

## THE BANDUNG CITY SPATIAL PLANNING POLICIES IN GEOLOGICAL PERSPECTIVE\*

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### ABSTRACT

The Bandung city has an advantageous position, both from geographical, geological, political, and strategic aspects. The location of Bandung city, which is in the highlands, is famous for its cool weather. Since the colonial era of the Dutch East Indies, Bandung City has been the center of government and research in the field of geology. One piece of evidence that is still well preserved is the Geology Museum. Even the impression of geology is still strong with the many government institutions in the field of geological development in this city. The aspect of natural resources, including geology, is also the main asset to organize the Bandung city. The volcanic products that underlie this city become a fertile land for agriculture and the mining industry for construction and industrial materials. Several rivers also flow in this area. The hilly panorama with the post-volcanism phenomenon is an attraction for developers in the tourism sector. The groundwater potential is also abundant. The development of Bandung City does not mean that there are no obstacles. The significant increase in population has earned this city the nickname of the most populous city in West Java. If the city government cannot control the increase in the population density, it is not impossible that this city will be a city that does not have the appeal again. In fact, now the impact is already being felt, traffic jams, floods, waste, etc. Bandung city spatial planning should be carried out in an integrated manner, involving historical, geological, geographic, socio-cultural, political, and strategic aspects.

**Keywords:** Bandung city, geological perspective, geostrategic, spatial planning, policies

### INTRODUCTION

The policies taken by stakeholders in zoning are based on various aspects. Apart from geographical aspects, geopolitical and geostrategic aspects are also considered. The terms Geopolitics and Geostrategic are usually used to cover a nation and a State. However, nowadays, with the development of regional autonomy, this concept is also starting to be adopted by communities that occupy part of the territory of a country. Etymologically, geopolitics comes from the word "geo" (Greek) which means the earth which is the living area. While politics from the word polis which means the unity of society that stands alone or the State, and "teia" which means affairs (politics) means the general interest of citizens of a nation (Sumarsono et. al, 2005). Geopolitics is

defined as the science of state administration in which every policy is related to the geographic issues of the region or place of residence of a nation. Frederick Ratzel introduced the term political geography, Rudolf Kjellen calls geographical politics and is abbreviated as geopolitics (Amin, 2009). The main elements of geopolitics consist of:

- 1) The conception of space introduced by Karl Haushofer concluded that space is a container for political and military dynamics.
- 2) The conception of the frontier (imaginary boundaries of two countries)
- 3) The conception of power politics related to national interests
- 4) State security conception

Geostrategic is a strategy in utilizing the geographic conditions of a country to determine goals and policies. Geostrategic is the use of the environment to achieve political goals. Geostrategic is also to create and maintain the nation in a pluralistic society (heterogeneous).

The city of Bandung has an advantageous position, both from geographical, political and strategic aspects. It's located at the crossroads of major cities that allow various communities to mingle (Figure 1). Its position is on a plateau with cool air so that since the days of the Dutch East Indies colonial rule, the city of Bandung has become the center of government, resort, and research in the field of geology. One piece of evidence that is still well preserved is the Geology Museum. Even today, the impression of geology is still strong with the many government institutions in the field of geological development in the city of Bandung.

Now, with the times that are controlled by the rapid development of technology, the city of Bandung seems to have lost its characteristic. The policy seems blunt. Development penetrates almost every corner of the City, without leaving the slightest open space as a counterweight the population continued to grow as if it could not be controlled. Hopefully, the goodwill of the autonomy holders to create a "berhiber" city of Bandung will continue to resonate followed by concrete actions with the support of all parties. "Berhiber" stands for clean green and flowering.

