The Urgency of Spatial Planning in Indonesia Based on Georisk Analysis

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Abstract

Spatial planning is a system of cities planning, space utilization and control as well as the factors that influence it. Such as Population growth, demand for regional development, economic interests and disaster. Overlapping sectoral needs into problems of spatial Indonesia now. So, it’s necessary to make analysis how that factor can influenced the pattern of spatial planning. The results of the analysis can be made Geo-risk the contents of the spatial reference stipulated in the UU and Local Regulations. This paper written using descriptive method to recognition and analysis the spatial planning and theirs pattern. Enduring physical development of geological disasters in Indonesia can be used as a reflection to make the planning, institutional and national geology research to minimize disasters caused by any of the spatial as floods, landslides, earthquakes and premature destruction of the building structure. Analysis of spatial Georisk recommends placement to maintain balance on the slope and water supply as a step in a sustainable spatial planning. Based on that analysis, at least there are five patterns to create model of spatial planning such as in the landslide potential area, earthquake potential area, volcanoes area, coastal area and overlapping area. Those patterns become recommendation to different pattern of spatial plan. Spatial planning become a very important thing to do in the city that has developed and emerging as spatial done not only in the initial planning of urban development, but also can improve the layout of the city so as to produce a sustainable spatial planning.

Keywords: Earthquake, Georisk, Landslide, Overlapping, Spatial Planning, Volcano

I. Introduction

Population growth, the demands of regional development and economic interests as well as natural disasters factor into spatial planning factors now Indonesia. According Dardak (2015) states that a growing population and a variety of other interests should form the basis for the preparation of the National Spatial Plan (Rencana Tata Ruang Wilayah Nasional/RTRWN) which can form the basis for the optimization of resources and disaster.

One case is in planning, coastal areas of overlap with other land use or non-compliance with regulations. This conflict is similar to the spatial conflict on forests in various regions as well as the port development plan Cilamaya, Karawang, West Java, which has a policy of conflict. Noncompliance with regulations and use of spatial layout will result in unsustainable. Another negative influence is the presence of disaster in response to non-compliance with the spatial plan. Floods, landslides, erosion and subsidence are multiple responses.

Based on the explanation, its necessary studies on the geological risk considerations as the basis in determining the new layout in order to maintain sustainability. This study gives a concept of how Georisk analysis can be used as a reference to make recommendations in terms of spatial and technical regulations.

II. Geoscience Framework

2.1 Indonesia Spatial Planning and Their Regulation Conflict

Based on Law No. 26/2007 on Spatial Planning, the spatial planning Indonesia has three
levels of spatial planning, there are national, provincial and district levels. Spatial plans made by the three levels of the Indonesian government should correspond to one another. The central government developed a National Spatial Plan delineate the first protected area for protected areas and for the development and cultivation followed by government level below it.

Due to the overlap of various sectoral policies related to space planning, space conflicts in various regions have the potential to create. Currently, the existing Law No. 26 of 2007 on Spatial Planning, Law No. 27 Year 2007 on Coastal Planning, Law 25 of 2004 on National Development Planning, Law No. 12 of 2008 (Second Amendment of Law No. 32 of 2004), and various policies other sectoral related to space. The impact on the ground, there is a conflict planning and space utilization in the various regions are the result of the overlapping of the policy, both in substance and institutional.

Examples of cases that occur are in planning, coastal areas of overlap regarding land conversion and damaging. This conflict is similar to the spatial conflict on forests in many regions.

The government plans to make port development Cilamaya, Karawang in West Java In order to deal with the limitations of cargo at the Port of Tanjung Priok and equitable development plans. This development project has great benefits. According to the Minister of Industry (2015) Cilamaya port development will bring down costs and add 30% charge for the electronics and automotive sectors with revenues of 78 billion USD in the period of 30 years. In addition, the construction of this port has problems in development.

The development is not in accordance with Law No. 32 Year 2014 concerning the Marine, AMDAL and Regional Regulation (Peraturan Daerah/Perda) No. 2 of 2012 on Spatial Karawang, West Java, the District of Tempuran and its surroundings, is an agricultural area and local regulations Article 38 about the area of fisheries Kab. Karawang. In addition, port development pipeline Cilamaya overlap with PT Pertamina.

2.2 Geo-Risk of Indonesia

Indonesia is a country that has a high potential natural disaster. If viewed as geographically Indonesia is an archipelago located at the meeting of four tectonic plates, the Australian continental plate, the continent of Asia, the Pacific and Indian Ocean plates. In addition to the east and south of Indonesia there is a volcanic belt that extends from the island of Sumatra and then Java, Nusa Tenggara and ends in the South, where the side of this mountain is old volcanic mountains and lowlands were largely dominated by swamps.

With these characteristics, Indonesia has the potential and proneness to disasters such as the eruption of earthquakes, tsunamis, volcanoes, floods and landslides. The earthquake that occurred because of the interaction of tectonic plates can cause a tidal wave or tsunami in the event in the ocean. With the region is strongly influenced by the movement of tectonic plates, and Indonesia often experiences tsunamis. During the period 1600 - 2000 there were 105 tsunami where 90% of which are caused by tectonic earthquake, 9% by volcanic eruptions and 1% by landslides (Latif in RAN PB, 2006).

