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REDESIGN OF PURWOKERTO WAGE MARKET WITH BIOCLIMATIC ARCHITECTURE APPROACH

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Abstract. Purwokerto Wage Market is the main market that is the center of trade in the Purwokerto area. Circulation in the market is one of the problems that need to be overcome and also the lack of openings causes the temperature in the market to be quite high during the day. From the data obtained, the temperature in the city of Purwokerto ranges from 21.4°C – 29°C. In addition, waste management that is not optimal causes the atmosphere to be less comfortable for both traders and market visitors. The number of informal traders who occupy areas that are not specifically for selling is one of the problems that must be solved. To overcome these problems, it is necessary to plan and design the market with a bioclimatic architecture approach that pays attention to the condition of the building and the environment. The analysis was carried out which was divided into several approaches, namely, functional approach, contextual approach, structural approach, performance approach, and architectural approach. The design was then carried out thermal tests using thermometers and digital anemometers in the morning and afternoon with temperature results at 30°C – 30.8°C. From the results of data collection and data analysis, a design plan for the main market building was obtained that was in accordance with the needs of its users. From the results of the study, it can be concluded that the application of the bioclimatic concept to buildings and site areas is a hallway and on the façade of the building in the form of secondary skin, vertical garden, dynamic façade which protects the building from direct exposure to sunlight. Then the rainwater collector is placed in the central area and as a vew in the building itself. The design that has been designed can be a reference in the redesign of the Purwokerto Wage Market building in improving and overcoming existing problems.

Keyword: *Traditional Market, Bioclimatic Architecture, Wage Market, Purwokerto*

INTRODUCTION

The market is a gathering place for people to conduct buying and selling transactions between sellers and buyers directly to obtain a good or service. The existence of a market that continues to grow to this day cannot be ignored because it plays a very important role in the community in meeting daily needs, helping the community's economy and becoming a source of government revenue with taxes.

Stall or shops in the market as a place of business must be clear about their ownership status to know the available capacity and

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maintain the function of the space as it should. In addition to traders who occupy los or stalls that can be called official traders, there are informal traders who also help in livening up the market atmosphere. However, the existence of informal traders also raises new problems, where in this sector must get a separate place but do not have a permanent place to trade and occupy an area that should be a circulation space or open space. The influence of these informal traders makes the environment inside the market seem shabby and more dense.

To answer these problems, bioclimatic architecture was chosen as a design concept to design energy-efficient buildings that result in reduced operational costs, reduced pollution to the environment, and comfort for users. Bioclimatic architecture focuses on the design of buildings that refer to the local climate with the aim of providing thermal and visual comfort, by utilizing natural energy sources such as the sun. The basic element of the bioclimatic concept is to include natural resources into the building such as the sun, wind, vegetation for lighting, and ventilation in the building.

MATERIAL AND METHODS

The method that will be used in the preparation of the design is to use the descriptive method. This descriptive method is a method that explains and elaborates on, the design of the basic concepts, requirements and design conditions of the planning and design of the Purwokerto Wage Market. From various explanations and descriptions of the design design, then look for field data that supports various things needed in the planning and design of the Purwokerto Wage Market. The data that has been collected will be analyzed and concluded, become the basic concept for the design and planning of the Purwokerto Wage Market, and be used as a basis in the architectural design of the building. Data collection will be divided into two categories, namely primary data including location surveys and direct interviews, and secondary data including literature studies.

CONCEPT

The purpose of the design is to implement the basic program of design and planning in accordance with the aspects of planning and designing the Wage Market as a parent market with a bioclimatic concept that is energy-efficient and environmentally friendly through redesign to overcome the problems that exist now so that it is expected to be able to provide facilities in accordance with the needs to accommodate buying and selling activities in it in an orderly and comfortable manner for the actors in it.
The Purwokerto Wage Market is a facility for sellers and buyers to interact and also as a place of service for the community in buying and selling goods, loading and unloading goods, a place to store goods, a place for social interaction, and a place to find out the level of demand of an area. Facilities in the market such as stalls, stalls, loading docks and other supporting areas are grouped based on the analysis of actors involved in market activities. The bioclimatic concept in the market is in the form of green areas, the use of natural energy sources such as the sun and wind as well as vertical vegetation, and the second layer of walls that surround the building.