### **The regional geological setting of Bandung city**

Physiographically, Bandung City is included in the Bandung Zone (Van Bemmelen, 1949). This area is surrounded by volcanic mountains in the north. Meanwhile, in the south and east are the plain areas. Meanwhile, in the west, it is bordered by karst hills. Regionally, Bandung City is located in the northwestern part of the Bandung Basin (Fig. 1). The geological profile from north-south that intersects the Bandung Basin is shown in Fig. 2. Based on the picture, it can be seen that (from old to young) the bases of Bandung City are Pre-Tertiary basement complex, Tertiary

rock, Plio-Pleistocene batholith, and Quaternary deposits. Several faults border this area with other areas, including the Lembang fault (in the north) and the Malabar-Tilu fault (in the south).

Geographically, the Bandung Basin is a plateau surrounded by mountains and hills (Alzwar et al., 1992; Dam, 1994; Silitonga, 2003; Tjetjep, 2004). The landscape in the area is in the form of a basin, elongated in a relatively northwest-southeast direction with a length of up to 60 km and a width of about 40 km. The distribution starts from the Nagreg area in the east to Padalarang in the west. Physiographically, this area is included in the Bandung Zone and Quaternary Volcano (van Bemmelen, 1949). In the north, it is bordered by Mt. Tangkuban Perahu, Mt. Burangrang and Mt. Bukittinggul. On the east side, there are Mt. Masigit, Mt. Mandalawangi, Mt. Sangianganjung and Mt. Kareumbi. In the south line is G. Malabar, G. Haruman, G. Chakra and G. Rumbia. Further to the west, several small cone-shaped hills around Cimahi, Soreang and Cipatik.

Geologically, the Bandung Basin can be divided into three parts, namely the eastern, central and western parts. The eastern part of the Bandung Basin starts from the Nagreg plateau to Cicalengka. The Cicalengka area to the G. Lagadar complex in Cimahi includes the central part of the Bandung Basin. Meanwhile, the western part of the Bandung Basin covers the Cimahi, Batujajar, Cililin and Saguling Reservoir areas. Several previous researchers, including Dam (1994), stated that what is meant by the Bandung Basin is a basin in the middle.

Bandung basin sediment composed of an ancient lake that is surrounded by old volcanic landform Quaternary (Dam, 1994). The landscape that surrounds the Bandung Basin is generally composed of Quaternary volcanic rocks in the form of lava, volcanic breccia, and tuff (Alzwar et al., 1992; Silitonga, 2003).

Several faults in the Bandung Basin are indicated to be classified as active faults, which are reactivation and development of Tertiary-aged faults (Fig. 3), including the Sukabumi - Padalarang Fault, which continues to Cicalengka (Katili & Sudradjat, 1984; Soehaimi et al., 2004) and the Lembang Fault on the

north part (Silitonga, 2003). Based on the recorded earthquake events, Bandung and its surroundings are one of the areas prone to earthquake hazards in Indonesia (Soehaimi et al., 2004).

### **Potential and Constraints to Development of the Bandung City**

Geographical conditions and geological settings can be potential as well as an obstacle for the development of Bandung City. Geographical position at a crossroads with easy access to major cities in Java Island, and close to the national capital is an invaluable potential (Fig.1). The mobility of population activities is relatively fast and covers a wide area. But on the other hand, some obstacles can arise at any time and become serious threats. Plural population freely in and out of Bandung City. Various studies and research results show that in addition to increasing population, crime usually increases. This will be a threat to the resilience of Bandung City.

The geological setting can also be a potential and obstacle in the development of Bandung City. Volcanic products can be used as construction and industrial materials to support infrastructure development and leisure facilities. However, if the utilization is not controlled, this condition can backfire for the continued development of Bandung City. Active faults that control the surrounding landscape can also become obstacles to development because they can disrupt land stability and have an impact on the damage to existing infrastructure.

