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Bandung Urban Sprawl and Idle Land: Spatial Environmental Perspectives

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Abstract

This paper addresses the growth of the urban population resulting in sprawl urban form and its relationship to land abandonment (idle lands). Bandung Metropolitan Area (BMA) in West Java was selected as a case study. Bandung urban topography is a shaped basin, thus has restrictions in the urban's physical growth. This research uses the Geographical Information System (GIS) approach to obtain urban land use patterns and the distribution of idle lands. The land use data were used the historical data from year 1991 to 2012. This paper discusses the impacts of the idle lands due to the urban sprawl, in the term of economic, ecological, and social aspects. This research found the number of idle lands scattered in various parts of the city. Based on these findings, the policy for managing urban development and the idle lands could be potentially improved.

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1. Introduction

Urban development expands along with the increasing of the population. Urban population growth, both from the natural increasing (births and deaths) and urbanizations, endorses sub-urbanizations to the outskirts. Though this outskirts are the fertile, productive, and irrigated agriculture land. The urban expansion also

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extends to the considered as conservation and preservation area in the hills, ie. forests, wetlands, and wildlife habitats. [8][12]

Bandung Metropolitan Area (BMA) continues to develop with high economic growth, above 8 percent per year[3]. Services sector and creative industries become the main sectors in its growth profile. Geographically, BMA is basin shaped, where the boundaries are hills and mountains, which giving more restriction to the urban physical growth than plain area.

In fact, one of the most important negative impacts of this urban's physical growth is the urban sprawl growth. This urban sprawl become more uncontrolled, more land use converted from agricultural to non-agricultural land. The effect of the urban sprawl spreading is more rarely water sources and clean water at dry season, more floods at rainy season, highly sedimentations, more air pollutions, and more low quality of water surface because of industries and domestics[5][8]. These situations also indicated in BMA [6].

Related to urban land resources, the residences who live in the spreading area of BMA choose to live in the suburbs. Since the land prices in the suburbs are cheaper than the centers. The urban central developed as business and office area. The Developers, who lack the capital or actually as the speculators, let the lands or buildings become displaced. This causes the land to be idle in the city center. Meanwhile in the suburbs, the speculators, consciously or not, buy the cheap lands and wait for the right time to build or sell the lands or buildings for gaining profit from increasing value of the lands. A lot of the fertile agriculture purchased from the farmers and then just abandoned [5].

The purpose of this paper attempting to analyze the impact, in terms of economic, ecologic, and social aspects of population growth resulting in urban sprawl form and its relationship to land abandonment (idle lands). This research uses spatial information of urban land use patterns and the distribution of the idle lands.

2. Methodology

This research uses spatial analysis method. The spatial information system could help to analyze the correlations and interactions between population growth, urban physics, idle lands distribution, and environment impacts in time series and a spatial way. Ecological, economical and social indicators, based on the underlying data, could be used to simulate and to assess spatially related decisions [6].

BMA consists of Bandung City as a capital city of West Java, five districts and eight sub-watersheds. We used all districts to study of urban land use patterns and samples to study the distribution of idle lands. The land use data used the historical data from year 1991 to 2012. Primary survey conducted in the middle of 2013 to obtain the distribution of idle lands. Figure 1 shows the method to fulfill this paper purpose.

The series of land use data interpreted from remote sensing data. The data were processed using Geographical Information System (GIS) approach to overlay and to analyze the spatial information. The next steps performed analysis of population growth and urban physical growth with an exponential regression mathematical equation, mapping the distribution of idle land parcels and model, and analysis of environmental perspectives (causes and environment impacts). The last of this paper offers the conclusions of the research.

3. Results

3.1. Bandung Urban Growth

BMA's population increased from 5,079,348 in 1991 to 9,341,995 in 2012. The average of population growth is above 3% per year. Similarly, the physical area also increased from 3,428,249 hectares in 1991 to 6,581,286 hectares in 2012. BMA physical growth from 1991, 1997, 2001, 2005, 2008, and 2012 presents in spatial information as indicated in Figure 1. Based on this results it appears that the physical growth showed

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