FUNDAMENTAL
: Regain From The Past

Case Study: Ciliwung Riverbanks, Jakarta, Indonesia

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ISSUES

Slum and Squatter in Jakarta.

Indonesia is the fourth most populous nation in the world, with a population of over 250 million people. More than 50% of its inhabitants live only on Java island that its sized only 6.7% of the total area of Indonesia. Not only focused on one island, the population in Indonesia focused even in one city, their capital city, Jakarta. It was not without reason, 60% of the Indonesian's finance managed in Jakarta. No wonder Jakarta is the main destination of urbanization.

With the population growth due to urbanization and the land scarcity issue, there appeared the settlements in illegal areas such as under the overpass, and most have sprung up in the riverbanks area. Riverbank residents lives with less attention to the preservation of nature and make the river as a giant trash can and toilet. This resulted in the rapid river overflows when it rains and Jakarta is always flooded.

To find solution of these problems, government take the steps that they think appropriate with the eviction of slum and squatter areas in Jakarta, especially in Ciliwung's riverside. However, the eviction occurs inhumane for the people, lack of preparation, and minimum planning for the eviction process.

How city accommodate the needs of citizens dwelling in the future with the land scarcity issue and the growth of illegal settlements?

How to design the dwelling that can be a catalyst for the environment and supports the green behaviour movement without ignoring the resident's social behaviour?

Dwelling in Indonesian Tropical Climate.

Nowadays, the Indonesian architecture in general, and Jakarta in particular, influenced by the non-tropical countries architecture style. Most of them just concern about style, but not the building performance. It can be seen from the design of micro-scale single house, to multi-

storey designed building that is not applied the principles of tropical architecture anymore. As a result, the building's main function as a shelter are not met properly. The building becomes hot due to his fault orientation and lack of shading, the absence of air flowing in preformance room naturally, lack of daylighting in the room, until the leak of rainwater in the building, is a few problems that can easily be found in buildings in Jakarta this days. This resulted in a waste of energy due to the building dependent on artificial technology.

The tropical climate gives so many resources that can be used for habitable activities, to build the structure, and maintaining the inhabitant needs. But today, construction is highly dependent on the fabrication materials that can only be produced in certain areas. By bringing in material from other regions, the building will produce a high carbon footprint. Moreover in the construction process, they always use heavy equipment that requires huge energy in the operation.

How is the design that can accommodate a tropical climate as a source of energy, materials, and the source of the necessities of life?

CONCEPT

Learning From Our Past.

Look into our past, traditional habitable life is proven to be sustain, not only for the human life, but also its nature. In terms of materials, the traditional architecture always take material directly from nature. With the short age of materials, they had to keep their material sources and designed their house parts with the ability to be replaced easily in case of damage. In terms to fulfill the necessities of inhabitant life, they rely on natural resources such as fruits, vegetables, and livestock that can be produced from their neighborhood.

The needs for shelter answered by their various architecture's principles that responds to the tropical climate. Few principles that be used include the proper orientation of buildings, the use of sun shading, the use of pitched roof with a good drain of rainwater, and the use of ventilation that allows air to flow. Stilted house typology also been selected in addition to minimize the intervention of land footprints by humans. It also helps the air to flow and keep the humidity stability inside house.

In traditional societies, the water element is not just to be used for fulfillling the basic needs of life. Water is also used for the household needs such as bathing, washing, fulfilling the needs of irrigation for the garden, and the transportation needs. With their dependence to the water, people have the awareness to take care of the river as main water source. They also realized that the river is not only theirs, but also a source for other villages across the river.

From the past we learned that people can build their own settlements with low technology and resources that they have around without ignoring their architecture performance in response to the tropical climate.

DESIGN

Design Strategy

With the issues and problems that exist, we are planning several stages of development with 1) recording the number of families living on the site that will be relocated, 2) preparing a natural resource to be used as a bulding material and the necessities of life at the site, 3) preparing the water management system to meet the needs of housing , 4) designing the social housing, 5) synchronizing between housing, landscape, and river, 6) encouraging to do continuation of the development to the next area with the design, so that the slum and squatter in the Jakarta can be restored.

