

# Concept Application of Directed Flow in the Land Order of the Herbal Plant Preservation Center with an Environmentally Insightful Architecture

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## *Abstract*

Mojooroto Sub-District, Kediri City has great potential in the field of herbal plant development, namely by utilizing the yard of the house but has not optimized the existing arrangement. Designing a herbal plant preservation center in Mojooroto, Kediri City, is a special land to accommodate various types of herbal plants so that the wider community can get to know and learn how to cultivate, and research well and correctly. The research method in this design is using qualitative methods. While secondary data include literature studies. Heinz Frick's theory with the theme of Environmentally Insightful Architecture is applied to aspects of land order, form and space that include harmony between humans and nature. The selection of environmentally sound architectural themes has an attachment to the surrounding nature. With the concept of macro nature and the concept of micro, directed land flow is applied in the form of a sequential arrangement of space with one another according to its activities.

**Keywords:** *Environmentally Insightful Architecture, Kediri City, Preservation, Herbal Plants*

## **1. Introduction**

Indonesia has rich biodiversity of herbal plants. One of them is Kediri City which has great potential for natural resources in developing the cultivation and production of herbal plants. The plant itself has properties or benefits for human health and is generally used as traditional medicine. Herbal plants are usually in the form of parts of plants such as leaves, roots, stems, or fruits that are dried and used as herbal medicines. Nowadays, the use of herbal medicine is rarely used by Indonesians. Even though when compared to chemical drugs, herbal medicines have almost no side effects contained in them. In addition, herbal plants in Indonesia are very potential and there are many types and each has tremendous benefits for our health and endurance.

From this description, it can be explained that the problems that occur in the city of Kediri, especially the Mojooroto sub-district, namely the lack of facilities to accommodate these herbal plants. So that the presence of this preservation center is expected to increase knowledge to the public about herbal plants that are around us or in Indonesia. In addition, the place is also used as an educational tourism place that focuses on herbal plants and herbal medicine processing places. Where in it there are gardens planted with various types of herbal plants in Indonesia, herbal plant study centers, herbal galleries, herbal medicine laboratories, herbal medicine processing, herbal tours, and so on.

## **Environmentally Insightful Architecture**

According to Endrasari, Widjajanti, & Azizah, environmentally Insightful architecture is a new innovation to sensitize a designer to start thinking about being environmentally friendly, saving energy and resources, having an attachment to the environment and maintaining a balance around in the design and planning of a design [2]. In the process, this development optimizes the benefits of natural resources, human resources and science so that it can be sustainable.

Heinz Frick's theory (1998) explains that environmentally friendly architecture does not determine what should happen in architecture, because there are no binding characteristics as standards or standardized measures but includes harmony between humans and nature [9]. In its application, it can be seen from the clarification of the selection of environmentally friendly materials. For example, building materials that can be re-cultivated such as wood, bamboo, rattan, etc. Natural building materials that undergo simple transformation changes such as red stone, tiles, bricks, concrete blocks, metal, glass, cement.

### **Principles of Environmentally Sound Architecture**

Some of the principles of environmentally Insightful architecture according to Heinz Frick include: (1) Energy efficiency: Buildings should be designed to reduce energy consumption, either through thermal insulation, use of recycled materials, use of renewable energy sources, and efficient planning in energy use, (2) Water management: Buildings should be able to manage water use efficiently, such as through the use of rainwater collection systems, waste treatment, and the use of water-saving appliances, (3) Use of environmentally friendly materials: Buildings should use materials that come from sustainable sources, such as by using recycled materials, environmentally friendly materials, or renewable materials, (4) Passive design: Building design should utilize natural energy sources, such as sunlight, wind, and natural light, to reduce reliance on artificial energy systems, (5) Integration with the environment: Buildings should integrate with their surroundings, both physically and socially. This can be achieved through the use of materials and forms that are appropriate to the local context, as well as involving community participation in the design process, (5) Building life cycle: Buildings should be designed to have a long life cycle, taking into account maintenance, upkeep, and adaptability to changing user needs.

### **Herbal Preservation Center**

The herbal plant preservation center is a facility dedicated to the research, development, and preservation of herbal plants. Its main goal is to maintain the genetic diversity of herbal plants and ensure that they remain available as an important natural resource for humans. In addition, the center also serves as a genetic bank, storing samples of herbal plants under specific conditions to maintain their sustainability. These samples can be used for plant breeding, crossbreeding, and maintaining genetic diversity.

