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Designing an Urban Farming Center: Supporting Bandung as a Sustainable City

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Abstract. Rapid population growth and urbanization, combined with the large number of tourists visiting Bandung city, have led to a high demand for fruits and vegetables. This encourages the importance of developing an Urban Farming Center to increase food security, reduce carbon footprints, and raise awareness of environmental problems. The design of this urban farming center aims to explore the implementation of urban farming programs and provide integrated facilities that support the dissemination of urban farming practices and knowledge to the wider community—particularly in Bandung—while also contributing to the city's goal of becoming a sustainable city. The study method is a qualitative approach involving field observations and in-depth interviews at various urban farming sites, a literature review, and a studio-based design. The Urban Farming Center design process involves creative thinking in combining environmentally friendly building designs with sustainable agriculture. The theme applied to the building's design is "Go Green Living", while the concept is "Sustainable architecture". The application of green building variables involves various aspects, such as the use of renewable energy sources, optimizing natural air circulation, the use of green roofs, and environmentally friendly agricultural technologies such as hydroponics, aquaponics, and efficient water management with rainwater harvesting. The design of the Urban Farming Center provides facilities such as agriculture and fisheries, education, public facilities, management facilities, service areas, and parking. This research contributes to sustainable city discourse through design solutions in enhancing urban food security, mitigating the urban heat island effect, improving energy efficiency, reducing carbon footprints, and fostering community education and participation in urban farming initiatives.

Keywords: urban farming, green building, sustainable architecture, sustainable city, food security

1. Introduction

As a metropolitan city, Bandung has a large population and strong appeal as a tourist destination. Consequently, the demand for a variety of fruits, vegetables, and high-quality food ingredients is also quite high. The high rate of population growth and urbanization will also increase demand for food, impact the environmental carrying capacity, and potentially lead to food insecurity. The lack of green open space causes air pollution problems due to the overabundance of motorbikes and other motorized vehicles, flooding, and the urban heat island effect. The increase in the number of urban residents without support, balanced by the provision of nutritious food, employment, housing facilities, and other life-supporting facilities and infrastructure, will cause urban socio-economic problems, such as poverty and food insecurity (Cahya, 2014; Lovell, 2010). Likewise, the use of urban space that is not well-planned and ignores ecological functions will exacerbate environmental problems.

To overcome these problems, efforts are needed to raise public awareness of the importance of agricultural activities in sustaining cities. Urban farming is an activity of utilizing non-productive open space, such as yard land or unused empty land, into productive plantation land, which was initially carried out in the United States to overcome the poor economic conditions during World War II, until finally the food needs of United States citizens could be met by 40% (Belinda et al., 2017; Ekawati et al., 2025; Hadi, 2016; Luthan et al., 2019). Urban

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farming can provide beneficial impacts on the social, economic, and environmental life of sustainable cities, which are an integral part of national sustainable development.

The city of Bandung sources 96% of its food supply from other areas (DKPP, 2020). Consequently, the Bandung City Government—through the Food and Agriculture Agency — has launched an urban farming initiative known as *Buruan SAE* (*Halaman sehat, alami dan ekonomis* or Healthy, natural and economical yard) in various residential areas, utilizing both home gardens and idle land. Buruan SAE aims to address food-related disparities in Bandung by leveraging available yards and plots to meet family food needs (buruansae.bandung.go.id). Integrated with the *Kang Pisman* waste management program (Reduce, Separate, and Utilize), the initiative has successfully raised public awareness regarding environmental issues and fostered the formation of numerous urban farming groups. The program encompasses vegetable cultivation, fish farming, composting, livestock rearing, seedling propagation, medicinal plant cultivation, and fruit growing. However, more urban farming sites and groups are still needed to ensure local food security amidst the skyrocketing food prices in Bandung's markets.

Given the urgency of solving the aforementioned problems, providing dedicated facilities to disseminate knowledge about urban farming to the public is crucial. Therefore, this project-design-based research aims to explore the implementation of urban farming programs in Bandung and to create a building facility that embodies the appeal of urban farming as a symbol in the city of Bandung, aiming to attract public interest in developing knowledge, understanding, and skills in urban farming activities and to provide educational facilities for the community on urban farming.

