



Green Open Space Planning Using the Sustainable Child-Friendly Concept (Case Study: Kampung Seketeng, Sumbawa)

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Abstract. Green open space has a variety of functions that will be useful in creating environmental management balance and harmony. A decent city is not only about luxurious buildings, but also has space and facilities to support children's growth and development. The purpose of this research is to develop a green open space design in Kampung Seketeng, Sumbawa district. Regional design guideline is one of planning documents that exists in an area to support and contribute the realization of sustainable green city. In the next stage, the design of the area can be used as a reference in the implementation of the arrangement and management of buildings/physical activities. This research was conducted using a quantitative approach. The objective is to establish a green open space that is capable of serving the activities of Child-Friendly villages in a sustainable manner, is directed at developing the function of green open spaces in achieving the elements of "nature" and "society" in each typology of green open spaces formed. The expectation of this plan is that green open space can be increased through urban villages and able to serve community activities.

Keywords: Design · Green Open Space · Environmental management

1 Introduction

Public open space is part of the space in the area whose utilization is intended for places for community interaction activities, such as fields and parks. Based on its function, open space is divided into 2 categories, they are public open space and green open space. The establishment of a 30% proportion by the government is a standard benchmark to ensure the balance of the city's ecosystem, it's means that balance of hydrological systems, the microclimate, and other ecological systems that can improve the availability of the fresh air, and improve the city's aesthetic value [1]. Green open space functions as the lungs of the environment. The main characteristic of green open space is that it is easily accessible by the community to carry out group activities and does not always have to have green elements, in the form of malls, plazas, and playgrounds. Green open space emphasizes green elements (vegetation) in all its forms, while public open space is only open land that has not been built without plants.

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Government of Sumbawa regency, West Nusa Tenggara Province always support to design ethically public service. Kampung Seketeng is one of the areas in Sumbawa. According to records of BPS Sumbawa city during the dry season reaches average 31 °C and it causes Sumbawa’s people is reluctant to come out or interaction with others especially in the daytime. Survey conducted in Sumbawa showed that places designed for children are still lacking. Because of the importance of play for children, the government accommodates it in Law Number 23 of 2002 concerning Child Protection in Article 11: “Every child has the right to rest and use their free time to hang out with other children of the same age, play, have fun, and be creative according to their interests, talents, and level of intelligence for self-development”. A child-friendly concept is friendly to all its residents [2]. Children’s activities in the playground will be sustainable if the playground is equipped with safe and comfortable play facilities so that children feel happy and enjoy their time. According to [3], Correlation of theory with research on the development of green open space typology in overcrowded settlements height can be seen in Fig. 1.

Some of the main functions of green open space are ecological functions, namely ensuring that the provision of green open space becomes part of the air circulation system (city warp) and produces oxygen [4]. Additional functions of green open space (extrinsic), namely social and cultural functions, include: describing local cultural expressions; becoming a medium of communication for city residents; Recreational places are places and objects of education, research, and training in studying nature and aesthetic functions, including: increasing comfort; beautifying the urban environment both on a micro scale (home yards and residential neighborhoods) as well as on a macro scale (overall city landscape); stimulating the creativity and productivity of the townspeople; forming architectural beauty; and creating a harmonious and balanced atmosphere between the built and unbuilt areas.

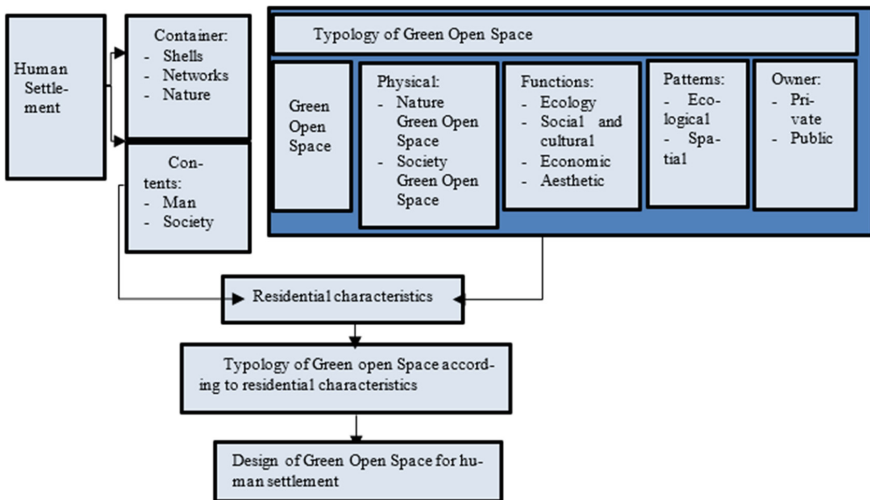


Fig. 1. The Correlation of theory with research on the development of green open space typology

