Simulation-based framework of bonus zoning to provide public space in Bandung city

E Sugiana¹*, T S D Hasan¹, D Zulkaidi¹ and N Prilandita¹

¹School of Architecture, Planning, and Policy Development, Institut Teknologi Bandung, Ganeca Street 10 Bandung 40132, Indonesia

*E-mail: ervan.sugiana@gmail.com

Abstract. Bonus zoning is a zoning regulation tool that allows developers to get more density in exchange for public facilities improvement or provision. Bandung already has designated areas for Bonus Zoning within their Local By-law No.10/2015 on Detailed Spatial Plan and Zoning Regulation. This research aims to identify potential public space through zoning regulation tool along with the accompanying compensation. We simulate the formula of the provision of compensation on several areas in Bandung, within city/sub-city center and outside city/sub-city center. The compensation value is depending on land price and its location relative to the city center in the designated area. The average compensation in the city/sub-city center is higher compared to compensation outside the city/sub-city center. When applied correctly, bonus zoning can balance the intensive development and improved livability of its area.

1. Introduction

Public open space is one of the key elements in the form of community life in urban areas [1] and improving physical environment, social interaction, and economics of the city to some extent [2]. Public open space is defined as space that can be accessed by the public as a user of the space because the core of the public space itself is the place where functional activities take place which brings together the community both in daily activities and periodic activities [3].

The growth and increasing development of Bandung City raise the need for public open space. Bandung City faces difficulties to provide enough public green open space. The provision of green space in Bandung City, based on municipality data, in 2015 only reached 12.15% of the total area of Bandung which is 2,032,21 Ha from 16,729,65 Ha. The proportion of green open space consists of 6.39% public green space and 5.73% private green space. Based on Spatial Planning Act No. 26/2007, 30% of the city’s total area should be allocated as urban open spaces, consisting of 20% public open spaces and 10% private open spaces. Therefore, the area of public open space is still lacking. This is due to the limited budget for maintenance, the lack of public awareness to maintain the existing park.

Provision of public open space can be obtained through bonus zoning. There is a zoning regulation technique which is a spatial control tool contained in Local By-law No.10/2015 on Detailed Spatial Plan and Zoning Regulation, namely zoning bonuses. Bonus zoning or incentive zoning is a zoning regulation tool that allows developers to get more density by increasing its Floor Area Ratio (FAR) in exchange for public facilities improvement or provision [4]. FAR is defined as the total building floor area of a zoning lot, divided by the lot area of that zoning lot [5]. The default FAR in Bandung City for a commercial area is set at 2,1.
Zoning regulations have an important role in the control phase of spatial utilization in Indonesia which is still in the initial implementation stage so that it requires further exploration of the technical implementation procedures. The application of zoning regulations will be more effective and can be achieved the purpose of controlling the spatial plan with good understanding regarding procedures, techniques and methods of regulation, both by the government and the community.

This research aims to identify potential public space provision through zoning regulation tool along with the accompanying compensation. As bonus zoning is still uncommon in Indonesia, its implementation requires caution, so it will not give the impression of business as usual where developers can build as much as they desire if they can afford the compensation value. When applied correctly, bonus zoning can provide local governments with an additional source of funding to boost development, while maintaining the livability of its area [6].

2. Bonus Zoning Framework

This research uses a quantitative method by identifying the provision of compensation formula in applying zoning bonus zoning regulation technique. There are several steps to obtain the research aim, include:

- Examining normative legislation studies and policies relating to zoning bonus to elaborate on the legal aspects of applying zoning bonuses in Bandung.
- Identifying the location in the city of Bandung which allows the zoning bonus to be applied in accordance with the location criteria set out Detailed Spatial Plan and Zoning Regulation
- Identify compensation provisions in the application of zoning bonus zoning regulation techniques. This step includes calculating the amount of FAR (floor area ratio) that will be obtained by the applicant by considering the compensation land that has been reviewed. The calculation is carried out using the formula that has been determined and the results of these calculations become the main recommendations.
- Simulates compensation in the application of bonus zoning regulation techniques in several locations, particularly in the city center and sub-city center.

Although in a city like New York, incentive zoning is creating a privately-owned public space [7], in this case, the public space that has been built by the developer is given to the municipality. The recent study from Bandung City Agency of Spatial Planning in 2016 shows the calculation of the amount of compensation value that the developer has to submit to the municipality and the additional floor area that developer gets is shown in equation (1).

\[ A = \frac{I}{C} / FAR_{base} \times Taxable\ value\ of\ land \] (1)

Where;  
C = Compensation value (IDR)  
I = Index  
A = Additional floor area (m²)  
FARbase = Allowed FAR in Zoning Regulation  
The Taxable value of land = Sale value on tax object/SVTO (IDR)

The initial process of giving this bonus zoning is that the municipality has a plan for the location, size, and construction cost of public spaces. Cost of public space provision and construction converted into the additional floor area. Land prices are very influential, both at the construction site and at the location where public spaces are built. By mapping the price of land all over the city, compensation for zoning bonuses can be estimated.
3. Data

The determination of the area that can be applied to bonus zoning is carried out based on Local By-law No.10/2015 on Detailed Spatial Plan and Zoning Regulation. Bonus zoning cannot be applied in all cities, only in certain designated places. By referring to local regulations, the intensity level of the location can be mapped with bonus zoning. We identify the value of land in the city of Bandung which is subject to a zoning bonus. The land value rises as it goes to the city center and several strategic main roads. Based on Sale value on tax object data, the range of land values at the zoning bonus location is five hundred thousand rupiahs to over 10 million rupiahs/m².