Design Feature

1. Relocation

   Site that located in slum riverside will plotted 25 m x 30 m each. At the plotted site, the number of exsting houses are 15 units approximately. Thus, the initial design of the housing should be able to accommodate 30 houses (starting site + the neighbour site). With this development method, the concept of building without inhumane evicting can be applied in the design process. Relocation of the residents who must be moved to the vertical housing can be accommodated quickly because it happened in the close distance.

2. Walkup Vertical Housing

   a. The response to heat

      Heat from solar radiation in Jakarta contained mostly in the east and north side. Therefore, on the north and east orientation, the surface area of the building is reduced. Moreover, the application of double skin facade is used for providing insulation and shading for residential units.

   b. Response to the rain

      Building envelope formed as a single solid building to avoid the possibility of building leaks caused by a heavy rain. Sloping shape of building envelope also allows water to drain into the ground quickly.

   c. Response to the wind

      Stilted housing typology chosen to let the air flow from the base of the building. The building is designed to be porous and has a void in the middle to allows the air to flow between the module. And also each dwelling module designed with cross ventilation.

d. Response to sunlight

Each unit has a side facing out so that each house get enough light into the room. The used of shading device purpose is also to avoiding glare on dwelling module.

e. Material

The main used materials in the building is bamboo. In this landscape design purpose, bamboo planted along the riverside. Bamboo that has ready to harvest then will be cutted and preserved naturally with sinked it on river. Because of their structural strength and ease of processing, bamboo also chosen of its ease of procurement because it is very easy and fast growing plant, especially in the riverbank area.

f. Modularity

Each unit is designed on modular basis. This method facilitates the construction development and maintenance of each housing unit. When the unit must be repaired, people can do it by themselves.

g. Social Response

Housing is designed to accommodate a wide variety of people, ranging from the young to the elderly, couple, and families. Under the existing system, the people are required to work together in maintaining their homes. Thus, they keep the environment in which they live automatically.

3. Water Management

The main source of water relies on rainwater and river water filtration. Rainwater is captured and stored in the top of the building. Rain water filtered by the bamboo charcoal filtering process to be used for bathing, washing, irrigation, and for drinking with further filtering process in each housing unit. Water from the river is processed by phytoremediation system before it pumped for household needs.

4. Food Resources

Procurement of the needs for food are supported by the hydroponics concept. Vegetables are grown hydroponically on the housing corridor. In the landscape, will be planted selected fruits and vegetables that can live on the river soil conditions. For the fulfillment of animal protein, fish cages placed under the bridge.

5. Social Space

Riverbank space can become a social space for housing residents and communities in the surrounding areas by providing new green space along the river. This space can increase social activities around and will decrease the squalor along the river.

6. Sustainable Catalyst Neighborhood

The initial prototype role as a catalyst for the environment in managing its natural resources. Then, the development will become sustainable that will be done collectively

by a certain group of people: the riverbank community. Society relies on natural surroundings as the renewable energy provider.

7. Jakarta's Flood Barrier

Mound shaped landscape is designed to act as a flood barrier for Jakarta when heavy rain is coming and enabling the rivers overflow. The river bank is designed as a sponge to absorb water quickly with the presence of plants that have good water-absorbing roots. With the presence of plants that keep the soil structure in this landscape, erosion and sedimentation due to the river flow can be reduced so that the narrowing of the Ciliwung river can be avoided and flood can be resolved.

8. Ciliwung River's Filter

Each plot of this design acts as a filter river water. River water that came in and out from the housing system always filtered so that the quality of water always getting better. Water filtration’s process conducted by the phytoremediation method that used plant as a filter. This system is applied on some point across Ciliwung river, from headwaters to downstream. This continuous filtering process will make Ciliwung river’s water quality getting better.

9. Energy Resources

a. River

The river flow will be catched and used for moving the water turbines and producing electrical energy which then distributed to the rest of the housing unit.

b. Bio fuel

Human dirt that produced in the housing unit will be collected in septic tank and processed into bio-gas by non-oxygen fermentation systems so the gas can be used for cooking purposes.

10. Waste Management

Household waste is separated into two types, wet waste and dry waste. Wet waste material is collected and processed into compost and biofuel sources, whereas for dry waste can be recycled or sold.