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# Green Area of Daan Mogot low-cost apartement (*Rusunawa*) in West Jakarta as one efforts to create sustainable built environment

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**Abstract.** Government of DKI Jakarta build a vertical residential in West Jakarta, i.e. Daan Mogot Area of Green Low-Cost Apartment (*Rusunawa*) which is an area where the green concept is applied to the entire development infrastructure as an approach design in order to obtain the quality of comfort for occupants without neglecting the environmental sustainability. This research aims to find out if the Green Area of Daan Mogot Low-Cost Apartment (*Rusunawa*) in West Jakarta can be an effort to realizing a sustainable built environment. The method use is quantitative methods by interview that use random sampling technique as much as 40 respondents representing 8 blocks of apartments that including three aspects such as environmental aspects, economic and social foundation of the cultural. Assessment of sustainability standards in the Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta still must be upgraded to be able to reach the maximum value of the sustainability of the built environment through the socialization, which is expected to be a pilot project area of Green Building in Jakarta as well as being the main reference and basis for stakeholders who will build other buildings, especially vertical occupancy in order to realizing a sustainable built environment.

## 1. Introduction

The environment is a combination of physical conditions that include the State of natural resources such as land, water, solar energy, minerals, as well as the flora and fauna that grow above ground or in the oceans, with institution covering human creation as the decision of how to use the physical environment. In Indonesia it is called environment, according to Law Number 32 Year 2009<sup>1</sup> defines the environment as follows: the environment is the unity of the space with all objects, resources, circumstances and could be interpreted as a system that includes the environment biodiversity, biodiversity, environmental, non artificial environment, and the social environment. Natural resources are one of the elements of the natural environment, both biological and non biological, and a key element to increase humans welfare. The steep increase of the population resulted in increasing of human needs, which is also indirect cause of the environmental degradation. Environmental



degradation is one of the most dangerous threat to human survival. When nature is damaged because of humans doing, it is a sign that the environment suffered damage.

Humans must be able to cultivate it's environment where he is located and lived in order to carry out daily activities more easily, quickly and effective. At the time when humans live in a hot environment he created buildings that can reduce heat, vice versa when humans live in a dry environment he must cultivate his surroundings by taking water and stream it to the environment. The various actions carried out to get a comfortable environment. Architecture and the city is included in a context of the built environment.

In the implementation the built environment design is the second stage, after the planning phase that contains a series of things, which is the intent, purpose and goals; identification of the range of potential and existing resources; the suitability of the technology, materials and patterns of implementation or maintenance management. The planning stage is as stated by Prof. Lynch<sup>2</sup> in his book *Site Planning* that, "Site Planning is the art of arranging structures on the land and shaping the spaces between, an art linked to architecture, engineering, landscape architecture, and city planning. Its aim is moral and esthetic; to make places which enhance everyday life – which liberate their inhabitants and give them a sense of the world they live in". Meanwhile Prof. Tom J. Bartuskain<sup>3</sup> his book "The Built Environment, A Collaborative inquiry into Design and Planning", is systematically define that "...the built environment define by four interrelated characteristics, First, it is everything humanly created, modified, or constructed, humanly made, arranged, or maintained. Second, it is creation of human minds and the result of human purposes; it is intended to serve human needs, wants, and values. Third, much of it is created to help us deal with, and to protect us from, the overall environment, to mediate or change this environment for our comfort and well being. Last, that every component of the built environment is define and shaped by context; each and all of the individual elements contribute neither positively or negatively to the overall quality of environments and to human-environment relationships." When we observed carefully over the second formula that made the basis for the design of the built environment, we can make conclusion, that the balance between the three aspects of the natural environment-natural, cultural life (culture), and man-made creations, are worthy and should be set as its objective. The construction of the built environment in Indonesia still have a slight obsession towards modernization of the environment that are sometimes willing to sacrifice its natural elements. This implies that a well-ordered city is a town with sophisticated and smart buildings, road for motorway and highways. We need to consider that appropriate aspects of the preservation of nature and environmental conservation is one aspect that we should emphasized.