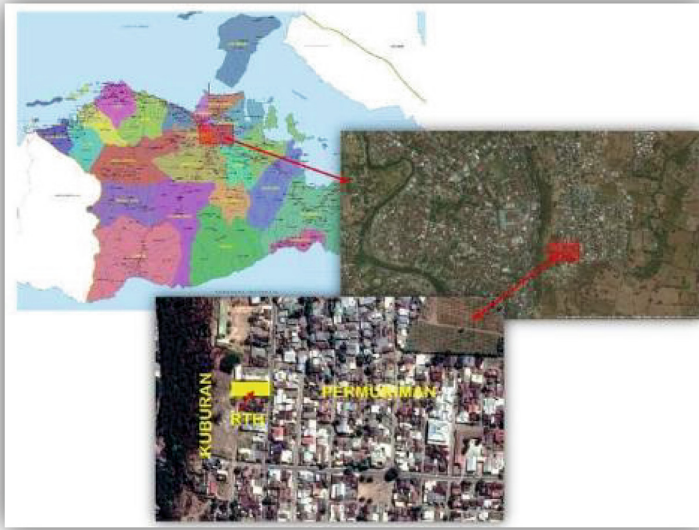


Fig. 2. Research location in Kampung Seketeng, Sumbawa, West Nusa Tenggara (Analysis, 2022)

Green open space is also very influential on health, both physical and mental health [5, 6]. Some researchers have also found a relationship between green open spaces and children's psychological development [7–9], children growth [10], and stimulate children's participation in carrying out positive activities in their environment [11].

The present paper focuses on establishing a green open space for sustainable child-friendly concept. The transformation of urban green space can improve the urban environment for children and promote the establishment of child-friendly cities. The concept of child-friendly cities can also be carried out in line with the green infrastructure approach, if the architects are observant in developing the design [12]. Two things to consider in the development of child-friendly spaces are the public value of the playground and the relationship between “children-friendly” and publicity [13].

2 Methods

2.1 Research Location

The research was conducted in Kampung Seketeng, Sumbawa. Primary data are obtained by field observation and using GIS to identify of existing public green open space and area (Fig. 2).

2.2 Data Collection

Data collection methods used are primary and secondary. Primary data collection is performed with survey in Kampung Seketeng. While the secondary data collection is performed with head of village and literature review.

2.3 Conceptual Analysis and Design

The analysis of this Green Open Space (GOS) includes:

1. View Analysis

The analysis of the selection of the viewpoint that is considered the best and has a special aesthetic value for the placement of a building. In terms of appearance, Kalimantan green space has limitations because it is only 19.8 meters wide on the side that coincides with the highway. However, its elongated shape has the potential to be developed with a linear concept, especially by adding a jogging track. In terms of front view, green open space must be able to attract attention by maximizing visuals that are limited in width.

2. Building Intensity Analysis

The analysis of building arrangements to create harmony and order between buildings in a community and to create a decent environmental quality [14]. Aspects related to the intensity of this building are the Basic Building Coefficient (KDB), Building Floor Coefficient (KLB), Building Floor Height (TLB), and Building Boundary Lines (GSB). At the back, there is a grave that is bordered by a dividing wall. Although the intensity of the buildings around the land to be built on the Kampung Seketeng's green open space is quite dense, the dense-void area, which is dominated by solid elements, will be balanced by the presence of green open space, which will strengthen the void element in the area (Fig. 3).

3. Linkage system analysis

The relationship between movement activities) that occur in several macro and micro zones, with or without various functions related to physical, historical, economic, social, and cultural aspects. In the design of GOS the focus is on how to create a cohesive space that can be enjoyed by all groups, from children, teenagers, adults, and seniors. The emphasis on child friendly concepts will not hinder the concept of spatial integration (Fig. 4).

