Design of vertical fisherman village in Penjaringan with sustainable development concept

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Abstract. Indonesia is known as an archipelago state that has more than 17,000 islands with a coastline of more than 81,000 kilometers. Therefore, the economic life of the Indonesian nation is largely centered on the coastal areas. Population growth along the coastline has resulted in fishermen choosing to live close to their source of life and building their economy there. Rapid population growth, and the scarcity of available residential land resulted in fishermen building denser settlements, expanding towards the sea and ultimately giving the impression of slums along the coast. It is felt that vertical settlements (flats) will provide solutions to problems in the conditions of these slum settlements. The effort to rejuvenate the fishing village in Penjaringan Village is the topic of this research with the limited vertical settlement approach, which takes into account: behavior patterns, habits, activities and daily needs of fishermen. A vertical development with a limited height is also seen as fulfilling the concept of sustainable development, where all fishing activities can be accommodated on a narrow area of land and do not sacrifice too much open land which is already small in the coastal area. In addition, fishermen's life and cooperation between them can be facilitated by carrying out a compact upward design. This is one solution that will differentiate this fishing village from other settlements. This development is declared successful if all the goals that have been set together can be achieved and bring benefits to the group of residents.

1. Introduction

Indonesia is known as an archipelago state, most of which have more than 18,000 islands with a coastline of more than 81,000 kilometers (www.merdeka.com). Since ancient times, the economic life of the Indonesian people has been more focused on the coastal areas and river estuaries. Most of these coastal communities work as fishermen. Over time, these fishing villages developed along the coastline which then used the beach as a place to live and the center of their economy.

Jakarta is the capital city of Indonesia which is known as the largest metropolitan city in Southeast Asia or second in the world with a high population of indigenous people and immigrants. Its rapid population growth and high population density are one of the driving forces for urban growth. North Jakarta has become a bustling coastal city and trading city and is very strategic for trade routes, resulting in an increase in population density of North Jakarta and the growth of uneven settlements, which results in narrow urban spatial planning. With a large population growth and not balanced with the development of city facilities and infrastructure and the improvement of urban services, this environment has the
potential to create slum settlements.

Indonesia is known as an archipelago state, most of with more than 17,000 islands with a coastline of more than 81,000 kilometers (www.merdeka.com) [1]. Since ancient times, the economic life of the Indonesian people has been more focused on the coastal areas and river estuaries. Most of these coastal communities work as fishermen. Over time, these fishing villages developed along the coastline which then used the beach as a place to live and build the economy. Jakarta is the capital city of Indonesia which is known as the largest metropolitan city in Southeast Asia or second in the world with a high population of indigenous people and immigrants. Its rapid population growth and high population density are one of the driving forces for urban growth. North Jakarta has become a bustling coastal city and trading city and is very strategic for trade routes, resulting in an increase in population density of North Jakarta and the growth of uneven settlements, which causes narrow urban spatial planning. With a large population growth and not being matched by the development of city facilities and infrastructure and the improvement of urban services, this environment has the potential to create slums.

Slum is a major concern in this area, which occurs due to the rapid increase in population density in this area. This slum will be tried to overcome with the concept of sustainable development, in which the designed vertical settlements will limit the height of the building to the maximum number of floors without elevators that can be passed by parents and children. The concept of sustainable development also requires the use of efficient materials and energy, in addition to providing an effective and efficient area for the common interest of fishermen. Penjaringan is one of the villages in the North Jakarta area, which is still classified as a slum. It can be concluded here some of the problems in Penjaringan Village:

- Disrupted activity
- Limited land
- Slums
- Utilities
- Poorly maintained facilities and infrastructure conditions
- Livelihood changes
- Not all inhabitant of this settlement are fishermen

Based on the issues previously described, the following design criteria were established:

- Through a good architectural design, all environmental facilities and infrastructure will be easily accessible to fishermen, both from their workplaces, as well as from other activity locations, such as selling fish, drying fish, tourist attractions and others. Thus the available facilities and infrastructure can be used by all residents of all groups and will ultimately improve their quality of life.
- The jetty area, clustered dwellings and the arrangement of areas connected comfortably and safely.
- The concept design of the village building as a vertical residence is able to minimize land use horizontally and is a solution to the increasing population density in the North Jakarta area. This design is also ensured to maintain the quality of sustainable development

A successful architectural design will pay attention to the concept of structuring physical space for human movement activities from one room to another, creating inner and outer space and also showing a picture of the perceptions and imaginations of the occupants. Social meaning in spatial planning becomes the basis for the behavior and perceptions of users or user groups. This is not only based on user needs in implementing interactive spaces. The application of interactive space can be successfully formed if social contact and communication can occur among groups of individuals. Social interaction has rules in society and these rules can be seen through the dimensions of space and time (Robert T Hall).