Starting from the awareness that our Earth has a limitation, then the harmony between the natural surroundings with human being is a must thing to do. Modern humans tend to leave local wisdom shared by previous community in favor of a modernity. This fact thus became the biggest contributor in the destruction of the environment. Global warming become an issue that we often to hear. The continuous increasing of human population making a rising number of problems, one of it is the decreasing of land for the settlement. This problem creates the slums, land using which is not supposed to be use as a settlements, such as the banks of the River, the suburb of railroads or the space under the bridge. In addition, excessive consumption for a comfort living way like the using of electronics and telecommunications connections creating an excessive use of energies. Moreover the using of materials that are not renewable in developing process. As well as many other things that can be evitable, but still used in the name of modernization and comfort way of living. In addition, increasing population density also resulted in depletion of green fields and open areas. Dwindling land resulted in increasing price of land. This affects human thought patterns to take advantage of most of the land for the building compared with the economic reasons for greening. In addition the presence of industry, industrial and transportation activities contribute gas, toxic liquids and garbage. Elements – elements of chemistry and biology raise various kinds of radiation. And all of it will ultimately cause harm on human health.

Big cities in Indonesia especially Jakarta should be able to deal with the impact of global climate and the local climate, with the mindset that there should be a change so that the future is not worse than the present (sustainable life), makes the built environment in particular shelter (housing) will produce an impact on the comfort of its occupants. The architect has an important role in the world of architecture, in terms of planning a building, should generally adjust to the climate where the building is located, serves to human activity in it and can deal with the global climate. Facing a climate like this, strong building it's not the only respond to the climate changes but also utilizing and making the buildings sustainable, it also contributing by reducing the effects of global warming and make the Earth has a friendly relationship with humans. Architects are expected to use the approach as described above in terms of design that is emphasizing the future (sustainable).

Green Area of DaanMogot Low-Cost Apartment (Rusunawa) in West Jakarta<sup>4</sup> is an area where the green concept is applied to the entire development of infrastructure in the daanmogot flats either in the drainage system and roads, water supply system clean, liquid waste processing systems and mechanical systems, solid and elektrik in the dwelling. In the concept of green facilities, infrastructure, design, and systems made possible by sound ecosystem, where the energy is utilized efficiently.

