

Sustainable Compact City as an Urban Sprawl Arrangement Concept in Penatih Dangin Puri, Denpasar

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Abstract The population growth in Denpasar City is happening very rapidly due to several factors and aspects of population. The growing number of people living in urban areas with aspects of life that take place continuously causes the city to no longer be able to accommodate all aspects of population activities. Therefore, there has been development in suburban areas such as Penatih Dangin Puri Village, which has become a location for filling space for an increasing population with various positive and negative impacts, one of which is the urban sprawl. To reduce the negative impact that occurs due to urban sprawl, the concept of sustainable compact city is the solution. The concept of Sustainable Compact City aims to reduce the use of conversion of agricultural land to non-agricultural land, reduce dependence on private transportation, empower public transportation, increase green open space, and make it easier for people to enjoy other public facilities. This concept is then expected to be able to produce the right strategy in accommodating all changes and indirectly control growth and be able to control the problems that arise due to the existence of this Urban Sprawl. Seeing these problems, the concept of Sustainable Compact City can be a concept for dealing with Urban Sprawl in the Penatih Dangin Puri village area, Denpasar City, which cannot be prevented from growing until now.

Index Terms— Urban Sprawl, Sustainable, Compact City, suburban area, structuring, land conversion.

I. INTRODUCTION

Denpasar City as the capital of Bali Province which is the center of activities, is one of the areas that is facing problems related to Urban Sprawl. In its role and function as the capital city of Bali Province, Denpasar City has problems that lead to Urban Sprawl such as: The population growth rate is increasing due to the large number of residents outside Denpasar who want to find a better life in the city resulting in the number of demands for housing / housing increasingly increasing, this is supported by developments that tend to be vertical and raise issues of land limitations. One of the suburban areas of Denpasar that is impacted by the urban sprawl is Penatih Dangin Puri Village which has urban sprawl problems such as decreasing environmental quality, for example the physical condition of groundwater,

conditions of water channels / drainage, traffic congestion conditions, garbage disposal, quality air, availability of green open space and flood management. To overcome the negative impacts that occur due to the urban sprawl, the concept of Sustainable Compact City is one solution.

The concept of Sustainable Compact City is an urban design and planning concept that focuses on high-density development with multiple uses and is mixed together in the same land to make the land as efficient as possible to ensure the sustainability of the next generation. The concept of Sustainable Compact City aims to reduce the use of conversion of agricultural land to non-agricultural land, reduce dependence on private transportation, empower public transportation, increase green open space, and make it easier for people to enjoy other public facilities. This concept is then expected to be able to produce the right strategy in accommodating all changes and indirectly control growth and be able to control the problems that arise due to

the existence of this Urban Sprawl. Seeing from these problems, the concept of Sustainable Compact City can be a concept to deal with Urban Sprawl in the suburbs of Denpasar City which cannot be prevented from growing until now.

II. REFERENCE

A. *Urban Sprawl*

Urban Sprawl is a process of spreading the physical appearance of a city outward, known as urban expansion, which is a form of physical expansion of the city. The expansion of the city is caused by the growing population and the increasing flow of urbanization. Broadly speaking, the urban sprawl process can be viewed in terms of two dimensions, namely the spatial physical dimension and the non-physical dimension (Yunus, 1999). The urban sprawl referred to in this study is a process of urban physical change that expels out of the city area with an increase in area due to the high rate of population growth / density. General Characteristics of Urban Sprawl: Low density housing, Limited extension beyond new development, Spatial segregation of different types of land use even though divided into zoning, Development hopping, No central ownership of land or land development planning, All transportation is dominated by private motorized vehicles, Fragmentation of government land use authority between local governments, Large variations in the fiscal capacity of local governments, Widespread construction of commercial lines along major highways, Heavy reliance on screening processes to provide housing for low-income families.

