VOLUME 14 No. 1, 22 December 2024 Pages 83-92

DEVELOPING POST-PANDEMIC LIVABLE AND SUSTAINABLE CITIES: PROVIDING SPACE FOR URBAN ACTIVITIES IN BANDUNG

PENGEMBANGAN KOTA PASCA PANDEMI YANG LAYAK HUNI DAN BERKELANJUTAN: PENYEDIAAN RUANG BAGI KEGIATAN PERKOTAAN DI KOTA BANDUNG

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Submitted: 2024-09-24; Revised: 2024-11-09; Accepted:2024-11-10

ABSTRAK

Penyediaan ruang untuk aktivitas perkotaan dan menjaga kelestarian lingkungan hidup menjadi isu kontradiktif dalam pembangunan perkotaan, termasuk Kota Bandung, yang diperburuk dengan adanya COVID-19. Dengan terbatasnya daya dukung, dampak COVID-19, dan tingginya aktivitas perkotaan, terdapat permasalahan mengenai dampak aktivitas perkotaan terhadap kualitas lingkungan perkotaan pascapandemi. Oleh karena itu, perlu dilakukan penelitian mengenai keterbatasan daya dukung Kota Bandung dalam menampung aktivitas perkotaan pascapandemi. Penelitian ini bertujuan untuk merumuskan konsep dan kerangka pembangunan Kota Bandung pascapandemi sesuai dengan kemampuan lingkungan dalam menampung aktivitas perkotaan. Pendekatan dan metode analisis yang digunakan dalam penelitian ini adalah deskriptif-kualitatif yang dapat menggali dan berfokus pada pendalaman literatur yang digunakan sebagai dasar penyusunan konsep. Secara umum, hasil penelitian ini berupa konsep pembangunan pascapandemi yang layak huni dan berkelanjutan, termasuk rumusan indikatornya, untuk Kota Bandung yang mencerminkan apa yang perlu dikembangkan pascapandemi. Penelitian ini cukup penting karena dapat melihat karakteristik Kota Bandung dan merumuskan pengembangannya sesuai dengan kondisi Kota Bandung sehingga hasil ini dapat digunakan oleh pemerintah atau perencana sebagai bahan evaluasi atau saran bagi Pemerintah Kota Bandung dan Pemerintah Provinsi Jawa Barat dalam memantau dan mengevaluasi pelaksanaan strategi, kebijakan dan program dalam pembangunan yang sesuai dengan kapasitas lingkungan di Kawasan Perkotaan Cekungan Bandung dan Kawasan Bandung Utara.

Keywords: *Layak Huni; Pembangunan Pasca-pandemi; Keberlanjutan; Aktivitas Perkotaan.*

ABSTRACT

Providing space for urban activities and preserving the environment are contradictory issues in urban development, including Bandung City, which COVID-19 exacerbates. With limited carrying capacity, the impact of COVID-19, and high levels of urban activity, there are issues regarding the impact of urban activity on the quality of the post-pandemic urban environment. Therefore, it is necessary to research the limitation of Bandung City's carrying capacity to accommodate post-pandemic urban activities. This research aims to formulate a post-

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pandemic development concept and framework for Bandung City based on the environment's ability to accommodate urban activities. The approach and analytical method used in this research is descriptive-qualitative analysis, which can explore and focus on deepening the literature used as a basis for drafting the concept. In general, this research results in the concept of a livable and sustainable post-pandemic development, including formulating indicators for Bandung that reflect what Bandung City needs to develop after the pandemic. This research is quite important because it can see the characteristics of Bandung City and formulate its development by the conditions of Bandung City so that the government or planner can use these results as evaluation material or suggestions for the Bandung City and West Java Provincial Government in monitoring and evaluating the implementation of strategies, policies, and programs inappropriate development with environmental capacity in the Bandung Basin Urban Area and North Bandung Area.

Keywords: *Livability; Post-Pandemic Development; Sustainable; Urban Activities.*

INTRODUCTION

Providing space for urban activities and environmental preservation are often conflicting issues in urban or city development, including Bandung City. Bandung City faces complex problems related to efforts for economic growth and increasing social welfare, but it must also strive to preserve the environment and available natural resources. Ideally, the development of an urban area must integrate three dimensions of development: social development, economic growth, and environmental protection and management. Those dimensions are expected to enable the urban area to develop sustainably (UN-Habitat, 2015).

