INCREASING CITY RESILIENCE THROUGH IMPLEMENTATION OF THE GREEN CITY CONCEPT IN INDONESIA

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ABSTRACT

In an effort to overcome various city problems, such as the decrease in green open space due to the increase in built-up space in the city, several cities in Indonesia, including the city of Banda Aceh, have implemented the Green City concept. The implementation of the Green City concept based on the environment requires the readiness of the government and city residents to participate in supporting the Green City concept which is expected to have a positive impact on increasing the resilience of the city. However, the successful implementation of this concept requires the city government's seriousness in making pro-environment policies and the active role of green communities living in society. For this reason, this research was conducted with the aim of knowing and describing the application of the Green City concept in Indonesia and its impact in increasing urban resilience. This study uses a qualitative descriptive method in collecting and analyzing data related to the implementation of the Green City concept in Indonesia. The results of the study indicate that the Green City concept in general provides benefits to the community by increasing the quantity and quality of green open space in the city. Although the concept of a Green City has not yet been fully realized by the city government in Indonesia, its improvements continue to be carried out on an ongoing basis. The synergy of government policies and the role of the community in a systematic and consistent manner in applying green attributes in the Green City concept has a positive impact on the resilience and sustainability of the city.

Keywords: city resilience; green attributes;green city; Indonesia; sustainable city
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INTRODUCTION

The dynamics of urban population growth with various activities have affected the availability of green open space in the city. The impact of various economic and social activities, among others, is the high need for use of built-up land so that natural open space in the city is decreasing. This trend of urban development does not only occur in the city center but also extends to the suburbs and surrounding areas, where along with the increase in population, the need for urban facilities and infrastructure development also increases to serve the needs of city residents.

Development by taking over existing green open space to be converted into built-up land, resulting in reduced availability of green open space in the city.

The consequences of urban development that ignore the availability of green open space will result in various environmental problems and other negative impacts such as changes in temperature, flooding, and pollution. Changes in temperature in the city is a phenomenon that occurs in a dense city area where the temperature is higher than the air temperature in parts of the city that have a lot of green open space. This phenomenon known as urban heat island (UHI) often occurs in densely built areas that have only a few green open spaces while the existing open spaces generally use ground covering materials such as asphalt roads and concrete floors (Kusuma et al., 2020).

In addition to the problems mentioned above, various other urban problems can also arise and disrupt people's lives. These problems include decreasing air quality, increasing pollution due to traffic jams, decreasing comfort in the urban environment, and the crisis of water resources. To overcome these problems, the concept of a Green City can be an alternative solution that is expected to be able to answer city problems while increasing the resilience of the city for the realization of a sustainable city life economically, socio-culturally and ecologically (Ernawi, 2012).

Several cities in Indonesia have implemented the Green City concept in development planning and rejuvenation of certain areas within the city. For example, the City of Bandung which carries the concept of a Green City by improving the quality of the city's green open space in the form of thematic parks (Sagala, et al, 2017). Likewise, Bogor City has planned a unique landscape arrangement as an effort to strengthen the image of Bogor City's identity as a Green City (Siregar, 2019).

In addition to applying green attributes in urban planning, the Green City concept also aims to increase the amount of green open space in the city as has been done by the Semarang City government (Sudarwani & Ekaputra, 2017), and the Sragen City government by optimizing the green lanes along roads and rivers. (AlHabib & Qomarun, 2014). The city of Banda Aceh has also experienced the same thing, which has implemented the Green City concept since 2011. The Banda Aceh City Government continues to optimize the existence of green open spaces in the city as an effort to make Banda Aceh a sustainable city after the 2004 disaster (Fuady, 2020a).

In general, the application of an environmentally-based Green City concept demands the readiness of the government and city residents to participate in each other in realizing an environmentally friendly Green City and is expected to have a positive impact on increasing city resilience. However, success in implementing the Green City concept requires the seriousness of the city government in making pro-environment policies and active community roles in green communities. Based on the description above, the formulation of the problem in this study is how to apply the concept of a Green City in Indonesia and its impact in increasing city resilience. The purpose of this study is to identify and describe the application of the Green City concept in Indonesia and its impact in increasing urban resilience.

LITERATURE REVIEW

The Green City concept is an idea to create an environmentally friendly city, by utilizing water and energy resources efficiently and effectively, reducing the amount of waste and improving environmental health, as well as optimizing the natural and artificial environment, in accordance with the principles of sustainable development (Ernawi, 2012). . For this reason, the idea of realizing a city into a Green City has a strategic meaning based on the consideration that the city's rapid growth can have an impact on the emergence of various urban problems such as slums, congestion, social inequality, flooding, and the reduced availability of green open space. These problems will be

increasingly faced by the city government with the emergence of the phenomenon of climate change, which requires more thorough and comprehensive and realistic preparation as a solution to changes that occur globally (Parasati, 2012).

