

Ecological Restructuring in Bandung Smart City Agenda

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Abstract:

Like other cities in Indonesia, Bandung has a smart city plan called Bandung Technopolis. It is a new thematic urban development innovation strategy to make Bandung even more advanced as a sophisticated city that can serve its population and the leading tourism city in Indonesia. However, this sophisticated urban planning also raises human ecological problems. It requires sufficient land for its implementation. This study found attractions between economic benefits, social change, and environmental restructuring involving residents and the city government of Bandung through qualitative methods.

Keywords: ecological awareness; social transformation; urban planning; West Java

Abstrak:

Layaknya kota-kota lain di Indonesia, Bandung punya rencana smart city bernama Bandung Technopolis. Ini adalah strategi inovasi pembangunan perkotaan tematik baru untuk menjadikan Bandung semakin maju sebagai kota canggih yang dapat melayani penduduknya dan kota pariwisata terkemuka di Indonesia. Namun, tata kota yang canggih ini juga menimbulkan masalah ekologi manusia. Diperlukan lahan yang cukup untuk pelaksanaannya. Studi ini menemukan daya tarik antara manfaat ekonomi, perubahan sosial, dan penataan lingkungan yang melibatkan warga dan pemerintah kota Bandung melalui metode kualitatif.

Kata Kunci: kesadaran ekologis; perubahan sosial; tata kota; Jawa Barat

INTRODUCTION

The development of an area is an essential thing for the development of the site. It is an effort to advance and improve and increase the value of something that already exists. It attempts to change a situation to lead to a condition considered better than the previous position. According to Moschen, S. A. et al. (2019), development is an effort to increase all resources carried out in a planned and sustainable manner. Bryson (2018), provides a more straightforward understanding that it is a change for the better through planned efforts. Development is a widely used word in all mass media around the world and is a concept that is often referred to and discussed by all levels of society (Anwar, Sjoraida, & Rahman, 2019).

The concept of sustainable development was first used in the mid-1970s and disseminated by the World Conservation Strategy (1980), UICN, UNEP, and WWF (Shafer, 2020). The Brundtland Commission has placed

environmental issues as a political agenda that has revived the world's attention about this ecological problem after the 1970s had been neglected. Sustainable development always requires the quality of human life and is consistently oriented long-term to the sustainable principles of human life now and in the future. The three things above released as the principles for applying a sustainable life are considered three things for implementing an environmentally sustainable life (Rockström et al., 2017).

The problem of sustainable development is related to the rapid progress achieved in development to improve the community's standard of living and welfare. Sustainable development includes three essential pillars: economic, social, and environment, that are implemented in an integrated manner. Human actions that exploit excessively have created problems with food, water, land, and energy availability. The situation will become an environmental and social burden that ultimately, the community and government must bear recovery burden (Friedman, 2017).

Although development is needed to overcome many problems, experience shows that development can negatively impact. In Egypt, the Aswan dam has reduced the production of sardines in the Mediterranean due to the holding of fertile Nile mud (Fahim, 2015). In Indonesia, one of the impacts of the development process is air pollution. Pollution due to traffic and industry will increase air pollution and affect the environment. Environmental quality will positively affect human health; thus, it is necessary to control to reduce air pollution in urban areas.

Sustainable development means that the environment can continuously support development. Indonesia recognizes the importance of ecosystems, namely an ecological system formed by the reciprocal relationship between living things and their environment. EIA is an analysis of environmental impacts before the implementation of a development project. The state is trying to spend its goals on subsidies or socializing private production expenditure and accumulation through public contributions on research and development of transportation infrastructure, military, and tax incentives. The expansion developed tends to intensify capital and then leads to automation, unemployment, and potentially creating jobs or welfare state programs.

This move drives state spending and capital growth, which is the essence of the nature of modern industrial capitalism (Shehu, 2017). In achieving development goals and objectives, side effects can occur in the form of used products and others damaging or polluting the environment. As with the development process of Bandung Technopolis in Cimicrang Village, Gedebage District, Bandung City has caused many ecological impacts. In environmental management, the ecology needed is human ecology, studying the interrelationships between humans and their environment (Glaeser, 2013).

The EIA of development impacts are defined as unexpected changes caused by development activities. Technopolis is an urban or suburban area and rural area dominated by high-tech activities in research, buildings, manufacturing, or a combination of the three (Castells, 2010). The concept of *technopolis* requires criteria in supporting the development of the idea. These criteria include the availability of an educated workforce and workforce that can meet workers' technological needs. Here, the technology looks to be a development concept that carries the modernization of regional development. Hence, in the context of Bandung's city development, the development of the Technopolis launched by the city of Bandung is an aggregation of information, communication and technology (ICT) activities with human resources, research activities, and innovation motivations located in Bandung.