The phenomenon of flooding is common in the Bandung Basin area when the rainy season arrives, especially in Dayeuhkolot, Majalaya, and in other areas in the central and southern parts of the Bandung Basin. Siltation of rivers due to uncontrolled erosion levels in the upstream area is one phenomenon that needs to be considered. Another implication that occurs due to an increase in erosion intensity, reaching more than 3,047,600 tons/year in the upstream area is silting of Saguling Reservoir, Cirata Reservoir and Jatiluhur Reservoir, which are in the Citarum River channel (Haryanto, 1994; Sjafrudin, 2003; Sukiyah et al., 2004, 2006; and Purbawinata, 2004).

Floods in Bandung City are mostly caused by drainage infrastructure that is not balanced with the expansion of regional development as residential and industrial land. The ratio between infiltration zones, drainage networks, and built-up land is not balanced. Ideally, if there is an increase in the development of residential areas, the drainage network and infiltration zones should also be increased.

The city of Bandung is listed as the most populous area in West Java. The population density of Bandung City reaches 14,228 people per square kilometer. The population of Bandung City reaches 2,393,633 people (Pikiran Rakyat, 2010). This number is far from ideal. Supposedly, everyone square kilometer the population is 1,000 people or 40 people per hectare. In 2025, it is projected that the population of Bandung City will reach 2,592,766 people (Setiawan, 2006). Bandung population based on population projections in 2019 was 2.507.888 people consisting of 1.263.916 inhabitants of the male and 1.243.972 female population people. When it was compared with the total population in 2010 as the results of the population census, it had increased by 0.17 percent (BPS-Statistics of Bandung Municipality, 2020). If the City Government cannot control the increase in the number and quality of population development, it is not impossible that this city will become a city that is no longer attractive as a comfortable place to live. In fact, now the impact is already being felt, traffic jams, floods, unprofessional waste management, etc.

### **Geopolitical and Geostrategic Aspects in Structuring Bandung City**

Based on the explanation above, it appears that the arrangement of Bandung City should pay attention to geographical, geological, historical, and socio-cultural aspects. Geopolitics and geostrategic in the management of Bandung City should be the main pillars before making spatial planning policies, not just prioritizing economic aspects. Each of these aspects has the potential to support and constrain obstacles. The potential cannot be utilized absolutely 100%, because there are many other considerations concerning the sustainability of a generation. Likewise, obstacles cannot be avoided entirely. The

wisest step is to make the most of the potential and reduce constraints as much as possible.

The policies that have been produced need regulations to oversee their implementation. Every policy taken contains the risk of positive and negative impacts. If the formulation of spatial planning policy for the Bandung City is based on optimal geopolitics and geostrategic, God willing, Bandung will be better. Bandung, which remains "berhiber" must still exist and needs full support from all citizens to protect it. Hopefully Bandung as "Parijs van Java" is not just a memory of the past.

## CONCLUSION

The Bandung city has a strategic geographical position, as well as its geological setting. The optimal utilization of the potential of both can support geostrategic and geopolitical for structuring the Bandung city. The increase in population needs to be controlled and maintained in quality. The availability of quality human resources will also determine the direction of Bandung City structuring policies that are environmentally sound. An increase in the built-up area must be balanced with an adequate increase in infrastructure. The ratio of the drainage network according to the area built must be assessed early, to reduce the risk of flooding.

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Source: <https://www.google.com/maps/>

Figure 1. The position of the Bandung City area in the context of the Bandung Basin and West Java region