B. *Compact City*

Compact city is an urban design and planning concept that focuses on high-density development with multiple uses and is mixed together in the same land to make the land as efficient as possible. The compact city was first coined by George B. Dantzing and Thomas L. Saaty, who had thoughts of improving the quality of life without sacrificing the next generation in accordance with the principles of sustainable development (Jabareen, 2006). This thought then inspired many planners to make city plans that were much more efficient. Compact city referred to in this research is a city planning design concept that refers to the principle of sustainable development to overcome problems caused by high density and to improve the quality of life of the community. The application of the Compact City concept has advantages, disadvantages and constraints from its application which can be described as follows: [1] The advantages of the Compact City Concept according to Dantzig (1973) include: Reducing dependence on private vehicles, Minimizing transport costs, Provision of efficient public infrastructure and services, Reducing public service costs, Forming active communities through high density housing, Revitalizing City Centers, Strict zoning between settlements and agriculture as well as protected areas, Able to accommodate many people, Save land and infrastructure,

Conservation of green open spaces. Some of these aspects are closely related to sustainable city aspects. [2] Disadvantages of the Compact City Concept: Increasing the use of vertical movement energy, Heat temperature caused by overcrowding, Concentration of congestion, pollution, and vehicle noise, Increasing the cost of land in the city due to restrictions on land availability for development, Concerns about the quality of life that are reduced by the presence of efforts to increase population density in cities, As well as the possibility of displacement of people with weak access, including the elderly and the poor. [3] Obstacles in the application of the Compact City concept: Increased squatter, land speculation, Difficulty in urban redevelopment through the demolition of slum settlements, Weak public transportation systems, Lack of urban planning capacity.

C. *Sustainable Development*

Sustainable development is a sustainable development that has the principle of meeting the needs of the present without sacrificing the fulfillment of future needs. According to Neuman (2005), in an urban context there are five elements that are the principles of sustainability, namely: capacity, feasibility, resilience, diversity, balance. In this research, what is meant by Sustainable Development is sustainable development that has the principles of meeting needs without harming or sacrificing the needs of future generations, without exploiting the use of natural resources that exceeds capacity.

III. RESEARCH METHODS

This research is a research using a combination research method (Mix Methods). The research approach used is a gradual mixed technique, which is a strategy in which research combines data found from one method with other methods. This strategy can be carried out by first interviewing to obtain qualitative data and then supported by quantitative data, in this case using measured data from survey results or facts in the field. The variables used were formulated based on a comprehensive literature review. This study relies on a lot of literature related to Urban Sprawl and Compact City. From the available sources, then note the important things that are able to represent some or all of the research needs. Variables are generated from statements obtained from literature such as journals and text books. Important information is then recorded in the form of information cards which can then be useful in compiling research variables. To find out the physical and non-physical changes that occurred in Penatih Daging Puri Village that were caused by Urban Sprawl using a qualitative method to describe the changes that occurred physically and non-physically so that they had an impact on changes in land use as well as the dominant factors that drove settlement growth based on interviews / results. interviews, field observations, and review of RTRW documents. Meanwhile, quantitatively, it can be seen from the extent of land changes that have

occurred. The analysis technique used is an overlay with the Intersect technique. Overlay analysis using Google Earth and Adobe Photoshop applications as well as the Arc GIS application to see changes in land functions that occur from the observed year. In addition, quantitative data was also obtained based on the results of distributing questionnaires with scoring techniques. The scoring results were then analyzed by factor analysis using Ms. Excel to determine the percentage of dominant factors.

IV. RESEACH RESULT

The development of urban sprawl in Penatih Dangin Puri Village is very much influenced by the high aspect of growth patterns and land use. The characteristics of the urban sprawl are characterized by the existence of settlements that have developed due to the impact of the urban sprawl. Development also occurs with the concentration of settlement growth. In its development, settlement growth occurs on green open land or empty land in the middle of existing housing. The many uses of mixed functions on residential land are evidenced by changes in the side of the building facing directly to the road, switching functions to offices, grocery stores, mini markets, laundry, etc. There are also many similar things in the residential area, in residential areas there are grocery stalls that use their garden or garage to be used as a place of business. Based on the overlay of settlement growth maps from 2000-2018 and RTRW for Denpasar City 2011-2031, it can be seen that the development of settlements occurs towards the Green Open Space (RTH) area. The impacts arising from the use of the Green Open Space area are as follows: [1] Infrastructure: Fixed road sections that cause congestion with increased use of private motorized vehicles, Construction of new settlements that do not have adequate public facilities such as access roads to settlements that can only be passed by two-wheeled vehicles or that can only be passed by four-wheeled vehicles and cannot pass, if a fire disaster occurs, the fire department or ambulance cannot be saved because of the sections roads that are not up to standard, Poorly constructed drainage can cause flooding if rainfall is high. [2] Environment: The reduction in agricultural areas (rice fields) which were used as green open spaces in 2000, the area of rice fields was 264 hectares, while in 2018 the area was 217.87 hectares. From the time of 2000 to 2018, there was an increase in residential development in green open areas as much as 46.13 hectares or around 17.473%. Garbage storage facilities that are not owned by the new settlements are also a serious problem, because the garbage trucks owned by the government only serve the main roads and do not enter residential areas, this will be a serious environmental problem because there will be accumulation of garbage at one point of the road space that will be causing congestion and the environment to become dirty / polluted. [3] Economy: The main factor causing development in Green Open Space Areas is the economic factor, because land located in Green Open Space areas is much cheaper than the remaining land in settlements that