4. Analysis of prevention and conservation

It is an effort to protect buildings, monuments, and the environment from damage and prevent the process of damage that occurs. Conservation encompasses all activities aimed

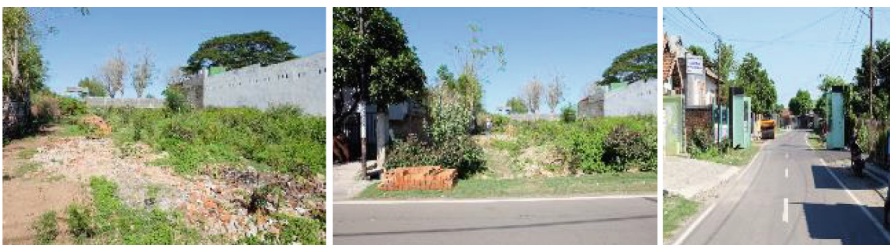


Fig. 3. The existing area

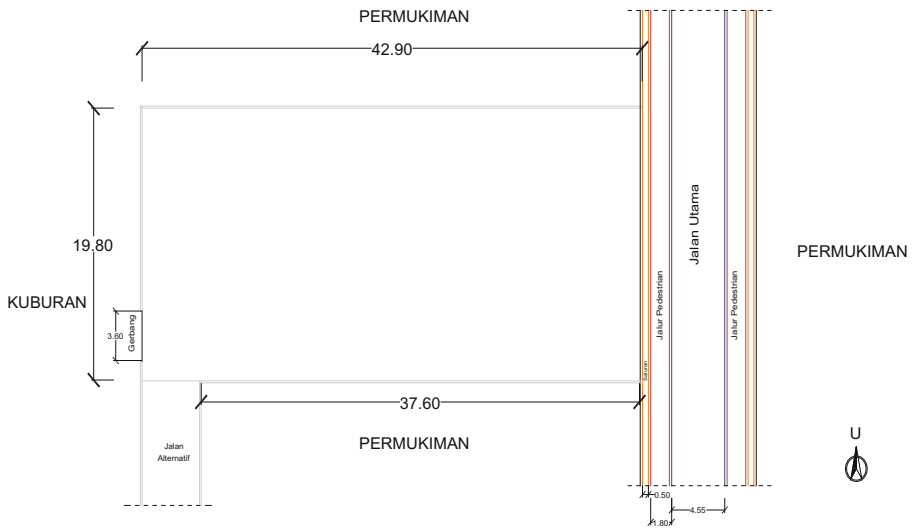


Fig. 4. The result of observation

at preserving a location's cultural value [15]. This conservation includes preservation, restoration, reconstruction, and adaptation activities. GOS in Seketeng area is more focused on revitalizing the area near the cemetery, with the challenge of how to liven up the atmosphere next to the cemetery.

3 Result and Discussion

3.1 Seketeng's Green Open Space Design Concept

1. Child Friendly Concept

The most dominant design element in this GOS is the child-friendly concept. 60% of the total area is designed for play areas and activities that support children's growth and development. The design of games and facilities must also be safe, affordable for children's physical standards, and easy to supervise. Thus, an area is also provided for parents to monitor their children's activities, as well as CCTV to monitor all parts of Seketeng's green open space.

2. Green Concept

The application of the green concept in the Child-friendly Green Open Space in Seketeng is done by choosing shady vegetation that is easy to maintain and placing it in strategic areas within the area. The selection of green vegetation also focuses on local plants that are easy to find in the vicinity and reflect the urban identity at a macro level.

Pavement is designed to be as minimal as possible, and it is recommended to use paving with holes or not be massive.

3. Function Integration Concept

GOS must be able to accommodate the diversity of its users. Although it will be dominated by children, this green open space must also be used by teenagers, adults, and seniors. Zone zoning is needed to maintain the comfort of each group.

4. Healthy Area Concept

Addition to the application of optimal vegetation to contribute to the health of the air in the green open space area, the design of the Kalimantan green open space also provides facilities that support the health of its residents. One of them is sports facilities. In this case, the most feasible are basketball courts (with a proportion of half court), a jogging track, and a coral therapy track. In addition, the existence of the trash can also apply the 3R waste sorting principle and is placed in an area that is able to cover all green open spaces. One of the non-design aspects that can be applied to strengthen the concept of a healthy area is to agree on rules to make this green open space a smoking free area, so signs and a collective agreement are needed to prohibit smoking activities in all areas within the green open space. GOS is also designed by providing an area designated for a living pharmacy where herbal plants and natural medicines are grown.