Location

The location is on Jl. Jendral Soedirman, Purwokerto Lor Village, East Purwokerto District, Banyumas Regency, Central Java. The site is located in an area with land allocation as trade and services. Site limit :

- North : Jl.Vihara, Stall
- East : Jl. MT Haryono, Pemukiman
- South : Jl. Jendral Soedirman, Shop
- West : Jl. Brigjen Katamso, Shop

Figure 1 Site

Figure 2 Siteplan

Contextual Aspect Approach

Acessibility

Data

Access to the site can be reached from Brigjen Katamso street on the west side, Vihara street on the north side, MT Haryono street on the east side and Jendral Soedirman street on the south side. Entry access for managers, traders and visitors is not distinguished from exit access to the site.

Figure 3 Acessibility

Response

The main entrance is on the south side, the other entrances are on the west and north sides. Entry access for managers, traders and visitors can be reached from the south and west sides of the site, while service access is from the north side. There are two exits of the site, which are on the east side and on the south side next to the main entrance.

Figure 4 Acessibility Response

Climatology

Sun

Data

Sunlight reaches the entire tread area from the right side of the tread to the left side of the tread. Morning sunlight on the east side is still necessary and does not interfere with comfort, while sunlight in the afternoon is quite disturbing so on the west side should be limited.

Figure 5 Sun

Response

The transverse building follows the direction of the sun to minimize the plane on the east and west sides as well as the installation of adjustable openings to suit needs and comfort. Dynamic façades are placed on the east and west sides and when lighting is required, the façade can be partially or completely opened. However, when the sunlight is quite disturbing from noon to evening, the façade can be partially or completely closed.

Figure 6 Sun Response

Wind

Data

From BMKG data, the wind direction on the tread in the morning - afternoon blows from the south at low-medium speed and the wind from the west in the afternoon at medium speed.

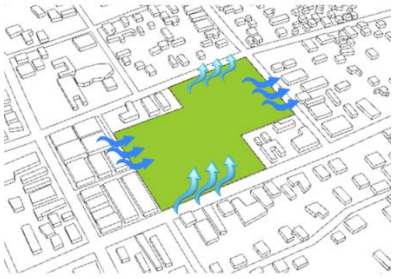

Figure 7 Wind

Response

Separating the building mass into several parts to allow air access. In addition, openings on the south and west sides to respond from the direction of the wind on the site.

Figure 8 Wind Response

View

Data

The site can be seen from all directions, clearly visible from Jalan Jendral Soedirman on the south side. On the west side the footprint is covered by buildings, on the north side it can be seen but slightly obstructed.

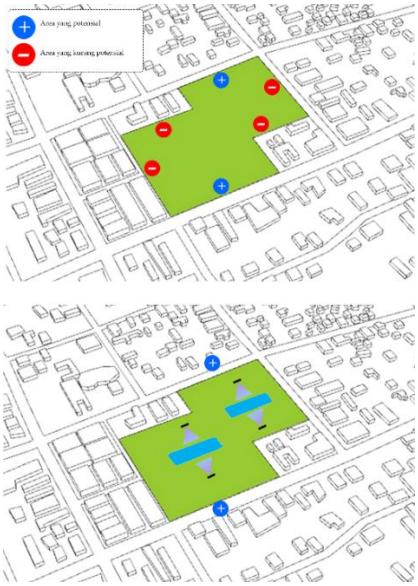

Figure 9 View

Response

The façade of the building leading to Jalan Jendral Sudirman is made open land and several facilities such as hallways, food bazaars, bus stops, pedestrian paths and provide vegetation as a barrier from noise and air pollution. Marking site entry and exit access is easy to see and unobstructed.

Figure 10 View Response

Architectural Aspect Approach

Bioclimatic architecture is an architectural concept that is related to climate and is not harmful by using the least amount of energy. Referring to the principles of bioclimatic architecture according to Ken Yeang, the application of design to market buildings is:

- *Dynamic Façade*

This Dynamic Facade can maintain thermal conditions in the building because it can be opened and closed according to the needs of the space.

Figure 11 Dynamic Façade

- *Vertical Garden*

A vertical garden is a green space or garden that is arranged vertically and the application of a vertical garden on the wall can help cool the room temperature. Vertical gardens can also be air filters from the outside and can be a barrier because they can absorb noise.