already have facilities that meet standards and the reduced interest of young people to become farmers which results in rampant sales rice fields.

From all the impacts described above, it can be concluded that Urban Sprawl will occur again. It can be seen from the growth pattern that widens towards green open space, homogeneous land use, the relationship between type members and community services is very low, transportation is still oriented towards private vehicles, road design that only maximizes residential occupants, the absence of public spaces and poorly planned processes development planning between actors and existing rules. In order for the creation of a Sustainable Compact City, the government can educate the public so that there is synchronization between existing regulations and implementation in the field, the need for control from the government is also an important thing as a form of the government's seriousness in enforcing existing rules if there is a need for sanctions for people who violate such as proposing electricity and PDAMs that will not be obtained, this will cause a deterrent effect as well as direct education to the community.

A. Concept of Sustainable Compact City as Arrangement of Urban Sprawl in Penatih Dangin Puri Village.

In the table below, the principles and strategies for implementing a sustainable compact city in the Dangin Puri training village are formulated. This strategy is formulated by analyzing the principles of sustainable compact city with aspects of existing conditions in Penatih Dangin Puri Village.

TABLE 1 IMPLEMENTATION OF THE CONCEPT OF SUSTAINABLE COMPACT CITY IN PENATIH DANGIN PURI VILLAGE

<i>Sustainability</i>	Capacity	Appropriateness	Resistance	Diversity	Balance
<i>Compact</i>					
City Service Scale (Typology)	Optimizing the capacity of the Penatih Dangin Puri Village area which is centered on the primary road.	Targeting the minimum and optimal population of Penatih Dangin Puri Village, so that the service scale is effective, adjusted to the capacity of the region.	Taking into account the prediction of future population growth, related to the character of the area and provision of facilities.	Adjusted to the capacity of the area, the higher the capacity of the area, the more various types of facilities will be accommodated.	Applying the proportion of green space and built in area development in accordance with existing Government regulations and the need for supervision to ensure its implementation

					n. Vertical development and intensity with regulated functions, KDB and KLB that are in the regulations
Density and Intensity	Optimized the development of the concentration density and intensity in the zone according to the rules.	The availability of space in a proportional building.	Paying attention to future predictions, the rate of population growth.	Intensity and diversity, suitability with regulated functions, KDB and KLB that are in the regulations	Vertical development and intensity with regulated functions, KDB and KLB that are in the regulations
Land Use Diversity	Adjusting the scale and capacity of each function in a proportion that can support the concentration of activities and transportation. With a ratio of 60% residential and 40% non-settlement in accordance with government regulations.	Get rid of the functions associated with industrial factories, warehouse.	Apply the blending function not only horizontally but also vertically. Such as the use of the ground floor as a public function, and the next floor is a semi or private function.	Supporting a variety of functions and types of facilities, for example, rusunawa.	Proportion of limited green and public functions in each area and building.
Community-Type Diversities	Control of the percentage of the capacity of each community to achieve the planned movement pattern. 70% are migrants, and 30% are local indigenous people.	It is planned to accommodate all circles but still contextually, so that it can be accepted by all communities.	Community diversity can eliminate the distance between the majority and minority groups, this creates equality and community assimilation so that harmony and social resilience.	Diversity of communities with productive age groups.	Equitable access for all communities to access all physical facilities and green spaces without any exceptions.
Circulation and Transportation	Use of public transportation, such as school buses,	Ensuring safety, security and road users (motorist	Easy access to public transportation pick-up areas.	Supporting diversity of transportation	Centralize the area of transportation services