The Grand Concept of GOS is compact public space, they consist of fun, healthy, and diverse. The most dominant design concept in this Kalimantan green open space is the child friendly concept. This is the main point in the design, namely the fun concept, which means fun. The atmosphere that will be created is a fun, cheerful, and cheerful atmosphere. The implementation of this fun concept is with a variety of games, the application of attractive colors, cheerful outdoor ornaments and furniture, as well as the selection of design elements according to children's preferences. 60% of the total area is designed for play areas and activities that support children's growth and development. The design of games and facilities must be safe, affordable for children's physical standards, and easy to supervise. The "healthy" concept is the concept of a healthy area. In addition to the application of optimal vegetation to contribute to healthy air in the green open space area, the design of the Kalimantan green open space also provides facilities that support the health of its inhabitants. One of them is sports facilities. In this case, the most feasible are basketball courts (with a proportion of half court), a jogging track, and a coral therapy track. In addition, the existence of the trash can also apply the 3R waste sorting principle and is placed in an area that is able to cover all green open spaces. One of the non-design aspects that can be applied to strengthen the concept of a healthy area is to agree on rules to make this green open space a smoking-free area, so that signs and collective agreements are needed to prohibit smoking activities in all places (Fig. 5).

The concept of diverse means an area that is used by various users. Kampung Seketeng's GOS must be able to accommodate various groups. Although it will be dominated by children because the main theme of this green open space is child-friendly green open space, this green open space must also be used by teenagers, adults, and seniors. Because the users of this area are not only children. Children are, of course, accompanied by their companions when playing in the park, and the companions can be their parents, siblings, or grandparents (Fig. 6). In addition, there are diverse groups,

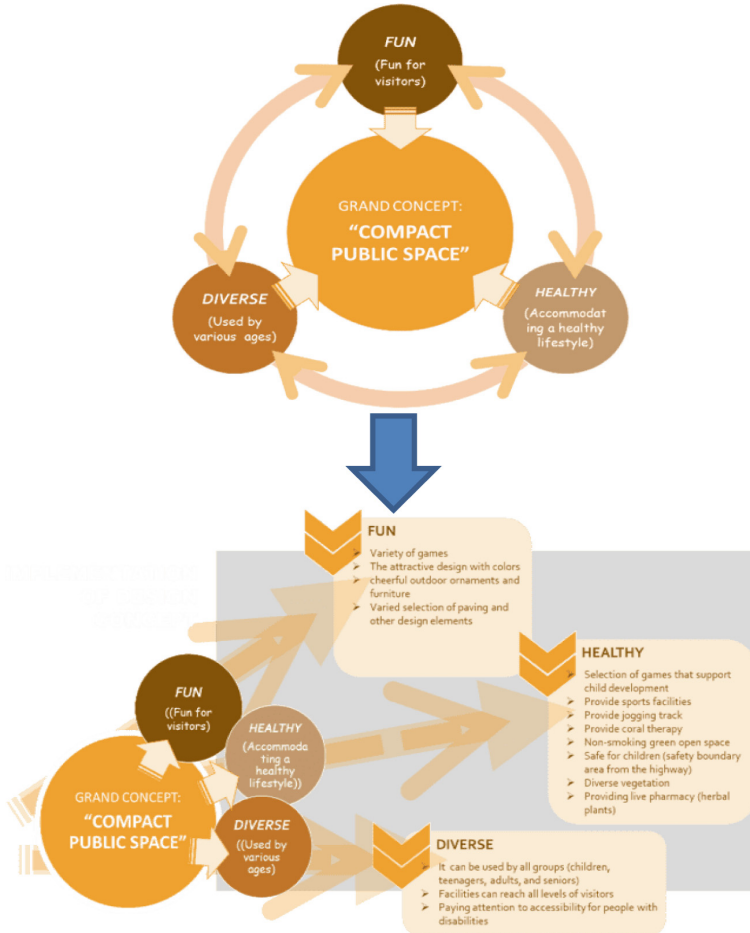


Fig. 5. The Grand Concept of Kampus Seketeng's GOS

including people with disabilities. They have the right to use green open space facilities so that the design of this area must facilitate accessibility and not prevent people with disabilities from visiting and utilizing this GOS. The three concepts above, namely Fun, Healthy, and Diverse, are integrated into one big concept which is transformed into the design of Kampus Seketeng's Green Open Space, a child-friendly GOS (Fig. 7).

The development of the green open space concept also applies the concept of tropical architecture in accordance with the elements of tropical architectural design [16]. In addition, the presence of green features in the form of vegetation and trees is a green infrastructure approach in designing a public space [17] (Fig. 8).