Figure 1. Bonus zoning calculation framework

Figure 2. Land value at bonus zoning designated area
4. Bonus Zoning Compensation

4.1 Public Space Provision Cost

The cost of building public spaces includes [7] land acquisition, land clearing, open space designing, construction, operation, maintenance, and control. For this study, the cost component measured is only until construction. The focus is compensation calculation, and, although not discussed much, the scenario used is where the private construct the public space then give it to the municipal government to be managed. Because the public space managed by the private sector limits its function to some degree [8]. The simplified price of constructing public open space costs is assumed around two hundred thousand rupiah per square meter [9]. This price is then added to the land price, so the price of providing public space can be estimated.

4.2 Compensation

The specified development location is in a strategic location (city centers or sub-city centers) in Figure 2. The planned public space location is also near the development area, in the activity center. The zone at those centers is commercial area zone. Using the formula (1), the calculation is carried out presented in Table 1, the assumption that every proposed developed area is a commercial zone. The index is given value from Bandung City Agency of Spatial Planning in 2016. With the existing index, it was found that by providing an amount lot of public space, each location was rewarded differently.

| Location of the development area | Proximity to city/sub-city center | Index | estimated sales value of taxable object per m² at the developed area (IDR) | estimated sales value of taxable object per m² at public space area (offsite) | Obtained additional floor area (m²) for every 1 m² public space |
|---------------------------------|---------------------------------|-------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| PPK Alun-alun                   | City center                     | 1     | 15,000,000                                    | 7,500,000                                      | 1.08                                          |
| PPK Gedebage                    | City center                     | 0.5   | 3,500,000                                     | 3,500,000                                      | 4.44                                          |
| SPK Sadang Serang               | Sub city center                 | 1.4   | 1,500,000                                     | 1,500,000                                      | 1.70                                          |
| SPK Maleer                      | Sub city center                 | 1     | 7,500,000                                     | 1,500,000                                      | 0.48                                          |
| SPK Arcamanik                   | Sub city center                 | 0.8   | 3,500,000                                     | 750,000                                        | 0.71                                          |
| SPK Kordon                      | Sub city center                 | 1     | 7,500,000                                     | 750,000                                        | 0.27                                          |
| SPK Ujung Berung                | Sub city center                 | 0.7   | 15,000,000                                    | 350,000                                        | 0.11                                          |
| SPK Derwati                      | Sub city center                 | 0.6   | 3,500,000                                     | 3,500,000                                      | 3.70                                          |
| SPK Kopo Kencana                 | Outside city/sub city center    | 1.4   | 7,500,000                                     | 1,500,000                                      | 0.34                                          |
| SPK Sadang Serang               | Outside city/sub city center    | 1.4   | 1,500,000                                     | 1,500,000                                      | 1.70                                          |
| SPK Maleer                      | Outside city/sub city center    | 1     | 3,500,000                                     | 1,500,000                                      | 1.02                                          |

The biggest reward is in Gedebage. By constructing 1 m² of public space in Gedebage, developers will get 4.44 m² of additional floor area. In near sub-center such as Derwati, the compensation value is high, because of the high index, located in Bandung Timur as the proposed direction of city development. Such as SPK Kordon, where there is still available relatively lower land price to build
open space, developers are given lower compensation. The average compensation in the city/sub-city center is 1.56 m² additional floor area for every 1 m² public space. The average compensation outside city/sub-city center is 1.02 m² additional floor area for every 1 m² public space. Providing public space in the city/sub-city center is rewarded with higher compensation compared to those that aren’t.

5. Conclusion

This paper provides an overview of the simulation of the amount of bonus zoning compensation calculations in several areas in Bandung City. The compensation value is depending on land price and its location relative to the city center in the designated area. The current index corresponds to the direction of city development, giving greater rewards in center city, and the pushed development part of the city. This paper does not exam economic or other incentives designed to attract development.

Zoning incentives are suitable to apply to cities with high market pressure which indicates a high interest in development but limited land availability. It is necessary to study the city to determine the index in which direction the development will take place, as well as the part of the city where the zoning bonus requirements are high and which ones are low.

Zoning bonuses can be given by the Government while continuing to put forward a scenario of collaboration between the City Government and private developers. A certain public space compensation must be prepared by the developer to increase the extent of a certain floor is determined by the location of the building and the location of the public open space. By assigning a certain amount of index, the municipality can direct the proposed development areas. The municipality can involve developers for providing public space with clear and binding regulation, so the intensive development will be balanced with improved livability of its area.

References

[1] Woolley H 2003 Urban Open Spaces (London: Spon Press) p 2
[2] Shirvani H 1985 Urban Design Process (New York: Van Nostrand Reinhold)
[3] Carr S, Francis M, Rivlin L and Stone A 1992 Public Space (New York: Cambridge University Press)
[4] Homsy G C, Abrams G and Monastra V 2015 Public Administration Faculty Scholarship, 5 Incentive Zoning: Understanding a market -based planning tool.
[5] 1982 Incentive zoning in New York Australian Planner 20:1 pp 49-51
[6] Hasan T S D, Zulkaidi D 2018 Assessment of Potential Locations for Bonus Zoning in Bandung Journal of the Malaysian Institute of Planners 16 pp 231-238
[7] Zulkaidi D 2010 Reinstatement Model of Public Investment in the Provision of Urban Open Space. Arte-Polis 3 International Conference on Creative Collaboration and the Making of Place.
[8] Nemeth J 2009 Defining a Public: The Management of Privately Owned Public Space Urban Studies 46 (11) pp 2463-2490
[9] Nitdiawati 2011 Perencanaan Ruang Terbuka Hijau (RTH) di Jalan Bhayangkara Surakarta. Undergraduate Thesis. Universitas Sebelas Maret Surakarta

Acknowledgements

Authors wishing to acknowledge the Ministry of Research Technology and Higher Education of Republic Indonesia for their funding under Primary Research of Higher Education scheme that made this research possible.