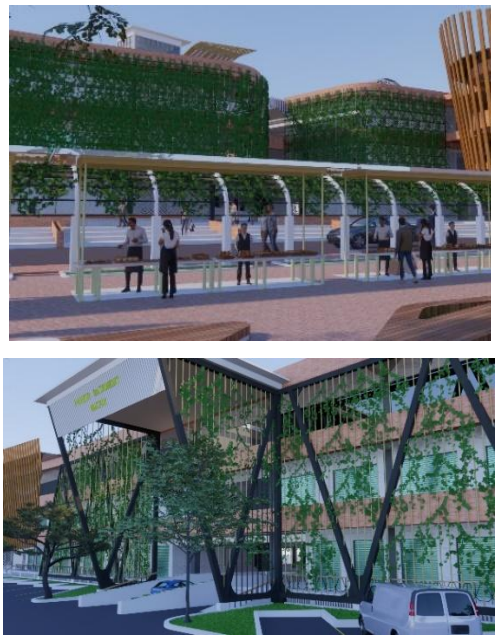

Figure 12 Vertical Garden

- *Building Fins*

The fins on the shell of the building form gaps that can be passed through by the airflow to help dissipate the hot air in the building and cool the space.

Figure 13Secondary Skin

DESIGN RESULT

In the redesign of the Purwokerto wage market, the design uses a grid on the structure to maximize the function of the space, as well as utilizing the site to get maximum final results.

Figure 14 Situation Plan

Figure 15 Siteplan

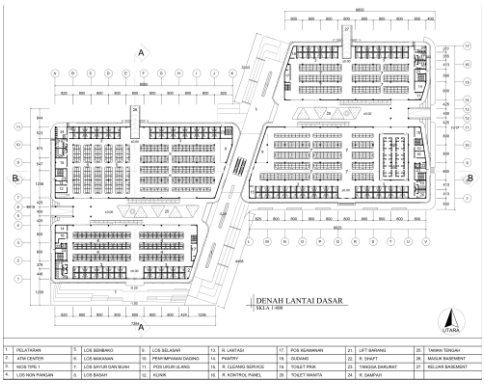

Figure 16 Floorplan 1

Figure 17 Floorplan 2

Figure 18 Floorplan 3

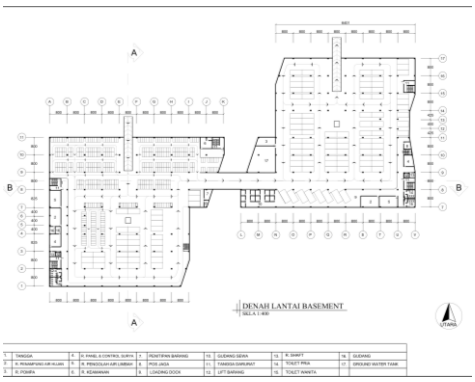

Figure 19 Basement Floorplan

Figure 20 Front View

Figure 21 Back View

Figure 22 Right View

Figure 23 Left View

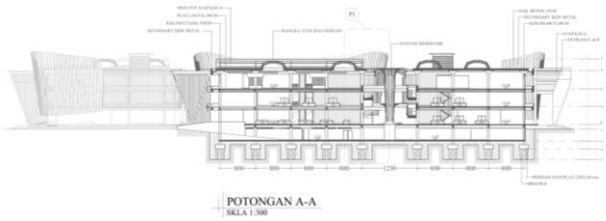

Figure 24 Section A-A

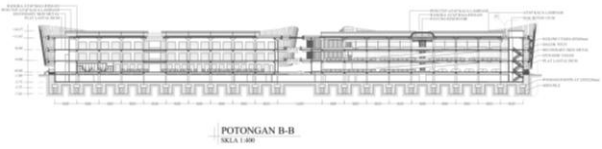

Figure 25 Section B-B

Main entrance with a clear marker in front of the site.

Figure 26 Main Entrance

The food baazar area in front to attract the attention of passers-by.

Figure 27 Food Baazar

Dynamic façade that can be operated to suit the needs of the space.

Figure 28 Dynamic Façade

Loading dock for a loading and unloading area that is easily accessible to vehicles and easy to transport goods.

Figure 29 Loading Dock

The informal space for traders who occupy the area around the market to be more organized.

Figure 30 Stall Informal

The corridor is a vehicle-free area for walking for users that is equipped with vegetation and seating.

Figure 31 Hall

The vegetables and fruits stall most of the market area because they are suppliers to the surrounding market.