As revealed by Afiah, Anisa, & Hakim, the herbal plant research and development center building itself is a building that functions especially for researchers to develop and research herbal plants which then the results of their research are developed as new innovations that benefit the community [3]. Besides being useful for researchers, the herbal plant preservation center building is also useful for the surrounding community to accommodate plants that have been cultivated while increasing knowledge for better planting results.

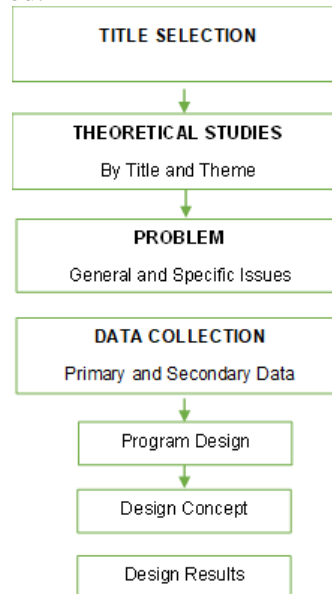
The explanation of the preservation center is in line with Putra, Azizah, & Sukarnen, regarding the application of the directional flowing concept to the land layout intended to facilitate building users to go to public facilities and other special facilities [1]. By designing a directional flowing path that has few intersections in its arrangement, wind circulation is very good because it spreads throughout the site. In addition to good wind circulation and making it easier for users, the arrangement of herbal plant gardens is also getting better, by classifying or clarifying the placement of herbal plants, it makes it easier for these plants to breed well.

According to Muhammad, Tarigan, and Alridiwersah, the arrangement and selection of plants at the preservation center adjusts to the surrounding buildings [6]. This is because to create good vegetation and create an environmentally sound environment. For the preservation and cultivation of herbal plants, it is necessary to pay attention to several important points such as, (a) soil preparation and processing techniques determined by the type of medicinal plants to be cultivated and the condition of

the land, (b) preparation of seedlings by generative and vegetative methods, (c) planting, and (d) plant maintenance which includes fertilizing, watering, weeding and hilling activities, as well as pest and disease control [6].

## 2. Method

The research method in this design is using qualitative methods and primary data which includes observation, interviews, and documentation techniques. While secondary data includes literature studies and comparative studies. Heinz Frick's theory applies the theme of Environmental Architecture which is applied to aspects of land, form and space arrangements that include harmony between humans and nature. Figure 1 is flowchart of method.

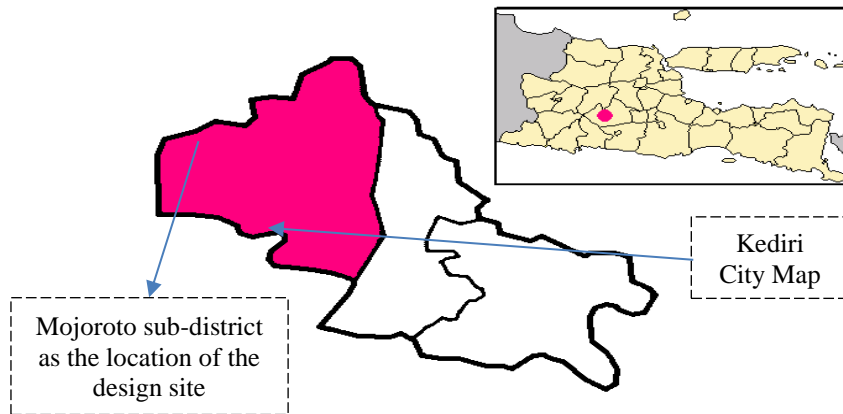


**Figure 1. Flowchart of Methodology**

## 3. Results and Discussion

### 3.1. Location

The location of the site used in the Designing of the Herbal Plant Preservation Center is located on Jalan Sultan Iskandar Muda Mojoroto district Kediri city, East Java. The boundaries of the site can be seen in Figure.1 on the eastern boundary side of PT Gudang Garam Tbk., the northern boundary of rice fields and residential areas, the western boundary of the brantas river and Kediri semampir bridge, and the southern boundary of the inn partner hotel and residential areas. The shape of the site is rectangular, with flat topography in the form of rice fields, so it does not require a cut and fill process. With a land area of 2.5 ha and a road width of about 8.5 m, the building line is about 4 meters (Front Side), 3 meters (Right and Left Side), 3 meters (Back Side) with a basic building coefficient of 50% and 30% green open space, see Figure 2.