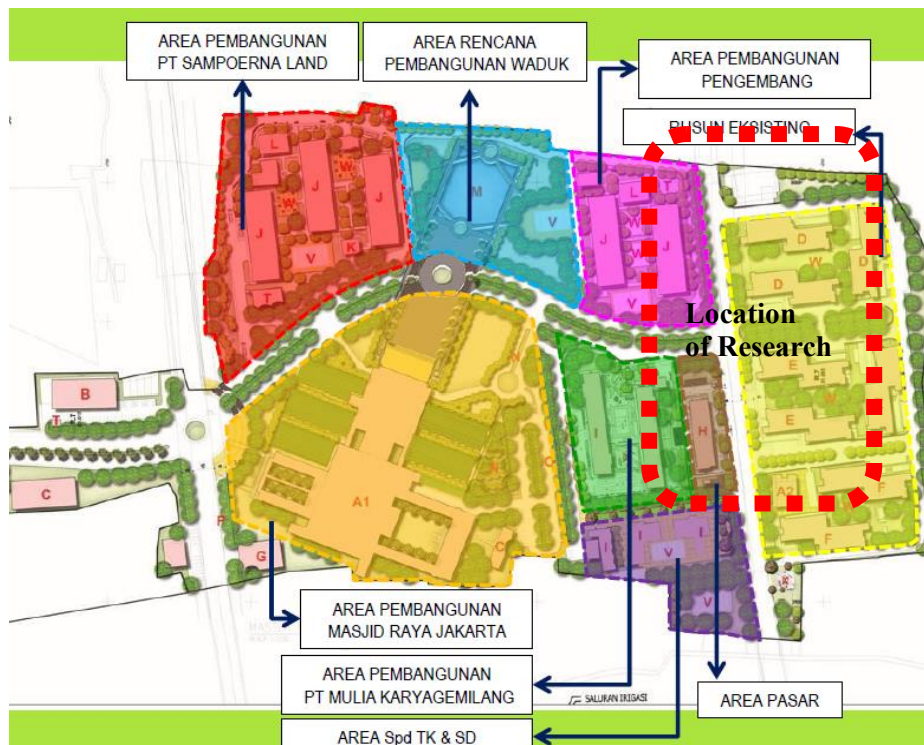


**Figure 1.** Existing of Green Area of Daan Mogot Low-Cost Apartment (*Rusunawa*) in West Jakarta<sup>5</sup>

Green concept that is applied in the Green Area of DaanMogot Low-Cost Apartment (Rusunawa) in West Jakarta is as follows:

- Energy efficiency is created through the reduction of energy consumption in the building, most of the energy needs in buildings are being fulfilled through renewable energy sources, as well as periodically inspect and monitor the performance of building systems.
- Minimizing the use of fossil fuels and make use of the most renewable energy sources available in nature include: Sun, wind, water, geothermal and biomass.
- Resource efficiency including through water use efficiency. Efficiency is achieved by minimizing the use of water obtained from the ground and Water Company for garden/landscape watering. In addition, the efficiency can also be obtain by considering the use of waste water that is still worth using grey water as the source for watering plants. Reducing overall water consumption in buildings will also be able to increase the efficiency of the use clean water.
- The concept of a zero-waste production is not only related to the efficiency of the utilization of resources, but also with the implementation cycle of the material in the system. The waste generated by a single subsystem should be able to serve as a resource for other subsystems. Concepts like the Recycle and reuse of material cycle is the application and efficiency of resource utilization in the Green Concept.

- One Stop living concept basically has a definition where the resident in a residential complex can meet all the needs of their life in one region such as shopping facilities, sports, business, entertainment room and so on. With the application of this concept, the designers aim is to make the life of residents becoming easier in term of fulfilling their needs, it also can save energy, cost, time and reducing the intensity of traffic jam that exist in city areas, which resulted in increasing of people productivity.



**Figure 2.** Location of Research on Block Plan Green Area of Daan Mogot Low-Cost Apartment (*Rusunawa*) in West Jakarta<sup>6</sup>

The Planning of Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta that efficient, effective and sustainable is expected to be a pilot project for another Green Building area in Jakarta, as well as becoming the main reference and basis for stakeholders who will be build other buildings especially vertical residential in an attempt to obtain a sustainable built environment.

**2. Method**

Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta is a concept that is expected to be another effort in realizing a sustainable building environment. This research uses quantitative methodology to determine if Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta can be an effort to realize a sustainable target environment, especially in West Jakarta.

To achieve these objectives, survey and interview were conducted within the residents of Daan Mogot Low-Cost Apartment, in order to know the parameters of the sustainable development environment with the living pattern of the inhabitants who have developed by following the pattern of life Residents. The collection of data for this achievement is conducted using the DCBA method questionnaire through a random sampling technique interview of the entire number of inhabitants from the demographic data of the population acquired.

To determine the number of samples that are sufficiently representative, then the number of samples used at least 30 samples, because the values or scores obtained from a number of > 30 samples, the distribution will follow the normal distribution (Ida Bagus Mantra, 1989)<sup>7</sup>. For this research researchers use respondents as much as 40.



**Figure 3.** Picture of Respondents while on Interview

The determination of 40 respondents was the researcher's assumption that the samples were taken to be quite representative, and to minimize any inaccurate data that would be taken from respondents representing 8 residential blocks of Daan Mogot Low-Cost Apartment.