The Green City concept in Indonesia in its application has been regulated in a program, namely the Green City Development Program (P2KH), as a manifestation of the elaboration of Spatial Planning Law No. 26 of 2007 mainly related to the fulfillment and provision of land for green open spaces. UU no. 26 of 2007 mandates the realization of 30% of the city's area as green open space (RTH) with a portion of 20% in the form of public green open space (RTH Public) and 10% in the form of private green open space (RTH Private). The Green City Program will provide benefits for the government and city residents by increasing the quality and quantity of green open space so that they can maintain environmental ecosystems and improve the quality of the urban environment to be cleaner, healthier, more comfortable, and more beautiful (KPU, 2011).

According to Fuady, et al. (2020a) related to the resilience of the city to face disasters, the concept of urban resilience must be planned to respond to various possible changes that can occur in the urban environment, either slow gradual changes or fast events that can paralyze the city's functions. Disturbances and threats to cities will ultimately have a negative impact on urban communities, especially those who are classified as vulnerable. The great uncertainty and duration of a disturbance must be taken into account as a preparation and if a disturbance occurs, action can be taken quickly so that the risk that arises will be less. In connection with the concept of a green city, the resilience of the city can also be simulated against various possible threats and disturbances, including responding to the impact of climate change.

LITERATURE REVIEW

This study uses a descriptive qualitative approach in conducting a literature review related to the implementation of the Green City concept in several cities in Indonesia and using it as a reference in understanding the application of the Green City concept in Indonesia and its impact in increasing urban resilience. The literature review data comes from official government documents, journal articles, research reports, and other relevant and reliable sources.

RESULTS AND DISCUSSION

Implementation of the Green City Concept in Indonesia

The Green City concept in Indonesia was pioneered by the Ministry of Public Works through the Green City Development Program (P2KH). This program is based on the Green City Action Plan (RAKH) which is based on spatial planning in regional development, with a sustainable city paradigm and the importance of regional independence, as well as the coordinating role of the province and the central government in sustainable programs.

The Green City Development Program has received positive responses from several district/city governments, where 60 Regents/Mayors have signed the Green City Commitment Charter at the Peak Commemoration of Spatial Planning Day on 7-8 November 2011, as a form of joint commitment to create a Green City. Efforts to realize a Green City, starting with accommodating the target of achieving green open space of 30% of the total area, in the Regional Spatial Plan (RTRW) in each district/city. This is also in accordance with the mandate of Law no. 26 of 2007 concerning Spatial Planning in realizing a safe, comfortable, productive, and sustainable space (KPU, 2011).

The Green City concept is a development of the concept of a sustainable city, which is based on the

principle of sustainable development and the real conditions of urban development, so as to be able to answer actual urban needs as well as respond to the global challenges of climate change. The mission of a Green City is not only to green urban space, but includes a broader and comprehensive vision, namely to create an environmentally friendly city that utilizes water and energy resources efficiently and effectively, and reduces the amount of waste. This concept also integrates urban transportation systems, improves environmental health, and optimizes the natural and artificial environment based on the principles of sustainable development in maintaining the balance of environmental, social and economic elements of the city.

There are eight green attributes as indicators to realize the Green City concept. The first attribute is green planning and design, which aims to improve the quality of spatial plans and urban designs that are more sensitive to the natural environment, and include adaptation and mitigation efforts to climate change. The second attribute is green open space, which aims to improve the quality and quantity of green open space within the city in accordance with the city's characteristics, with a target of 30% of the city's green open space availability target. The third attribute is a green community, namely the development of a network of collaboration between the government, the community, and the business world who care about a healthy urban environment.

Furthermore, the fourth attribute is the reduction and processing of waste and waste (green waste), by implementing zero waste. The fifth attribute is the development of a sustainable transportation system (green transportation) that encourages residents to use environmentally friendly public transportation, as well as walking and cycling for short distances. The sixth attribute is the improvement of water quality (green water) by applying the concept of ecodrainage and zero runoff. The seventh attribute is the use of energy sources that are efficient and environmentally friendly (green energy). And the eighth attribute is the application of green buildings that are energy efficient (KPU, 2011).

According to Ernawi (2012) all attributes of a Green City do not stand alone, but become an integral unit, including in relation to local economic development as a follow-up impact of the realization of each attribute. Some green attributes such as green waste, green transportation, green water, green energy, and green building are often referred to as green infrastructure.