Coastal areas in Indonesia are vulnerable to tsunami include the west coast of Sumatra, south coast of Java Island, the north and south islands of Nusa Tenggara, Maluku islands, the north coast of Irian Jaya and almost the entire coast of Sulawesi. (RAN PB, 2006).

Indonesia has a tropical climate with two seasons, wet and dry seasons, besides Indonesia also has high rainfall. Such climatic conditions coupled
with the condition topography surface and rock are relatively diverse, can lead to hydro-meteorological disasters such as floods, landslides, forest fires and drought. Along with the increase in human activities, environmental degradation is becoming increasingly severe. The environmental damage will eventually trigger an increase in intensity and number of disastrous events hidrometeorology in many areas in Indonesia.

Based on data BAKORNAS PB known between the years 2003 - 2005 there have been 1429 disasters. From these data, hydro-meteorological disasters are most common, with a total of 53.3% of the total disasters in Indonesia. Hydro-meteorological disasters are more frequent floods (34.1%) followed by landslides (16%).

III. Methodology

In this study we use the descriptive analysis. According to Sugiono (2009), descriptive analysis is a method that is used to describe or give a picture of the object under study through data or samples that have been collected as without doing analysis and making conclusions apply to the public. In other words, the writing of this paper in relation to the descriptive, analytical research is tacking problems or focus on issues as presently conducted research, the results are then processed and analyzed for the conclusions drawn, said descriptive because it aims to obtain an objective presentation of the analysis of the influence Georisk in spatial planning.

IV. Discussion

3.1 Geo-Risk as Spatial Planning Consideration

Physical construction of enduring geological disasters in Indonesia should be a reflection for building integration spatial planning, institutions and national Geoscience research that found the harmonization of authority primarily relating to the problem of geological disaster. In Reflection disaster, the government must anticipate the destruction of the cities in Indonesia by movement activities and meeting the world's three major plates are very active due to the activity of plate movement reaches 12 cm per year can endanger the lives of an estimated 240 million people who inhabit Indonesia.

All analyzes spatial conditions must be based Geo-risk that will produce specific spatial maps based on various aspects, disasters, economic, social and cultural. A reflection of the history of the flood disaster, volcanoes, land movements, earthquakes and tsunamis that have occurred in Indonesia have had to really be a lesson, that disaster will never take place again in almost the same location with a different intensity strength with time events not definitely. In the absence of good planning area, it is prone occurrence of improper use of the area or disturbed the environment. To that end, studies Geo-risk note and be a key input in the planning of an area. Thus, the region will be able to orderly planning of land allotment while maintaining environmental sustainability. An example is the use of land on the banks of the river, causing the overflow of the river at a time when the rainy season. Geologically, the river naturally will experience flooding phase, so it requires adequate flood plains so that the overflowing river is not intrusive. This flood plain should not be earmarked for residential or industrial, but can be used as a green open space.

3.2 Management of Indonesia’s Spatial Planning based on Geo-Risk

a. Concept

Based on spatial Geo-risk a spatial concept which bases its geological potential risks in its design. With complex geology in Indonesia becomes an important thing to implement and take into account the geological risks. The spatial concept based Geo-risk are follows:

1. Design the spatial planning in the Landslide area

Housing dominance in Indonesia is located on a steep slope areas. Handling in the design of this area is necessary to reduce landslides. In the spatial planning area are stabilizing slopes of water saturation and loading on the slopes. Figure 3.1
shows the minimum parameters that must be met in order to establish a stable and secure slope for housing. The parameters of a reference to build residential or other functions. Some simple components are like a tree, retaining wall and the pipe line. The component serves as a counterweight to control parameters relevant in the context of the slope stabilization. Here is an animation as a recommendation slope engineering for residential areas.

Figure 3.1 Layout Design Safe Slope Avalanche (a) the slope with retaining wall, forests and gardens, (b) retaining wall, plumbing and pool, (c) the tree and field (d) (Kentucki, 2015)

On top of the slope area can be used for housing with consideration for the construction of retaining wall, plumbing and trees as a deterrent in the areas of water saturation slope. If the above parameters are not met, then that will happen is as follows:

Figure 3.2 Landslide (Kentucki, 2015)

The above recommendations form the basis for the construction of housing or other land uses. Especially the Lembang, Pangalengan, sumedang and several other areas that have a high potential for landslides

2. Design of Spatial Planning in Flood Potential Area

Flood occurred in various regions in Indonesia such as Jakarta, Bandung, and some city areas in Indonesia. Flood became the foundation for creating spatial created to avoid it. The concept of spatial planning to solve flood problems related to spatial future.

In essence, the incidence of flooding due to the overflowing river water contained in a city beyond its capacity. Setting the amount of water to get into the city is the key word in this concept. Neither set jetting flow in the upstream and downstream. To make recommendations in the area of spatial flood is on the body of the river and cities structure.