**Table 1.** Demographic characterisitc of the respondents<sup>8</sup>. (Source:Unit Pengelola Rumah Susun Tambora Dinas Perumahan Rakyat dan Kawasan Permukiman Pemerintah Provinsi DKI Jakarta (2019)).

	Blok A	Blok B	Blok C	Blok D	Blok E	Blok F	Blok G	Blok H
KK	86	90	82	81	88	97	89	94
Total	86	90	82	81	88	97	89	94
Gender								
Male	176	175	170	159	179	185	179	192
Female	160	155	147	152	161	179	171	192
Total	336	330	317	311	340	364	350	384
Age								
Kids & Teenagers	156	155	145	143	144	146	172	186
Adult	130	127	131	126	149	153	136	141

Elderly	50	48	41	42	47	65	42	57
Total	336	330	317	311	340	364	350	384

This DCBA method can be used as an initial reference for developers and building planners. Or to assess the quality of an already developed built environment that meets sustainability standards. This DCBA method has the uniqueness of flexibility to be developed according to local conditions. In this research the DCBA is representative through numbers. Where D = 1, C = 2, B = 3, A = 4. The number representation is used to facilitate the researchers to take an average number from the interview results of Green Area of Daan Mogot Low-Cost Apartment (Rusunawa) in West Jakarta. This method is developed by covering the following aspects:

**Table 2.** Methodology Development Reviewed from Several Aspects<sup>9</sup> (Source : Field Works (2019))

Parameter	Penilaian	D	C	B	A
Lingkungan	Natural resource protection Working lands Outdoor Recreation :ruang terbuka hijau, lapangan olahraga Public health and safety : sumur resapan, kawasan resapan banjir Community character				
Economy	Public and Social Facilities				
Social and Culture	Empowerment, Participation and Institutional				

### 3. Results and Discussions

The essence of planning and designing in a development is continuous process towards the welfare of the population. In this case, the population becomes central to the concept of development where it is necessary to balancing the management aspects of development. Without this balance, the progress of development will be interrupted and disconnected which eventually brings the misery of mankind itself as it has happened right now. Along with these ideas, recent sustainable development concepts that are related to environmental and social issues are the issue. Based on the Brundtland report in the World Commission of Environment and Development (1987)<sup>10</sup>, Sustainable Development has the following understand: Development which meets the needs of the current generation without compromising the ability of future generations to meet their own needs.

Then Surjono (2009)<sup>11</sup> responded to this understanding by suggesting that the continuity of natural resources is the key to the success of sustainable development where there is a balance between human needs and natural/environmental support. In supporting this balance, sustainable development must be supported by the pillar aspect of environmental, economic, social and cultural aspects. From this understanding, it can be understood that the concept of sustainable development is a multidisciplinary realm that must be run in an integrated manner.

The architecture in this case contributes to the two main aspects of architecture as the process and architecture as a product. As a process, architecture is a form of decision-making involving multidimensional thinking or concept that encompasses the environment, economics, social and culture as well as construction/technology techniques to realize the built environment Sustainable quality for human life.

The aspects that support the efforts to realize the sustainable target environment in Green Area of DaanMogot Low-Cost Apartment (Rusunawa) in West Jakarta are as follows:

**3.1 Environment**

The environment in Daan Mogot Low-Cost Apartment in West Jakarta is within the range value 3-4 (A). It can be seen on:

- Natural resources protection such as providing green open space that can become urban farming space as land utilization for food needs and replacing green land used for development. To maintain the cleanliness of the environment by regulating waste disposal and providing waste bins in public, social facilities and also trash shafts in each unit of residential flats and also provide signage for garbage in place. The recycling of recycled or recyclable materials from the paper, or plastics that produce handicrafts that can be resold.