Bandung City is designated as the National Activity Center and core urban area in the Bandung Basin Urban (*Cekungan* Bandung) area, directly making Bandung City the center of activity. On the other hand, some areas of Bandung City also play a strategic function as conservation and development control areas. The dynamics of social and economic development are pressing the need for urban space and natural resources to meet human needs and strive for environmental preservation.

The announcement of pandemic status regarding the spread of Coronavirus Disease 2019 (COVID-19) infection at the beginning of 2020, including in Indonesia, continues to increase the national number of confirmed cases of COVID-19 infection. The impact has encouraged the Central and Regional Governments to change problem management strategies. Cities are also asked to change their approach to resolving crises, from physical conditions to economic and social structures. Cities are making new commitments to fight the spread of disease, implementing new strategies, measures, rules, and planning tools to build post-pandemic urban environments capable of facing future health crises (Klaus, 2020). The highest spread of COVID-19 infections occurs in areas with high socio-economic activities. The distribution of confirmed cases is related to GRDP per capita, ecological footprint, urban population, and environmental capacity (Muranyi & Varga, 2021). These indicators show the high socio-economic activities of the community in an area, where Bandung City has all these indicators as the city where the pandemic occurred.

The existing conditions, city development, and the pandemic are contradictory, especially concerning density. The COVID-19 pandemic suppresses community activities to prevent the spread of infection, while the SDGs encourage growth through activities to achieve sustainable development goals. Heggen et al. (2020) explained that the SDGs must interact with the COVID-19 pandemic to achieve their targets. Muranyi and Varga (2021) stated that there must be harmony between making people's lives healthy and the COVID-19 pandemic, based on environmental preservation. In this way, it is hoped that Bandung City can become a city that is adaptive to new post-pandemic habits as a forum for all community social and economic activities by directing its development on principles that prioritize environmental sustainability.

Through changes to the 2018-2023 RPJMD (Development Plan), Bandung has adjusted the conditions of the COVID-19 pandemic as a response to handling and improving the health system, overcoming the economic impact through providing a social safety network, as well as efforts to increase government performance achievements. By looking at the limited environmental carrying capacity and land capacity, the impact of the COVID-19 pandemic, and the high level of urban activity, there is an issue regarding the impact or burden of urban activity on the quality of the post-pandemic urban environment. Therefore, this research aims to formulate concepts and frameworks more targeted towards the post-pandemic development of Bandung City by the environmental capacity to accommodate urban activities by looking at Bandung's environmental capabilities, essential services, and improving the quality of city infrastructure prospects. development of leading sectors in Bandung City after the pandemic.

Literature review

Sustainable Development

Sustainable development has been implemented in various schemes which are basically aimed at achieving global human welfare. Until now, sustainable development continues to be a keyword for development and environmental management (Elliott, 2006). Furthermore, sustainable development is now stated as a principal policy objective of various institutions in development from the earliest times. Global developments show that there is a desire from all countries in the world to develop the MDGs scheme to be more comprehensive by introducing the concept of Sustainable Development Goals (SDGs).

SDGs have five main pillars: People, Planet, Prosperity, Peace, and Partnership (UN, 2015). As outlined in the UN (2015), the People pillar indicates that the SDGs aim to ensure that all humans on this earth will be free from poverty and hunger, have an equal position, and have the right to live with dignity. Of the 17 SDGs goals, several of them are new goals that focus on natural resource and environmental management goals, such as clean water and sanitation, affordable clean energy, climate change, underwater life, and life on land.

Livable City

The Livable City concept is a city development concept that focuses on developing the city environment as a place to live and for activities. Generally, a city can be livable if residents have a "comfortable" perception of living there (Hahlweg, 1997). This "comfort" cannot be separated from the relationship between physical aspects (such as infrastructure, basic service facilities, spatial planning, etc.) and non-physical aspects, such as economic activities and social cohesion (Evan, 2002). De Haan (2014) explains livability with a concept that emphasizes 3 (three) issues: Living, Connecting, and Growing. Life issues relate to fulfilling the basic needs of city residents as individual human beings, including essential services such as health, the availability of clean water, guaranteed security, and electricity. Connected issues relate to the mobilization of city residents, which includes the availability of transportation access to the comfort level of each mode of transportation.