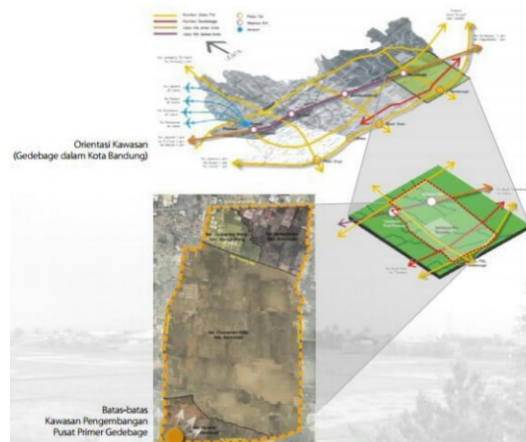
METHODS

The method used is also called the naturalistic research method (Smith, 1981). This research is fundamentally dependent on human observations in their region. It relates to these people in their language, their lives, and their interaction with their world around them (Sjoraida, Anwar, & Rahman, 2019). This research reveals and obtains an in-depth picture of the impact of the Bandung Technopolis development process on the human ecological environment. This study aims to explain, describe, display, and explain the situation or phenomenon in the field based on collected data defined in words or sentences (Lincoln & Guba, 1985). Separated according to categories to obtain conclusions, and then developed into problems and solutions, which proposed to bring truth in the form of empirical data support in the field.

RESULTS AND DISCUSSION

Technopolis is a term that refers to the concept of developing an area dominated by high-tech industries. It is a regional planning center that focuses on high technology-based sectors. The development of Technopolis launched by the Bandung city government is an accumulation of information, communication, technology, research activities.

Picture 1. Bandung Technopolis Map



The development of Bandung Technopolis has benefited many parties, such as developers, digital industry players, and the government. But the people of Gedebage, especially residents in Cimincrang Village who have lived there for years, also need more attention. The people live in harmony, cooperation with each other, a sense of family, and upholding the values and norms. The development of the increasingly modern technological era leads to the establishment of industry and resulted in increasingly narrow agricultural land. With the rampant development, most of the paddy fields cultivated by residents have been turned into housing projects.

Table 1. Comparison of Development between Agriculture and Construction Sectors of Bandung City (2019)

No.	Description	2015 (Billion)	2016 (Billion)	2017 (Billion)	2018 (Billion)	2019 (Billion)
1	Agriculture	156 (0.26%)	168 (0.24%)	162 (0.2%)	193 (0.2%)	229 (0.2%)
5	Construction	2,604 (4.31%)	3,224 (4.59%)	3,827 (4.67%)	4,425 (4.63%)	5,401 (4.86%)
Amount	Gross Regional Domestic Product	60,444 (100%)	70,281 (100%)	82,002 (100%)	95,613 (100%)	110,670 (100%)

The impact is increasingly complex and the development of secondary and sector activities tertiary Bandung City has suppressed agricultural sector activity. Agricultural land increasingly depleted and replaced by other sectors that are considered more profitable. This has resulted in the agricultural sector at all has not experienced growth in the last five years. The shift in the function of agricultural land has caused the loss of livelihood of the Cimincrang people. Most of the residents who work as agricultural laborers are unemployed or switch to the service sector, especially to the construction sector. The presence of migrants, namely the middle and upper classes who inhabit housing, influences the community's social structure. The Bandung Technopolis development concept has the potential to drive regional progress. But environmental aspects and locality of citizens must be prioritized so that citizens' existence and sustainability are maintained.

The Bandung Technopolis area is going to do with an area of around 712.36 ha. The development can positively impact if the changes caused are beneficial to the community or a negative impact if they are detrimental and risky for the community. The effect of the Bandung Technopolis development process is an environmental change caused by government activities.

The researchers' interests are in studying and researching the problem regarding Bandung Technopolis Development processes.

The first Bandung Technopolis development was the construction of roads or infrastructure for access to the Summarecon Project. Technopolis Development is one of the programs to achieve the fourth mission in the Regional Medium-Term Development Plan of the City of Bandung. The Technopolis core area is gearing towards becoming a high science-powered industrial estate. With this policy, population activity movement can spread and can unravel the traffic burden of the downtown area. The Bandung municipal government chose the concept of techno-city because Bandung City has supporting factors.

Bandung has an information technology-based educational institution for the development of technology. The rate of economic growth of the city of Bandung is above the national average. The term creative city is driven by the activities of entrepreneurs who create an economy of creators. Special Economic Zone is an area developed for special economic activities that have high economic value.

Table 2. Bandung Technopolis Development Activities

No.	Activities	2014	2015	2016	2017	2018	2019
1.	Feasibility studies						
2.	Bandung City Spatial Detail Plan						
3.	Land acquisition						
4.	Detail Engineering Design						
5.	Revision of Bandung City Spatial Detail Plan						
6.	Licensing						
7.	Environmental Impact Analysis						
8.	Land maturation						
9.	Construction						
10.	Operational						

The components of activities that will be carried out in the construction of the Technopolis City Service Center Area include: (1) Land acquisition (Government center, Gedebage highway, Infrastructure, Lake retention, the main football stadium of Gedebage Land Development, Green Open Space); (2) Construction (Central government, Special economic zone, Gedebage highway, Integrated station, Basic infrastructure, Floating Mosque, Lake retention).