In the design of fishing settlements in Penjaringan, the concept of Sustainable Development has become an option, where ecological principles and environmentally friendly buildings will be of
particular concern. Thus, the research themes are: "Design of a Vertical Fisherman Village in Penjaringan with the Concept of Sustainable Development".

2. Research methods
The study process used in designing this vertical fishing village with the application of interactive space in Penjaringan is carried out by a research method that is quantitative-correlative analysis.

2.1. Data collection methods
The method used in technical data collection is as follows
- Survey / Observation
- Interview
- Documentation

2.2. Source of data
Data sources are divided into two, namely primary data and secondary data. Primary data is data that is done in the form of field studies. Secondary data in design is also important, one of which is literature study. The literature study used is a reference for all types of references such as books, journal papers, articles and other scientific works. Besides that, another thing that is important is to adjust the Basic City Spatial Plan (RDTRK) for DKI Jakarta as a reference in planning.

3. Land analysis and conclusions
See figure 1.

![Figure 1. Land analysis and conclusions.](image)

The various functions that exist in the design building are as follows:

3.1. Activity activity approach and space requirements
- Primary function facilities as a residence for fishermen to rest and gather. Type of residential unit (studio and family).
- Secondary function facilities, this function includes activities that accommodate residents to gather and work together in a common building unit. Inside there are also service activities, multipurpose rooms, playgrounds, places of worship, health clinics, jetty and fishing area.
- Tertiary function facilities, this function includes activities to improve the economy of residents who come from the lower middle class, namely business units, shops, management offices.
With provisions (figure 2), 50% KDB and 5 floors, ground floor design with areas that can be accessed for the public areas, parks, management / work rooms and MEP areas. floors 2-5, are flat units that are private or residential and on the 6th floor, a drying area, which is placed on a floor-top per building block. The shape of the mass chosen is rectangular because it has a low heat distribution and has a high space for housing, with a total of 4 building blocks. And the direction of the building faces north and south so as to maximize the air entering the building. And for the fishing area it is placed near the dock area and behind the building so that public movements are not disturbed by occupancy (table 1).

| Land Area | PERDA | REALIZED |
|-----------|-------|----------|
| KDB       | 50% = 6,000 m² | 5,496 m² |
| KLB       | 2 = 24,000 m²  | 18,320 m² |
| KB        | 5          | 5        |
| KDH       | 30% = 3,600 m² | 3,550 m² |

3.2. Application of concepts in design

This building (figure 3) takes the concept of an industrial building because of the exposed materials such as red bricks and aci stucco, iron materials, open piping, open ceiling construction so that it looks warm and modern but simple. The use of this material is intended to make the room feel cooler, the walls are not prone to cracks and are fire resistant.
The Penjaringan area (figure 4) is a coastal area where many people work as fishermen, for that in realizing it in the form of buildings that represent the culture of the community, the facade is taken from the form of sea waves made from light blue ACP and for the fishermen's buildings take a typical Bugis traditional roof which will become the hallmark and accent of this area.

3.3. Concept interactive space design

The drying room (figure 5) is designed according to the needs of fishermen so as to improve the social (communication) and economic level of the occupants, located in the rooftop area in each residential tower block. With access using a freight elevator to transport wet fish to the rooftop so as not to interfere with activities in the residential building.
Common spaces (figure 6) are located in the 3rd floor area of the building, designed for temporary gathering places for residents before carrying out their fishing activities. And there is a connecting bridge between building blocks making it easier for residents to interact with each other so that it makes it easier to gather to work together. And there are also children's play facilities, a plaza and a shared reading room on the 1st floor.

Figure 7. The fishermen's areas.

The fishermen's areas (figure 7) are located near the jetty so that zoning works and occupancy is not disturbed and thus facilitates their work. And there is also a TPI for temporary fish deposits, warehouses to store their fishing equipment and design a fishermen's working area to repair equipment jointly and communally.

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