The Growth Issue is related to the individual development of a city resident both from a cognitive and psychological perspective. This issue is related to the availability of equal education for all city residents and the existence of easy sources of access to knowledge for city residents. This issue also includes guaranteeing a sense of justice for each city's citizens and freedom of expression. Apart from that, the basic concept of a Livable City is a derivative of the Sustainable Development concept, which prioritizes the balance of environmental, economic, and social pillars. Furthermore, IAP (2018), through the Bandung City habitability survey, used seven main aspects to assess the city's habitability, namely (1) Transportation, (2) Spatial layout, (3) Social, (4) Environmental, (5) Basic Services; (6) Utilities; and (7) Economics.

Post Pandemic City

Since the beginning of 2020, the COVID-19 virus has hampered activities in urban areas. Countries in the world then formulated possible efforts to mitigate the adverse effects of the pandemic in the future. Therefore, the UN believes 2021 is the right time to evaluate how a territory, city, area, or building is planned, designed, built, and maintained (UN-Habitat, 2021). All countries in the world are experiencing a time of crisis, marked by reduced national income and hampered population activities. Decision makers - in this case, the regional government and the central government - are faced with a big problem: the development must consider the possibility of increasingly rapid virus transmission and accommodate classic urban problems such as population growth and urbanization. UN-Habitat (2021) also states that the impact of the pandemic on the regional scale must be mitigated at a higher scale, namely the city scale, as well as at the regional and national scales.

METHOD

The data collection method was secondary data collection, obtained from various sources such as planning documents, popular media, journals, and the Bandung City government. Analysis was carried out using descriptive-qualitative analysis methods based on the data that was then obtained. This method is used to explore further how the concept of post-pandemic development is relevant for Bandung City as a response to better city development. It also focuses on deepening the literature used as a basis for drafting the concept. This analysis triangulates an in-depth literature review from scientific journals, planning documents, popular media, and case studies related to handling and developing post-pandemic cities. This analysis includes several detailed steps. First, it will identify the main concepts that will be the basis for responding to post-pandemic city development. Second, it will explore the relationship of relevant concepts to the context of cases in Bandung City. Finally, indicators should be formulated to explain the chosen concept in more depth to be more comprehensive and targeted. Bandung was chosen as the focus of this study because it is one of the metropolitan cities with relatively high density, and the spread of COVID-19 infection rates is also quite large. Those are the reasons why Bandung needs to be planned for post-pandemic city development.

RESULTS AND DISCUSSION

Bandung City During the COVID-19 Pandemic

In formulating the issue, a review was carried out of several policies sourced from documents, including Spatial Plan Documents (National RTRW, West Java Province RTRW, Bandung City RTRW), Development Plan (National RPJM, West Java Province RPJP, West Java Province RPJM, Bandung City RPJM), and Bandung City Open Data. Apart from reviewing the planning documents containing these policies, a review of the existing conditions of Bandung City was also carried out based on physical and environmental, social and population, facilities, infrastructure, economic, institutional, and financing aspects.

Based on the physical and environmental conditions of Bandung City, it was found that there was a decline in environmental quality. This is characterized by air quality with an Air Quality Index (AQI) of 64-93 in the moderate air pollution category; there is a reduction in the quality of water resources (rivers) and a reduction in groundwater due to industrial activities; and an increase in built-up land in the North Bandung Area (KBU) within the administrative boundaries of Bandung City which should be designated as a water catchment area. Then, the availability of land in Bandung City became increasingly limited. This is characterized by a low proportion of green open space where the percentage of green open space in Bandung City has only reached 12.5% of the target of 30%. There are also still slum settlement areas covering an area of 419.94 hectares in 2020, and the informal sector has not been

fully accommodated in the spatial pattern of Bandung City. From the physical and environmental findings, it can be concluded that the environmental capacity of Bandung City is increasingly limited.

Based on Bandung's social and demographic conditions, there was a decline in the human development index trend of -0.11% in 2020, possibly caused by the pandemic. Then, health problems were discovered, especially regarding COVID-19 in Bandung City. This is indicated by the number of positive cases of COVID-19 in 2020, reaching 5,645 cases and 154 deaths. The average daily addition of COVID-19 cases is 19 cases with a death rate of 2.7%, and there are several sub-districts with the highest active confirmation of COVID-19 per day.

Apart from that, there is an increase in population density, which is indicated to be unable to be supported by land capacity, where the population has increased by 0.21% from 2019 to 2020, the number of incoming migrations is relatively high, and Bandung City has the highest population density in West Java. There is also an increase in the poverty rate in Bandung City due to the pandemic. From these social and population findings, it can be concluded that there is an issue of demographic pressure on the land's carrying capacity and challenges to the population's welfare due to the pandemic in Bandung City.