Rice fields dominate land use in the Gedebage area. Also, there are also mixed land uses such as for trade, industry, residential areas, housing, offices, and government. In the Bandung Technopolis development plan, the activities to be developed and accompanied by various supporting facilities are as follows: (1) Educational facilities (Universities and libraries); (2) Health facilities (type B hospitals and emergency hospitals); (3) Places of worship; (4) Sports and recreation facilities; (5) Infrastructure (Roads, Highways, Toll Access, Lake Retention); (6) Green open spaces (thematic planting, regional parks); (7) Trade and service centers; (8) Means of transportation; (9) Residential housing.

Citizens' Perception of Bandung Technopolis Development

Perception is the ability of a person to organize an observation. A person may have a different perception, even though the object is the same. The existence of development and development plans in the Cimincrang area impacts many aspects such as economic, social-population, and urban infrastructure. From a financial perspective, the development of Technopolis has the potential to improve the regional economy. The pros and cons of responding to a phenomenon are always there in human life. It is because everyone has a different perspective on assessing something.

In this case, too, several indications are pro to the development process of Bandung Technopolis in Cimincrang Village. Many people were willing to move their houses or sell their land, rice fields for development. Some people were very enthusiastic because the community land affected by the development received compensation double the previous price, while also giving increased economic income. In the Technopolis Development process, where the construction is near the Cimincrang residents' homes, it creates various perceptions of the residents, both positive and negative.

Since 1995, the Cimincrang area has been developed by the developers by building housing complexes. The process of development by shifting paddy fields causes loss of farmers' livelihoods. The main goal of the development project on an area is to improve the community towards collective progress. Some people agreed with the Bandung Technopolis Development processes because their economic situation was better with the compensation money. However, some people did not agree with the development because the project's existence will be detrimental to the people affected by the eviction.

Community of Cimincrang Village, Gedebage Subdistrict, Bandung City, has experienced the development project's direct adverse effects. With the transition of paddy fields now turned into a development process, the loss of farmers' livelihoods. Road infrastructure is damaged due to the activity of land transport trucks, roads that are muddy when it rains, and air pollution that interferes with breathing due to land spills from trucks. It was said by an elderly citizen, "Yes, hopefully, the government will pay attention to the fate of our rich little people, which is not strange; the important thing is that Bandung can be prosperous for its people."

An environment is where all objects, forces, and conditions are present in a place or space where humans or living things are located. The atmosphere is very influential for developing living things, be they human, animal, or plant. If one of the surrounding environments is polluted, it will affect other creatures, such as those in Cimincrang and the surrounding area because of the smart city development agenda (Pratama, 2020).

Ecological Impact of Bandung Technopolis Development

Ecological damage is a change in the physical, chemical, or biological nature of the environment that exceeds the standard environmental damage criteria. Development that does not pay attention to environmental problems will have a low relevance value to change. The more the population, the more the land used to make residential settlements. The external environment is outside the population but has a strong influence on a development program's success rate. The area of East Bandung's underlying physical condition, especially in the Cimincrang Village of Gedebage Subdistrict, needs to be carefully planned.

Cimincrang community, whose majority of livelihoods is farmers depend on their daily life for their crops. Environmental impacts, in general, include effects on water quality. Effects of air quality along with local communities, affected public health. People at risk are those living on the edge of a road often passed by many vehicles. The impact of reservoir inundation on water downstream of the reservoir is a significant negative impact. Without well-planned, land management can have substantial negative impacts.

Based on Indonesian Government Law No. 41 of 1999, the PM10 (Particulate Matter) threshold should be valued at 150 $\mu\text{g} / \text{m}^3$. From the concentration plot results, it can be seen that several areas have PM10 concentration levels that have passed the threshold, among others Rancabolang, Mekarjaya, and Pasirluyu; all are the surrounding area of Bandung Technopolis Development Project (Pratama, 2020).

The Bandung Technopolis Development process in Cimincrang Village has caused environmental problems. Land-use change causes loss of paddy farming land—the inconvenience of residents who feel air pollution disturbance. Water quality has decreased from before; healthy become a lack of clean water flow. Also, due to the loss of employment in agriculture caused by the Bandung Smart City's massive construction work, the government and local development parties such as NGOs undertook skills development, and the community was involved in these development projects. Thus, the Bandung Smart City also belongs to the community, including those who have suffered ecologically from the presence of this Technopolis development.

CONCLUSION

This paper can lead to a study of how technology or smart city is implemented in a city. Humanitarian risks are likely to clash with the technological and economic development of a region. In the Bandung Technopolis project, development processes experienced several obstacles. The development conflicted with the Environmental Impact Assessment (EIA) both mechanically and systematically, impacting the social, economic, and environmental sanitation environment. The development processes of Bandung Technopolis in East Bandung resulted in many perceptions in the community because the Bandung Technopolis Development was not well socialized. The development process of Bandung Technopolis has an impact on Ecology in Cimincrang. The development process is contrary to the EIA because much of the agricultural land as the community's main livelihood is lost and socially and ecologically damaged. The efficient use of land and inexpensive and useful technology can be a way out for people who are on the transition path between traditional villages and techno-cities.

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