The implementation of green attributes by the city government that applies the Green City concept is in fact uneven, where some attributes can appear to be more dominant than other green attributes. According to Amira (2014), from the results of the evaluation conducted on the application of the eight attributes of a green city in the city of Jakarta, more prominent results were obtained on the attributes of green transportation, green open space and green planning and design. This is in line with the plan to develop mass transportation which is the main focus of the Jakarta City government. While the existence of green open space in the city of Jakarta is getting better in quality, it is difficult to fulfill green open space in quantity due to the increasingly scarce and expensive land in the city of Jakarta.

Meanwhile, according to Kusuma, et al (2020) the city of Surabaya as the second largest city in Indonesia with a large population and increasing use of built-up land, has also felt the threat of climate change in the form of flooding and increasing temperatures in the city environment. As an anticipation effort to overcome these problems, the Surabaya City Government has implemented the Green City concept with eight green attributes that must be met. In the early stages, the focus was on three main attributes, namely green planning and

design, green open spaces, and green communities.

The Surabaya City Government has implemented green planning and design attributes in the Regional Regulation Number 12 of 2014 concerning the Surabaya City's Regional Spatial Planning (RTRW) 2014-2034. Likewise, the availability of public green open space in the city of Surabaya has reached 21.79% of the total area of Surabaya or equivalent to 7,290.53 ha. Meanwhile, in the development of green communities, many environmental care communities have been formed in the city of Surabaya, which include actively carrying out environmental care programs, namely HiLo Green Community Surabaya, Earth Hour Surabaya, and Sea Soldier Surabaya (Kusuma, et al, 2020).

Meanwhile, the Banda Aceh City Government has also demonstrated the application of green attributes in the implementation of the Green City concept in Banda Aceh City as seen from the enactment of the Banda Aceh City RTRW Qanun in 2009-2029 which states the importance of the availability of public green open space of at least 20% of the total area. the city of Banda Aceh (Bappeda, 2014). For this reason, the city government must be able to increase the availability of green open space every year according to the plan until 2029. Several other green attributes have also been implemented in Banda Aceh City such as: (a) green transportation with Transkutaraja buses running as an effort to reduce the use of private vehicles; (b) better waste management can be seen from the cleaner city atmosphere; (c) the provision of clean water is getting better where water services are getting smoother and more consistent in serving the needs of the residents; (d) the formation of green communities in the urban forest area of Tibang and Peulanggahan.

According to Ekaputra & Sudarwani (2013) green attributes have also been applied in the planning of environmentally friendly parks according to the Green City Development Program (P2KH) in Semarang City, as shown in: (a) Design of green open space parks in the Rejomulyo area and the land of the former Sampangan market; (b) increasing the role of the community by forming a Green Community from the local community so that the park functions optimally as a forum for social interaction; and (c) the application of a sustainable transportation system, which is applied to a system of ease and convenience of accessibility in the form of roadside sidewalks, parks, pedestrian paths in parks as well as bicycle paths and parking lots.

Meanwhile, according to Susilowati & Nurini (2013), Surakarta City has also implemented the Green City concept, including by optimizing the function of green open spaces in dense settlements such as: (a) residential yards that function as a place for family-scale interactions; (b) office yards, shops, and business places that can be used as open parking areas, and places to hold various outdoor activities such as bazaars, sports, and others; (c) the roof garden of the building that can function as a place for family or household-scale interactions; (d) the development of green open space for pedestrians can be used as a social facility for interaction between residents both passively and actively as well as a natural element for temperature balancing, vehicle emission filters, and visual beauty.

Green City Concept and City Resilience

The Green City concept is a breakthrough urban concept in Indonesia that is pro-environmental as well as being able to answer global challenges in the future. As an environmentally friendly city concept, this idea is also expected to have a positive impact on the community by building community and government resilience at the local level. Urban resilience in the Green City concept can also be linked to the context of climate change mitigation and adaptation (Parasati, 2012).

Climate change has become a serious challenge for many cities around

the world, especially in developing countries, where urban population growth has accelerated rapidly. Climate change is a threat that can increase physical and social vulnerability, destroy economic activities, and hinder development. The urban poor will receive the greatest impact, because this group lives and works in informal settlements that are prone to exposure to these threats.

Regarding the threat of climate change, several big cities in Indonesia such as Jakarta and Semarang have felt the impact in the form of the threat of flooding due to rising sea levels (Harjati, 2011). Several locations on the coast of Jakarta are estimated to be inundated due to sea level rise which increases by 0.57 cm per year, while land subsidence is also predicted by 0.8 cm per year. This has a major impact on the city's infrastructure and economic productivity (Parasati, 2012).