According to Bareja (2010), urban farming, also known as urban agriculture, is the practice of cultivating plants or raising livestock in and around large cities (metropolitan areas) or small towns to obtain food, other necessities, and additional income (Wunawarsih et al., 2025). Kaethler (2006) divides urban farming activities into the following types: 1) Community gardens, which are urban agricultural activities with a minimum area of 150 m², with the following criteria: suitable land for planting and good accessibility to ensure support from each individual in the community; 2) Urban agriculture on impervious surfaces, which are urban agricultural activities carried out on land that is generally impervious to water and has an area of approximately 465 m² or more (Kaethler, 2006; Rahdriawan et al., 2019). Based on these two criteria, community-managed urban farming activities covering more than 150 m² can be classified as community gardens, enabling residents to assist one another in meeting their families' food needs. Meanwhile, activities at this urban farming center can be classified as urban agriculture, given the site's area exceeding 465 m² and its comprehensive facilities—such as infrastructure for hydroponics and vertical farming, aquaculture systems, and more.

Urban farming methods (Fig. 1.1) can include hydroponics (planting using a non-soil growing medium), aquaponics (a mutually beneficial combination of aquaculture and hydroponic systems), and vertical farming (planting using growing media in vertically arranged (tiered) containers to utilize limited space or land (Mudofi et al., 2024).

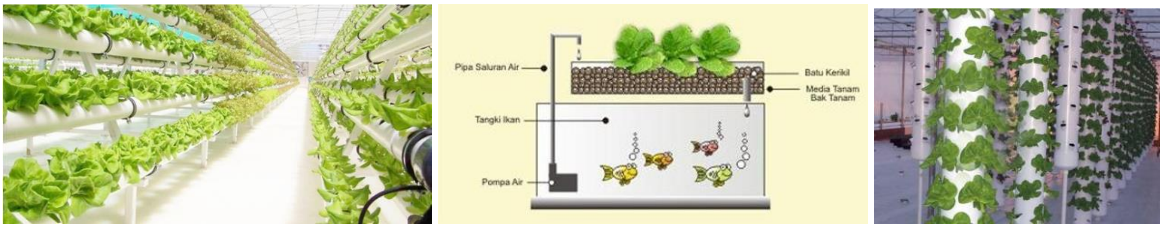


Figure 1.1. Hydroponics, aquaponics, and vertical farming (Various sources, 2024)

Some of the values obtained from urban farming activities are: a) economic value, where the harvest from urban farming can be sold to get additional income; b) ecological value, because it can overcome various ecological problems faced by urban communities (Listyowati et al., 2023) c) aesthetic value, because the plants presented can increase the aesthetic value of the built environment; d) Social Value, where farming activities in urban areas will be able to build communication between activists. Urban demographic conditions allow for social integration from various groups in community life; e) Educational Value, where the application of the urban farming concept provides learning for various groups, especially the younger generation (horizontal cultural transmission); and f) Psychological Value of growing plants, because the green color of plant leaves can provide calm.

By using efficiency and moderation in the use of materials, energy, and development space, along with an ecological and energy-saving approach in the design of the built environment, sustainable architecture is implemented to support sustainable urban development and ensure that what is used does not limit opportunities for future generations (Ekawati & Ardiyanti, 2023). Concepts supporting sustainable architecture include energy efficiency, land efficiency, material efficiency, the use of environmentally friendly technologies and materials, and waste management. This process encompasses the entire life cycle of a building, from construction, utilization, preservation, and demolition. This concept is applied in the design process of the Urban Farming Center.

Figure 1.2. K-Farm by Avoid Obvious Architects (Avoid Obvious Architect, 2018)

The first precedent study is the K-Farm project by Avoid Obvious Architects. Located on the beach in Kennedy Town, Hong Kong (Fig. 1.2), this project utilizes circular geometry in its design, which symbolizes unity, plants, and pier elements. The facilities provided are an indoor aqua farm, an office with a green wall and solar panels, food carts, open classrooms, and an aquaponics pond. The farm is designed to be inclusive, so people can access farming without bending down (Avoid Obvious Architect, 2018).

Figure 1.3. Urban Farming Office by TN Architect (ArchDaily, 2023)

The second precedent study is the Urban Farming Office located in Ho Chi Minh City, Vietnam (Fig.1.3). This project demonstrates the potential of vertical urban farming. The facade consists of planter boxes suspended with a variety of local vegetation, allowing them to receive ample sunlight (ArchDaily, 2023). This green approach will provide safe food and a comfortable environment with minimal energy consumption, contributing to a sustainable future for the city (Astbury, 2023). The differences between these two projects are shown in Table 1.