**Figure 4.** Urban Farming Space and Signage through garbage in its place

- Outdoor recreation by providing providing green open space that can become urban farming space as land utilization for food needs and replacing green land used for development. It provides a sports field for teenagers and adults and also provides RPTRA to become a children's destination which is used to become a playground.



**Figure 5.** Urban Farming Space, Sports Area and RPTRA



- Public Health and safety by providing a wells to accommodate temporary water falling in a home environment that is then attached to the ground or can be re-streamed to flush crops so as to maximize the use of rainwater For environmental sustainability and also prevent flooding in Green Area of Daan Mogot Low-Cost Apartment (*Rusunawa*) in West Jakarta.
- Community character by providing space that is capable of supporting social activities and is able to be an important factor for the interaction of residents such as communal space on the 1st floor, residents ' hall and Citizen's garden.

### 3.2 Economy

The economy of Daan Mogot Low-Cost Apartment in West Jakarta is within the range of 2-3 (B). This can be seen in the effort to increase the local economic potential that will be the expectation of every household resident in increasing self-reliance and well-being. The local economic potential, expressed as the base sector, can be find in:

- Provide free space to host buying and selling activities for residents who want to sell their wares to improve their economy such as opening stalls to sell food and drinks.



**Figure 6.** Food and Beverage Kiosk, Salons

- Small industry typical of the house dwellers by providing the PKK Gross Mart that is, make handicrafts from recycled materials or unused materials such as newspapers or plastics and other materials into the decoration of spaces such as flower vase, basket , or accessories such as clutch, wallet, sandals and so on.



**Figure 7.** PKK Gross Mart

- Provide urban farming space as land utilization for the food needs of the house of Daan Mogot Low-Cost Apartment in West Jakarta. Plants produced in the urban farming space is vegetable mustard, onions, chili and so on that can be consumed alone so there is no need to buy anymore to the market. 20% of respondents felt the benefits of urban farming space to meet family food needs. It takes socialization about the importance of urban farming space for the residents of Daan Mogot Low-Cost Apartment in West Jakarta.
- Provide waste bank for the residents of Daan Mogot Low-Cost Apartment in West Jakarta who have registered with the agent number from the relevant bank in order to redeem the garbage for a certain amount of money that can help improve the economy Residents can increase the efficiency of the garbage bank activities so that the existing garbage can be managed well on a larger scale. A total of 80% of respondents of the residential residents felt the benefits of the waste bank to improve the economy and make the quality of the home environment. 20% of respondents did not use the Trash bank facility because it worked so there was no time to deliver to the trash bank. Garbage dumped through the shaft will be selected by cleaning service in the house that will be exchanged for a certain amount of money in the trash bank. Further socialization required for all residents of Daan Mogot Low-Cost Apartment in West Jakarta can feel the benefits of waste bank.



**Figure 8.** Garbage Bank

### 3.3 Social and Culture

Social and culture in Daan Mogot Low-Cost Apartment in West Jakarta is within range of value 3-4 (A) can be seen on:

- Open space that can be utilized to host events as cultural reflection of the occupants and support social activities and is able to be an important factor for the interaction of residents.



**Figure 9.** Social Activity in Daan Mogot Low-Cost Apartment in west Jakarta

- Empowerment, participation and institutional to improve the development of environmental sustainability, history and culture in the occupant of youth and adult homes in particular through socialization.

#### 4. Conclusion

Assessment of sustainable development environment in Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta is carried out against several aspects that are used as a parameter such as environmental, economic, social and cultural where this assessment results expected to provide quality value from a built environment that meets sustainability standards. Assessment of environmental, economic, social and cultural aspects of the Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta still survives because indigenous, local traditions and cultures have established a relationship and provide good value in the assessment of sustainable building environments. Overall the assessment of sustainability standards in Green Area of DaanMogot Low-Cost Apartment (*Rusunawa*) in West Jakarta should still be improved to be able to achieve the maximum value of sustainability of the target environment through socialization so that is expected to be an effort to realize a sustainable building environment.

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