For this reason, the city government must take the initiative to prepare for the impacts of climate change both in the present and in the future by taking into account the strength and severity of the impacts that will occur. A city government like Jakarta that already has a city resilience plan means that it has prepared its city as a tough city (DKI, 2019). Although the certainty of the occurrence of a disaster is difficult to predict, the impact that will occur can be predicted, so that a resilient city will be able to respond to disasters quickly and effectively, in an efficient and appropriate manner (Fuady, 2020b). For this reason, the idea of a plan to build a city's resilience to climate change is an important priority for the city government.

According to Fuady, et al (2013) the existence of green open space as one of the attributes in the Green City concept plays an important role in supporting city resilience, especially those related to the ecological functions of green open spaces in terms of providing oxygen, storing water and absorbing carbon dioxide. With the availability of various large trees in the green open space of the urban forest, naturally the urban forest will produce oxygen when the photosynthesis process takes place during the day. Likewise with the availability of ground water, the wider the green open space in the city, the greater the opportunity for plants in the green open space to absorb and store groundwater and prevent waterlogging and flooding. Furthermore, trees in green open spaces also function to absorb carbon dioxide from motor vehicle exhaust, thereby reducing the level of air pollution in the city.

The mitigation aspect in climate change is the various efforts made to reduce greenhouse gas emissions. In addition, mitigation is also carried out by increasing the efficiency of energy use in the built environment in the city, increasing the use of alternative energy sources, and using mass transportation systems with alternative energy sources aimed at reducing the number of private vehicles.

Regarding the aspect of disaster mitigation, the existence of green open space as one of the attributes of the Green City concept has an important role in terms of protection and rescue in the event of a disaster. Green open space in the form of a high hill can be a safe area in the event of a flood and a large green open space can be a place of evacuation (Fuady, 2015). Likewise, if the attributes of green energy and green transportation have been implemented optimally, they will function in mitigating efforts to reduce greenhouse gas emissions in the city.

In relation to urban resilience, apart from planning disaster mitigation aspects, the city government must also take into account adaptation aspects. The adaptation aspect in climate change includes various actions taken to reduce the level of vulnerability of cities and their residents to the impacts of climate change. Examples of adaptation to climate change include improving urban drainage systems to anticipate increased rainwater discharge, improving flood control

systems, planning and controlling land use and space use, increasing food security, reducing water use for households and industry, and increasing resource utilization. alternative water such as rainwater (Parasati, 2012). These adaptation efforts require the involvement of all urban stakeholders.

In line with increasing urban resilience, the city government's efforts by applying the attributes of green planning and design as well as increasing the quality and quantity of green open space in the city will reduce the level of vulnerability of the city and its inhabitants to the impacts of climate change. For example, the case of the city of Surabaya, which experienced flooding in several densely populated areas and an average temperature increase of above 32 C in a wide area, which is about 58.58% of the area of the city of Surabaya. The highest temperature increase occurred in the eastern and western areas of Surabaya City where generally the land cover was in the form of built-up areas. To overcome this problem, the Surabaya City Government has made efforts related to optimizing and adding green open spaces (Kusuma, et al, 2020).

CONCLUSION

The concept of a Green City is not only present as a plan to increase the area of green open space in the city, but also to encourage the realization of pro-environment policies by the city government which at the same time can answer the city's resilience problems in the future. The success of the city government in implementing the Green City concept consistently requires the commitment of the community to want to change their behavior to be more environmentally friendly, save natural resources and not be consumptive of energy.

In implementing the Green City concept, the city government also faces various challenges, including high financing and the limited land within the city that can be used as green open space in order to meet the target area of 30% of the city area. Likewise in the environmental aspect, the challenges faced are the increasing number of residents in the city from time to time which results in an increase in the burden that must be accepted by the environment, as well as development orientation which tends to be economic and less sensitive to environmental aspects. In addition, there are still challenges in the social aspect in the form of low community participation and limited cooperation and coordination between sectors in environmental management.

The success of the Green City Development Program requires a sustainability approach, in the spatial planning implementation cycle that does not stop at the planning level, but continues to implement plans in the form of concrete actions on a city scale as a unified whole. This program is also not just a sectoral association, but a synergistic and collaborative program with the main pioneers from the city government and the community supported by the central government. Collaborative action movements, of course, cannot arise spontaneously, but require a systematic and consistent process, starting with socialization, mobilization, persuasion, and implementation, so that the hopes of real collective movement awareness in society can be realized.

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