Based on the condition of Bandung City facilities and infrastructure, it was found that the high volume of private vehicles and the presence of side obstacles caused congestion at several points on the road. The high volume of private vehicles is also caused by the minimal use of public transportation modes (23% of total vehicle use) and limitations in the number of transportation routes. Then, there are limitations in the function of the city drainage system, which are indicated by several things, like some of the drainage systems in the form of natural channels and the road drainage network not being well planned.

Currently, 70% of roads are covered by drainage networks whose quality does not meet technical specifications, resulting in puddles due to limited drainage capacity to accommodate rainwater runoff. Regarding wastewater handling service coverage, the Bojongsoang Wastewater Management Installation, as the leading waste management infrastructure, has not been able to meet the domestic waste service needs of the entire population of Bandung City. Apart from wastewater, the most crucial municipal utility is drinking water. The piped Drinking (Clean) Water Supply System provided by Perumda Tirtawening is currently unable to achieve 100% access to clean water. Another finding is that the solid waste service system with the "collect-transport-dispose" pattern has not been able to overcome the waste generated. For educational and health facilities, Bandung City currently has 1,002 units of educational facilities, consisting of 542 elementary/equivalent units, 296 junior high/equivalent units, and 164 high school/equivalent units, and 2036 health facilities, consisting of 26 hospitals, 70 Community Health Center, and 1,933 Posyandu units (integrated service posts), with a range of education and health facilities covering almost all sub-districts in Bandung City.

From the findings of facilities and infrastructure, it can be concluded that there is an issue of inadequate essential services, as well as the quality of infrastructure not meeting standards and not being effective in supporting urban activities. Based on the economic conditions of Bandung City, there have been changes in economic activity due to the COVID-19 pandemic, where the rate of economic growth in Bandung City has decreased, followed by a decrease in people's purchasing power, a decrease in per capita income, an increase in the unemployment rate, a change in offline shopping transactions to online, and decline in offline retail activity.

The role of Bandung City as a center for trade and services, creative industries, and tourism is not optimal, as indicated by the hotel occupancy rate, which shows a decrease in the number of tourists, as well as limited development of processing industrial

land, which is directed towards development outside Bandung City. The contribution of the Bandung City Information and Communication sector is also not optimal. The Information and Communication sector, aimed at becoming the leading sector in Bandung City, has a low contribution to GRDP. From the economic findings, it can be concluded that there are challenges to developing leading sectors in Bandung City after the pandemic in the context of sustainable economic improvement.

Based on institutional and financing conditions, there are findings that cross-sector coordination and integration are not yet optimal. This is indicated by several supporting findings, including cross-sector coordination between stakeholders is not optimal; lack of mainstreaming of environmental protection and management principles among each development stakeholder; service performance achievements and good governance in drinking water and waste management are less effective; limited capacity for ICT-based services; and limited quantity and quality of Bandung City Government human resources. Inter-regional cooperation and multi-stakeholder partnerships in urban development are also not yet optimal.

Based on 2020 Bandung City LAKIP data, pandemic conditions caused the level of community participation and collaboration to be 0% due to minimal participation due to restrictions on community activities. Regarding financing, financing synergies to meet development needs and post-pandemic development needs are not yet optimal. Development costs tend to be high for infrastructure and urban development projects, while regional financing capacity is still limited, especially with the refocusing of the budget for handling the COVID-19 pandemic. Within these limitations, the integration and synergy of conventional and non-conventional financing in Bandung City is still not optimal. From the institutional and financing findings, it can be concluded that there is an issue of limited institutional governance capacity, collaboration, and synergy in financing the development of Bandung City because of the pandemic.

Framework for Linking Concepts with Post-Pandemic Case Development in Bandung City

By looking at the condition of Bandung City during the COVID-19 pandemic, Bandung City has limited environmental carrying capacity and land capacity. The impact of the COVID-19 pandemic and high levels of urban activity are problems that impact or burden urban activities on the quality of the urban environment. post-pandemic. To respond to the problem faced by Bandung City using the concept proposed in the literature review, this paper will formulate the concept for Bandung City's development after the pandemic. The concepts that will be used are Sustainable Development, the Livable City, and the Post-Pandemic City concept.