Figure 32 Stall Vegetable and Fruits

The basic food area that provides various daily necessities is on the ground floor to facilitate the transportation of goods.

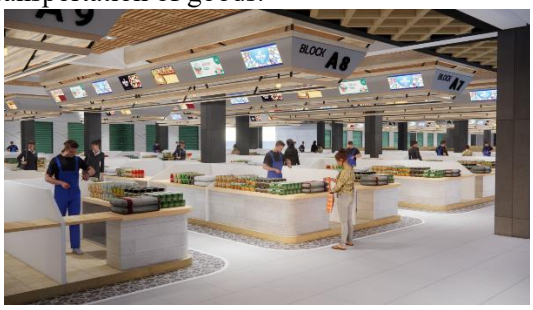

Figure 33 Stall Groceries

Non-food stall that provide goods such as clothes, furniture, children's toys and so on are in this area.

Figure 34 Stall Non-foods

The dry stall area that provides dry food and dry food, this los also occupies most of the market area.

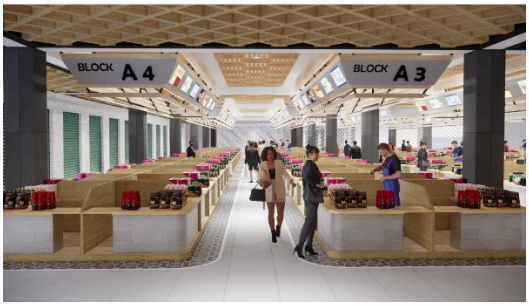

Figure 35 Stall Groceries and Dry-foods

The wet stall is on the ground floor and is covered, this room provides meat, poultry, and fish that have been cut.

Figure 36 Stall Wet

A multipurpose room for management purposes such as meetings to events organized by market managers.

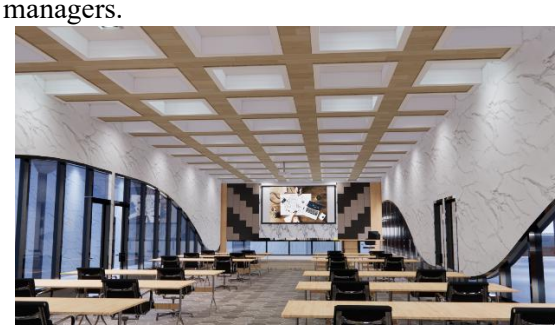

Figure 37 Multipurpose Room

Rental booths that can be rented for promotional needs and exhibition of goods.

Figure 38 Rental Booth

Skylight as natural lighting during the day above the circulation area.

Figure 39 Skylight

A foodcourt that provides ready-to-eat food on the upper floor with skylights to attract visitors.

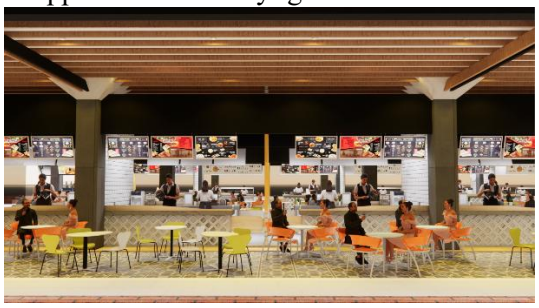

Figure 40 Foodcourt

The park with rainwater reservoir as a point of view and an air exchange area is also a resting place for visitors.

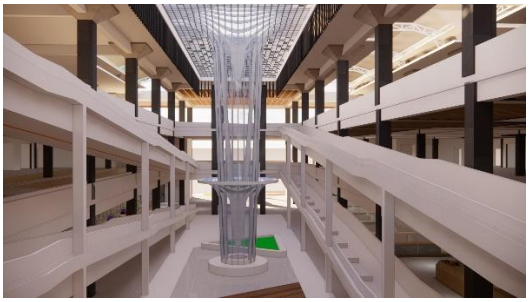

Figure 41 Rainwater Reservoir

CONCLUSION

Traditional markets have been a part of the history of trade in Indonesia, and will remain. Competition with the existence of a modern market is the reason why the market must continue to develop to be able to survive, one of which is the use of good planning concepts. The concept of bioclimatic architecture can be an option with its interesting application such as

façade appearance, spatial arrangement to maximize market functions that are attractive to the community. Secondary skin, dynamic façade, vertical garden to rainwater reservoir are new things in their application to the market which will be the attraction of the market

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