In designing, zoning, or dividing the area, it is very necessary to place the right design elements according to their function and purpose. This area is divided into 6 zones. The zoning details are:

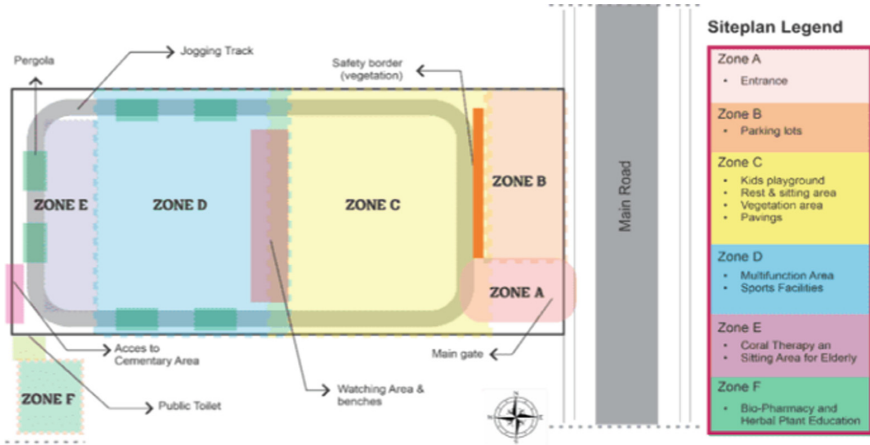


Fig. 6. The Zoning Design of Seketeng Green Open Space



Fig. 7. The 3D Child-friendly Kampung Seketeng Green Open Space

1. Zone A (Entrance). It is being created as the entrance to the Child-friendly Kampung Seketeng' GOS area, so it must be sturdy and modern.
2. Zone B (Parking Area). The parking area is designed for four wheeled and two wheeled vehicles in front of the child friendly green open space area
3. Zone C (Children's Playground, Sitting Area, Various Vegetation, Variative Paving). Based on a child-friendly theme, a children's play zone is, of course, best designed for children. This zone includes a seating area for parents to supervise and monitor their children's activities. Designed with a pergola planted with vines as shade. The



Fig. 8. Illustration of Zone C and Zone D for multifunction area

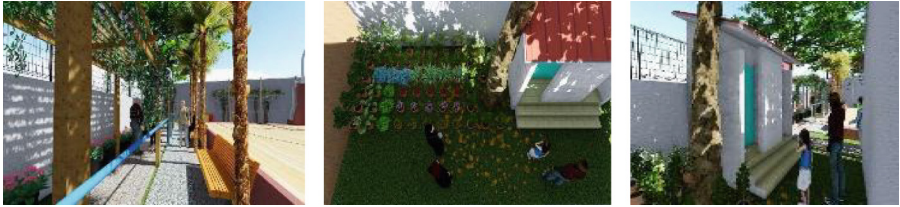


Fig. 9. Jogging track, coral therapy, herbal plant, and public toilet

placement of this sitting area is about 80 cm higher than the surroundings, so that the view of the person sitting is wider than the surroundings. These seats are placed spread out so that they are easily accessible by parents and children who may be tired after playing. The location of green open space that is in direct contact with the road must be anticipated by designing a safe boundary between the play area and the road. This fence is designed in the form of a flower pot with a sufficient height so that it does not seem monotonous and adds to the aesthetics of green open space from outside the area.

4. Zone D (Multifunction Area, Sports Facilities). A basketball court is an option to be placed in green open space due to limited land. In addition to playing basketball, this zone can also be used for community activities, especially temporary ones.
5. Zone E (Coral Therapy and Sitting Area for Seniors). This zone provides coral therapy that can be used for seniors and other ages who want to experience coral stone therapy. As a form of senior friendly, this zone is designed with rail safety and comfortable seating.
6. Zone F (Living Pharmacy and Herbal Plant Education). This zone teaches children the names of the plants in their surroundings. This zone is also equipped with public toilets (Fig. 9).

4 Conclusion

Based on research results, it can be concluded that green open space in Kampung Seketeng with the child-friendly concepts has great potential to expand. The expectation of this plan is that green open space can be increased through urban villages and able to serve community activities. Seketeng's green open space design has implemented several approaches, ranging from child-friendly design, green infrastructure, to

the application of environmentally friendly concepts. As a result, the design of this park is very relevant to the daily life of the people in the surrounding settlements. It is hoped that development with a similar concept can be carried out in settlements, especially those that are densely populated and have very limited open space.

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