Figure 3.3 Spatial Planning in Flood Potential Area (Kentucki, 2015)

There are several methods that can be used to overcome this problem such as creating floodways, dams and flood embankments.

Figure 3.4 Flood in City (Kentucki, 2015)
3. Design of Spatial Planning in the Region Potential Earthquake

In the area of the spatial planning quake, some things to consider is the activity of the fault and the concept of home or room that was built. The active faulting associated with the point and the magnitude of the earthquake epicenter. While the concept of harm related to the mitigation measures in response to the earthquake with the concept of earthquake resistant houses. In the area of spatial planning quake, Georisk analysis recommends the concept of home and earthquake-resistant buildings in order to avoid premature damage to buildings.

4. Design of Spatial Planning in the Regional Spatial Volcano

With Indonesia lay the Ring of Fire in the World, the spatial planning volcanic region becomes indispensable. In the area of spatial planning is attention to geological conditions, the distance to the peak of the volcano, the placement of space, design houses and accessibility. Geological conditions can be included in the classification of secure placement within the home region of volcanoes would recommend the area that can be used as residential or other functions in terms of the direction of the eruption of the volcano. In the response, the area housing the volcano should pay attention to the design of the house. One design right house volcano area is home whose roof has a slope of more than 450 as mitigation measures against volcanic ash.

5. Spatial Layout Design in Coastal Regions

With a long coastline and the magnitude of potential beneficiaries Indonesian owned, then the arrangement of space in this area is needed. In the arrangement of space in coastal areas, a few things that must be considered is the place, the secondary effects and hazards. Although there are several methods of doing reclamation, spatial planning is still needed in this area, given the reclamation method still has a secondary effect. Reclamation of coastal areas which serve to address this need to minimize abrasion, tsunami or other secondary effects of the economic, social and cultural. Their abrasion will certainly lead to erosion of the shoreline and the beach is not likely to be exhausted. In addition, the intensive development of coastal areas will also cause tidal flooding. Based on these exposures, the placement of land on the right lithology indispensable.

6. Design of Spatial Planning in the Regional Spatial Overlapping

In the spatial arrangement of overlapping, some things that must be considered are the level of urgency, the secondary effects and legal parameters. The degree of urgency reflects whether development was necessary or not. Secondary effect describes the influence of the building or other special. A case in point is in the planning Cilamaya port, which has an influence on the pipe of Pertamina and that function. While the parameters of the law are compliance with laws and regulations spatial regions within the parameters of the AMDAL and land conversion. In this case required the relocation of the manufacture of the port to avoid losses Pertamina. Recommendations geology is required in this case.

b. Application Strategy of Spatial Planning Concept in Indonesia

Geo-risk analysis forms the basis for spatial planning Indonesia. Based on the above concepts, required the cooperation of all parties to implement these concepts, and in this case the government, stakeholders and society. Government geological factors enter into the content of the laws of spatial and local regulations regarding the layout. Government regulators are expected to be made.
Overlapping policies as is now happening is not expected to recur for the achievement of a sustainable national spatial planning. In addition, the presence of Georisk in the spatial plan will provide a reference for stakeholders to think again if you have an interest in development in areas prone to geological risks are great. The government can make the Georisk analysis to be combined with other regulations as a condition for a project to be executed.

In addition, to the holders of the project and stakeholders recommended to take into account the Georisk. The results of this analysis will provide a reference direction of the development of a project and the methods used in the project. The advantage to stakeholders is extend the life of the building, adding profits and add to the functionality of the buildings under construction. In addition, adding the image of environmentally friendly is also one of its advantages.

3.3 The Urgency of Spatial Planning of Indonesia

Spatial become a very important thing to do. Some cities in Indonesia such as Jakarta, Bandung and other cities are an example of a city that has a poor layout. This is evidenced by the well-organized layout of the city, slums, flooding, pollution of rivers and some other implications. Spatial is not only done in the initial planning of urban development, but also can improve it by several methods such as relocation. Population growth, investment interests and various other sectoral interests will trigger the uncontrolled growth of the building. Opportunities for the appearance of a conflict of interest will be even greater. Knowingly or not land conversion be considered commonplace in the future if the function and arrangement are not controlled. The secondary threat is the disaster occurred. The placement of the wrong space and structure will increase the level of damage to buildings or areas. Hotel and residential development on the shoreline will lead to abrasion, housing construction in the area is rather steep slopes-steep would potentially landslides and some other geological risks. The determination of the appropriate spatial and performed with a variety of considerations to be paramount to do

Conclusions

a. Consideration Geo-risk analysis will provide recommendations in the pattern and spatial system in Indonesia, especially for the determination of the location, structure and other materials related to the construction of the building.

b. Recommendations Geo-risk analysis can be included in the content of both the Law of spatial regulation, and other local regulations.

c. Cooperation between the various related fields is necessary to operate a sustainable spatial concept for the future of spatial Indonesia.

To build a sustainable spatial planning, takes the role of all parties to cooperate in controlling development in accordance with the layout in Indonesia. The concept and design of the proposed layout will not run anything as perfect as if cooperation is not established. Reforming the Indonesian space early it, is the first step to organize the future of Indonesia.

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