Y) has a determination coefficient value (R2) of 0.481 which means the variability of environmental risk (Y) which can be explained by the variability of variable changes in land use in population and accessibility aspects of 48.1 percent, or in other words the contribution of the effect of changes in land use on the aspects of population and accessibility to the environmental problems of Makassar City by 48.1 percent, while the remaining 51.9% is the contribution of other variables outside of this study. Hair et.al (2014) states that in general the coefficient of determination is low if it is worth 0.20, while in the results of this model the three coefficients are worth more than 0.20. So based on these results the suitability of the model is quite good.

IV. CONCLUSION

Changes in land use in the population aspects of environmental risk have a coefficient with a positive direction. The calculation results show that the path coefficient is 0.593 or 59.3% with a t-statistic of 11.141 (t-statistics> t-table) with a large P Value 0.000 (P value <0.05) giving a decision that the population aspect has a significant effect on environmental risk. Accessibility to environmental risks has a coefficient with a positive direction. The calculation results show that the path coefficient is 0.143 or 14.3% with a t-statistic of 2.185 (t statistics <t table) with a P value of 0.029 where (the value of P Value <0.05) gives a decision that accessibility has a significant effect on environmental risk.

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