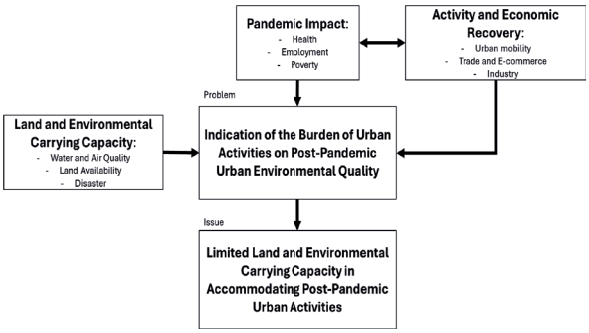

Figure 1.
Post-pandemic Issue in Bandung City
Source: Analysis Result (2022)

Sustainable development using the SDG pattern is an essential mandate from communities worldwide, and it must be implemented through various development activities in all fields worldwide, including Indonesia. Thus, it is inevitable that Bandung City, one of the regions with the largest population in Indonesia, will implement the SDGs. Implementing SDGs for Bandung City is not easy because it has many goals (17 goals, 169 targets, and 230 indicators) with high complexity, which is considered very ambitious. Meanwhile, Bandung City still has many challenges, especially regarding poverty, un-

employment, and inequality. However, all these problems must be resolved.

On the other hand, the pandemic situation that has been going on since the beginning of 2020 has provided an opportunity for cities and urban areas to respond and minimize the impact of the spread of the virus. The time gap the Bandung City government uses to refocus its programs and budget means that Bandung City requires an adjustment framework for the current direction of city development. For this reason, adjustments to the shift from urban activities to post-pandemic activities were analyzed.

In addition, the direction of development and construction of Bandung City since the formulation of the Bandung City RPJMD for 2013-2018 has been stated in mission 1, "Making Bandung Comfortable Through Spatial Planning, Infrastructure Development, and Controlling Quality and Environmentally Conscious Space Utilization." It is using the livable city principle. Bandung City has an average livability index (63.6), so it still has much room for development. Even though the habitability index is assessed using community perception, components still constitute the community's minimum needs, such as green open space requirements and basic service needs, including clean water, waste, sanitation, and transportation, to support residents' mobility and other needs.

The Livable and Sustainable Post-Pandemic City concept formulated in this paper uses several development concepts, especially to complement the contents of a Livable City, which was already the development concept for Bandung City before the pandemic. Then, the Post-pandemic City concept already has content that is more or less like the Livable City concept, but there are still several shifts in substance as an effort to recover from the COVID-19 pandemic. The livable city concept in Bandung City has seven leading indicators: (1) ecology, (2) infrastructure, (3) utility, (4) transportation, (5) spatial layout, (6) social, and (7) economics (IAP, 2018).

The content of post-pandemic city concept has four main contents that can add to the content of a livable city, namely: (1) environmentally based spatial planning; (2) community social safety net; (3) economic potential and prospects; and (4) post-pandemic government governance. The content of a livable city, which already accommodates the needs of a sustainable city (social, environmental, and economic pillars), as well as the direction of the New Urban Agenda (NUA), can be complemented by 4 contents of the Post-pandemic City concept. In this way, seven indicators were obtained by combining sustainable development, livable city, and post-pandemic city concepts to obtain the basic concept of a Livable and Sustainable Post-Pandemic City Development.

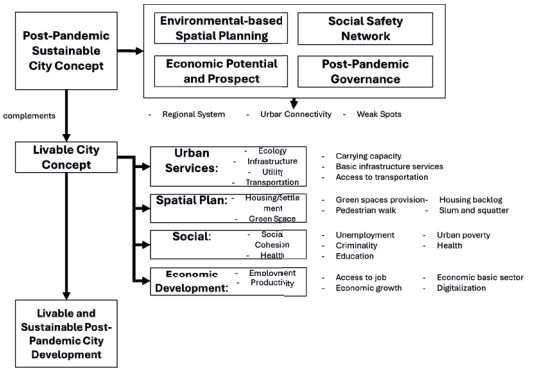

Figure 2.
Livable and Sustainable Post-Pandemic City Development Concept Framework
Source: Analysis Result (2022)

Based on the framework formulation above, each indicator has an explanation to determine what the city needs. Urban form and function analysis describes the suitability of Bandung City's spatial planning on a regional and city scale, discussing interactions with surrounding districts/cities, points or city spaces vulnerable to COVID-19, and the adequacy of basic city service needs. Social safety network analysis discusses poverty and inequality resulting from the pandemic situation. Post-pandemic economic development analysis shows a shift in economic activity to a digital economy as well as the Information and Communication sector and Wholesale and Retail Trade as the leading

sectors, while governance and institutional analysis discusses post-pandemic governance, collaboration, and financing efforts for Bandung City.