**Figure 2. Map of Mojoroto Sub-district, Kediri City**  
*Source: Google Earth, 2023*

An introductory description of the site conditions as shown in Figure 3 is for the northern site boundary of 170m and slightly forward with a size of 120m while the east is 100m and the south is approximately 300m and the west is 115m.



**Figure 3. Site Location**  
*Source: Google Maps, 2023*

### 3.2 Climatological Analysis

In this herbal plant preservation center, analysis about site is an important point for consideration of the design of land arrangements both from solar analysis, wind analysis, noise analysis and analysis related to the view described in the Figure 4:



**Figure 4. a) Sun and Wind Analysis, b) Response to Design**

Source: Google Maps, 2023

Based on the site analysis, the cultivation area is placed on the west side of the site because it gets optimal morning sunlight. With optimal lighting, herbal plants can grow well. While the wind blows from the south and east, so the arrangement of good vegetation by placing the nursery and cultivation area on the east side so that the wind can be directed to pass through each plant so as to get good air circulation. Where good wind circulation can help the pollination or growth process of these herbal plants.



Figure 5. a) Noise Analysis, b) View Analysis

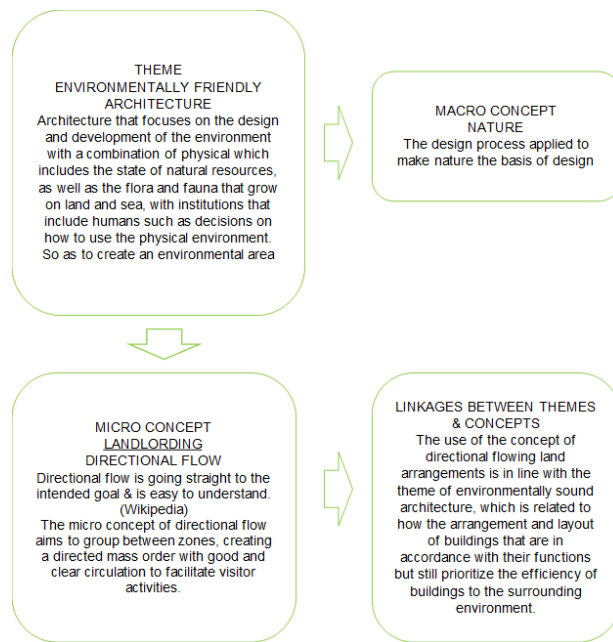
Source: Google Maps, 2023

Positioning the building mass at the highest noise point to slightly retreat to the back so that the building at the front does not hear too much noise from the main road. In the front area of the site there are trees, parks and ponds in order to reduce the intensity of existing noise. While responding to the view, the black area is the right area for placing interesting vocal points from inside and outside the land. Placement of ME (Main Entrance) on the south side of the area with the aim of fulfilling the aspects of easy to see, easy to reach, and safe to achieve. Dominant traffic access from the east, and based on the condition of the eastern tread is more strategic and does not disturb traffic in the area around the site. SE (Side Entrance) placement in the southern area is also on the other hand, with considerations based on the condition of the eastern tread is one of the accesses to the road.