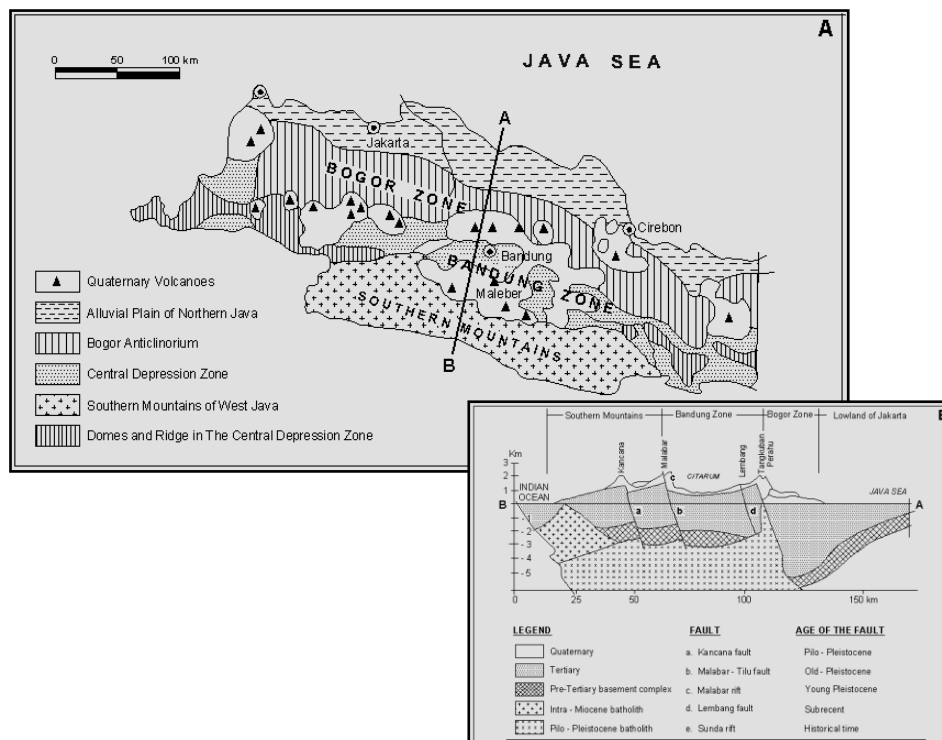


Figure 2. The geological cross-section intersects the Bandung Basin, showing the configuration of the constituent rocks and tectonic elements that control the Bandung Basin (van Bemmelen, 1949).

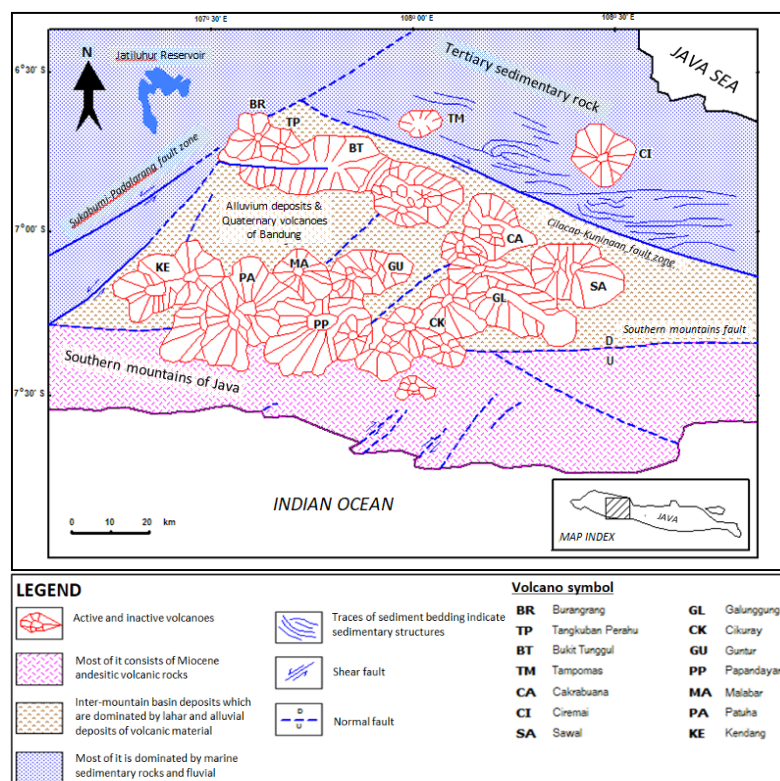


Figure 3. Regional geology around the Bandung Basin interpreted from Landsat images, showing the distribution of Quaternary volcanoes and active faults (Katili & Sudradjat, 1984).