Besides that, the use of space in urban areas is greatly influenced by the city's physical form, which has been dramatically affected by the COVID-19 pandemic. The urban environment, sanitation systems, public spaces, use of road space, and the form/regulation of settlements have transformed due to the pandemic, thus influencing how humans interact with city elements (UN-Habitat, 2021).

The analysis is sorted according to the weight of the Bandung City habitability assessment in the 2018 Bandung City Livable City Index Survey (Diskominfo & LPPM ITB, 2018). Bandung City population projections were analyzed to determine the number of city residents, which will be a benchmark for providing basic facilities and an analysis of carrying capacity. An analysis of the environmental capacity to accommodate land needs, essential services, and the city's environmental capabilities will be conducted to determine how Bandung City can support urban activities. Analysis of ease of accessibility of essential services is limited to health and educational facilities, focusing on essential services in assessing the Bandung City habitability index.

Social welfare analysis describes the social conditions of Bandung City from the aspects of social cohesion (labor, welfare, crime, and education) and health aspects. Bandung also has an average livability index of 63.6 based on measurements of the essential components of assessing a livable city. These components were then adjusted to the COVID-19 pandemic to make modifications to the post-pandemic livable city measurement indicators. It is hoped that adjustments to the COVID-19 pandemic will increase the city's resilience and readiness to face health crises and public welfare in the future.

Indicators and modification parameters are presented to achieve a livable and sustainable post-pandemic city. Some results of modified indicators are regional systems, weak spots, efforts to reduce poverty, supporting access to each trade center area, access to health services for the community, slum settlements, and a new economic framework. The following are formulated indicators based on the results of developing the Livable and Sustainable Post-Pandemic City Development concept for Bandung City.

Table 1.
Indicators of livable and sustainable post-pandemic city development

Indicator	Parameter
Environmental Capabilities	- Environmental System - Weak Spots - Disaster - Pollution
Social Welfare	- Criminality Rate - Poverty Reduction - Income - Social Inequality - Health and Education Fare - Food Security - Digital Infrastructure
Green Space and Housing	- Green Space - Housing Needs - Slum and Squatter Improvement - Pedestrian Walk
Education and Health Services	- Education Facilities - Health Facilities - Access to Facilities - Disease Prevalence
Clean Water and Sanitation Accessibility	- Clean Water Accessibility - Sanitation Facilities Accessibility - Waste Facilities - Drainage System
Transportation	- Public Transport Coverage - Roads Quality - Accessibility of Public Transport
Urban Economic Development	- New Economic Framework - Creative Economy - Economic Finance - Economic Competitiveness

Source: Analysis Result (2022)

CONCLUSION

This research provides a development concept that is more targeted at developing post-pandemic cities by looking at the existing conditions of Bandung City during the pandemic and then contextualizing it with the formulation of existing concepts. The existing concept was then reviewed to produce a development concept that was more comprehensive and suited to the needs of Bandung City with existing problems, especially in terms of providing space for urban activities and limited carrying capacity. This study also analyzes the potential and impact of the burden of urban activities on the quality of the post-pandemic urban environment to produce concepts for developing Bandung City that is livable and sustainable after the pandemic, including the indicators formulation. The results obtained from this study are expected to benefit the government, especially Bandung City and West Java Provincial Government.

It is hoped that the results of this study can be used as evaluation material or suggestions for the Bandung City and West Java Provincial Government as a leader in coordinating city governments as well as an actor who plays a role in monitoring and evaluating the implementation of strategies, policies, and programs inappropriate development with environmental capacity in the Bandung Basin Urban Area and North Bandung Area, as well as financially supporting and facilitating support for other infrastructure. The result of this study can also be used as material for evaluation and consideration in re-implementing development strategies, policies, and programs that are by environmental capacity.

The Bandung City Government also continues to coordinate with surrounding district/city governments to realize sustainable development in the Bandung Basin Urban Area. Besides that, it is also hoped that the results of this study can provide direction and examples for developing livable and sustainable cities after the pandemic. With this, the planner can formulate a series of actions, policies, and guidelines to determine the direction of development of Bandung City that is livable and sustainable after the pandemic.

Acknowledgements

This paper is the initial part of the publication results and collaboration with the ITB Urban Planning and Development Studio 2021. It is also part of the Urban Planning and Design Research Group research, which the PPMI Research Program ITB funds.

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