	online motorcycle taxis and trans metro buses.	s, vehicle passengers, and pedestrians). The road serves as a connecting line. There needs to be supervision from the local government.	As the right step to reduce the use of private vehicles and the use of motorized vehicles for minors.	modes as a measure to limit the use of private vehicles and reduce parking spaces.	and provide or improve supporting facilities in road construction.
Public area	The capacity of public spaces can be maximized and green spaces can be maintained	Quality public space that ensures the safety, security and comfort of its users.	Open space can become the center for communities and visitors to the area so that it can be used optimally.	A variety of open spaces, such as jogging tracks, fields and parks can support activities.	Public spaces are not only designed outside the building but also inside the building so that social interactions occur both inside and outside the room.

Source: Author (2018).

From the results above, it can be concluded that the concept of sustainable compact city can be used as a reference for structuring in Penatih Dangin Puri Village. From the aspect of the capacity to optimize the capacity of the Penatih Dangin Puri Village area which is centered on the primary road and the development of the density and intensity concentration in certain zones is in accordance with the regulations, it is just that it needs supervision and education to the community so that no violations occur. The government can also adjust the scale and capacity of each function in a proportion that can support the concentration of activities and transportation. The use of public transportation, such as school buses, online motorcycle taxis and trans metro buses, Dewata has been well implemented. The government needs to maintain and maximize the capacity of public spaces and green open spaces. The government needs to supervise control of 60% settlement and 40% non-settlement and control the percentage of the capacity of each community to achieve the planned movement pattern. 70% are migrants, and 30% are local

indigenous people. The feasibility aspect in Penatih Dangin Puri Village can run well if the government assesses the minimum and optimal population of Penatih Dangin Puri Village so that the scale of service is effective and can be adjusted to regional capacity and eliminates functions related to the factory / warehousing industry to maintain regional stability. The availability of space in public buildings must be proportional and well planned to accommodate all groups but still contextual, so that it can be accepted by all communities. The government must be able to guarantee the safety, security of road users and public spaces to create user comfort. In the aspect of resilience, the government must pay attention to prediction of future population growth rates, the character of the area and the provision of facilities. The community can apply a mixture of building functions not only horizontally but also vertically, such as the use of the ground floor as a public function, and the next floor is a semi or private function. Community diversity can eliminate the distance between the majority and minority groups, this can lead to equality and community integration so that harmony and social resilience. The government provides easy access to public transportation pick-up areas as the right first step to reduce the use of private vehicles and the use of motorized vehicles for minors. For the diversity aspect, the Penatih Dangin Puri Village government can adjust to the regional capacity, the higher the area capacity, the more various types of facilities are accommodated and adjusted to the KDB and KLB in the regulations. Support for the diversity of functions and types of facilities, communities with productive age groups, modes of transportation such as rusunawa, public transportation, jogging tracks, fields and parks as steps to support activities, limit the use of private vehicles and reduce the use of green open spaces. In the aspect of balance, the application of the proportion of green space and built in area development must be adjusted to existing government regulations and the need for supervision to ensure its implementation. The intensity of development vertically is a solution for the community so that it can increase the space and area of green open space to become stable. The government has centralized the area of transportation services and provided and improved supporting facilities for road construction.

V. CONCLUSION

The physical impact of Urban Sprawl that occurs in Penatih Dangin Puri Village covers several sectors, namely: uncontrolled development of housing development, growth of commercial buildings that develop along the road network, congestion caused by an increase in the number of vehicle intensity and the use of road shoulders as parking lots. and trade stalls, changes in land use resulting in poorly planned urban planning and housing, less than optimal conditions of infrastructure and facilities. The suggestions that can be recommended for the government are:

1. Can optimize land use in accordance with the

existing spatial layout so that environmental quality is maintained;

2. Socially, it can link the differences or mixing of communities in an environment to become tighter;
3. In terms of economic factors, concentrating an area causes savings in infrastructure, travel costs and population density to be sufficient to support the local economy.

The implementation of the Sustainable Compact City concept is an effort to control the Penatih Dangin Puri Village area against the impact of population growth and the need for high movement so as to reduce traffic congestion in the city, reduce air pollution, reduce energy use, and reduce the number of developments in green open space areas.

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