### 3.3 Concept and Design Results

#### 1) Concept

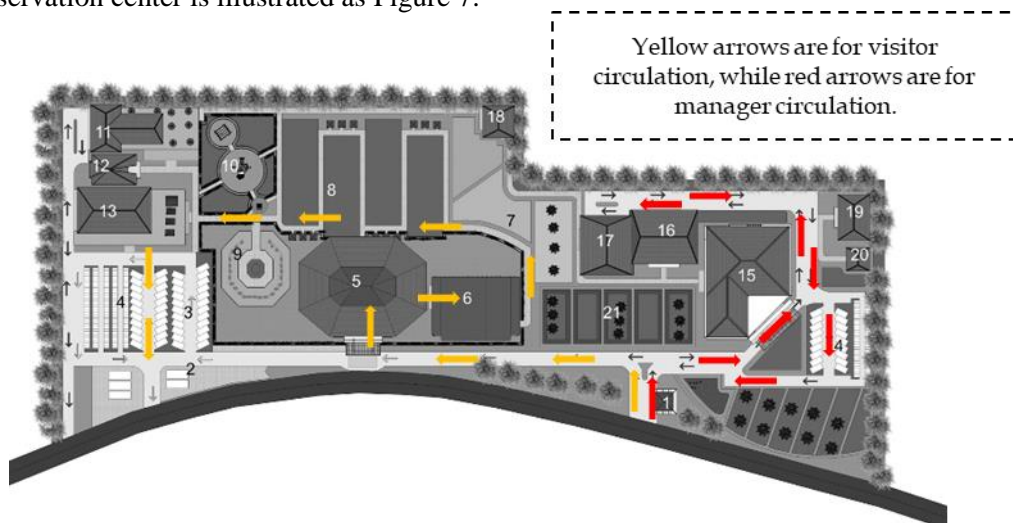
In the design of this Herbal Plant Preservation Center, the concept is derived from theme Environmentally Insightful Architecture. This concept is based on the analysis carried out in the previous stages by adjusting the space program, site location and of course the theme of the design which is environmentally friendly which involves design as a medium to present a natural, environmentally friendly impression to users. The diagram below is the flow of the concept design :



**Figure 6. Design Concept Diagram**

## 2) Design Results

This herbal plant preservation center applies the concept of environmentally friendly architecture designed and built by considering its impact on the environment. While the application of the concept of land order is directional flow. The concept of directional flowing land order is a plan that is carried out to maintain order and facilitate users in using a land. This concept aims to create an environment that is functional, efficient, and easy to use by all users. In this concept, land will be grouped and organized based on its function. For example, the parking area will be placed towards the entrance so that users can easily park their vehicles. Meanwhile, the children's play area will be placed at the back so as not to interfere with adult activities. In addition, this concept also organizes the flow of users to avoid confusion and congestion. For example, pedestrian paths will be clearly marked and directed to their destination easily. The application of the directional flow concept to the land layout of this preservation center is illustrated as Figure 7:



**Figure 7. Landscaping Design**



The design of the land order is made in a directional flow so that visitors can reach the site widely and facilitate visitors from one building to another building contained in the design and placement of buildings on the site. The circulation of visitors in the application of directional flow is:

Guard Post > Reception Facility > Herbal Gallery > Herbal Garden > Green House > Playground > Herbal Café > Herbal Mart > Exit to Parking Lot.

As for the manager's circulation in the private area, it is different from the visitor's path but still applies the concept of directional flow as follows:

Guard Post > Herbal Laboratory (Droff Area) > Management Parking > Processing Building > Storage Warehouse > Tool Storage Room > Waste Management and Mechanical Electricity > Exit.



**Figure 8. Landscaping Design**

The application of this land layout design (see Figure 8) is inseparable from how to maximize the land so that visitors can explore the land by providing green open areas as supporting facilities within the site. In addition, the zoning arrangement is also important to support the concept of directional flow. There is a clear distinction between public zones and private areas intended for managers and important guest visits. Meanwhile, the public zone is directly connected to the visitor parking area. The final result of the application of the concept of the land order of the herbal plant preservation center is as follows:



**Figure 9. Bird's Eye Perspective of the Landscaping**

It can be seen in Figure 9 above that the placement of plants is accumulated according to climatological analysis both from solar analysis, wind analysis, noise analysis and view analysis, to optimize the growth and development of the plants themselves. As for landscape design in the Designing of the Herbal Plant Preservation Center includes the layout and arrangement of natural or artificial elements in a large area, such as gardens or herbal plant nursery and cultivation areas, children's herbal gardens or playgrounds, and the courtyards of each building that support the design. Landscape design involves the selection and arrangement of plants, hard materials, and water elements to create aesthetic, functional, and quality spaces.

#### **4. Conclusion**

The designing of this herbal plant preservation center is a form of awareness and the author's efforts to accommodate various types of herbal plants in Kediri. In addition, it is a form of building approach to the community to be able to continue to advance the preservation of herbal plants. With the theme of environmentally insightful architecture will maintain a balance between the natural environment and human needs. While the application of the concept of directional flow is very suitable for this design because it facilitates both circulation and zonification of visitors and managers from one area to another. With the theme and concept of land arrangement, a place will be created to increase knowledge to the public about herbal plants around us or in Indonesia. So that herbal plants can be preserved and the place is used as an educational tourist spot that focuses on herbal plants and herbal medicine processing places that can advance the economy of the surrounding community.

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