Table 1. Comparison of Precedent Study Projects

	K-Farm / Avoid Obvious Architects	**Urban Farming Office / VTN Architects**
Location	In a coastal area, Victoria Harbor, Hongkong	In a newly developed area in Ho Chi Minh City, Vietnam
Areas	2.000 m^2	1.386 m^2
Function	Mixed-use (Education, market, events)	Office
Facilities	- Greenhouse - Vertical Plant - Open space - Aquaponics pond - Office - Rainy Shelter - BFA Farm	- Parking Area - Meeting room - Working space - Flexible space - Garden

Source: (ArchDaily, 2023; Avoid Obvious Architect, 2018)

2. Methods

2.1. Method and Data Collection

This study employs a qualitative approach with descriptive analysis. It began with a literature review, including a study of precedents involving projects with similar themes. Data collection involved field observations and in-depth interviews with community members involved in urban farming management, as well as neighborhood (RT = *Rukun Tetangga* or neighborhood association) and community association (RW= *Rukun Warga* or community association) officials, across three urban farming sites in Bandung City: 1) Antapani *Tengah* Urban Village (Antapani District); 2) Neglasari Urban Village (Cibeunying *Kaler* District); and 3) Cisaranten *Kidul* Urban Village (Arcamanik District). These three locations were selected due to the success of their respective community groups in managing urban farming activities. The locations of these three sites in Bandung City are shown in Figure 2.1:

Figure 2.1. The Site Data of Urban Farming Practices in Bandung
(Processed from Google Map, 2026)

Data collected regarding urban farming activities at each location covers aspects potentially relevant to the design of an urban farming center, such as:

1. Activity site: location and size of the managed land, land conditions, and geography
2. Activity management: management entity, objectives, history, and development of the activity
3. Commodities and sectors managed
4. Methods employed (conventional, hydroponics, aquaculture, or others)
5. Benefits of the activity for the local community
6. Future development plan.

2.2 The Selection of the Building Site

SITE DATA:
Land areas: 10,415 m^2
Land use: trading & services
KLB: 5.6
KDH: 20%
GSB: half the width of the roadway
KDB (Basic coefficient of building}
KLB (Building floor coefficient)
KDH (Green base coefficient)
GSB (Building setback line}

Figure 2.2. The Site Data of Urban Farming Center (Processed from Google map, 2024)

The site location is on Jl. Jakarta, Kebonwaru Village, Batununggal District, Bandung City, West Java (Fig. 2.2). The site is close to residential areas, campuses, and the Kiaracondong market. Its accessibility makes it attractive to visitors. Furthermore, the location complies with local land-use regulations, and the site meets the minimum area requirement of 465 m² for urban agriculture (Kaethler, 2006).

2.3 Design Process

The design process begins with identifying issues and background problems that will serve as initial design ideas and establishing design goals. A literature review is conducted by selecting several similar precedent studies and theoretical literature on urban farming and sustainable architecture. The process then continues with site analysis, creating design concepts and schematics, and finalizing the design (Fig. 2.3). Some considerations in selecting the site location (Fig. 2.4) include the following:

1. The site condition is close to residential areas that need greening,
2. Close to several campuses and offices,
3. Close to 2 markets, namely Kiaracondong Market and Cicadas Market,
4. There is no Urban Farming Center service in the area.
5. The site location is on a main road that is easily accessible

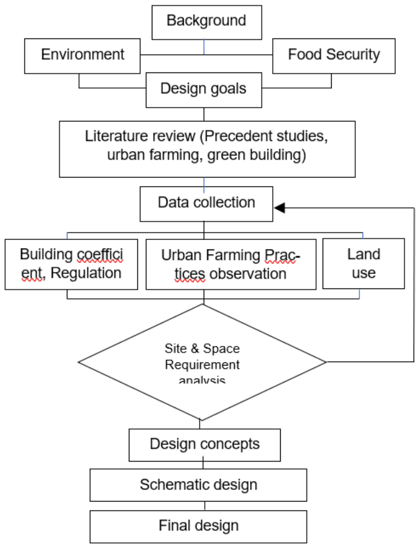


Figure 2.3. Designing process of Urban Farming Center (Author analysis, 2026)

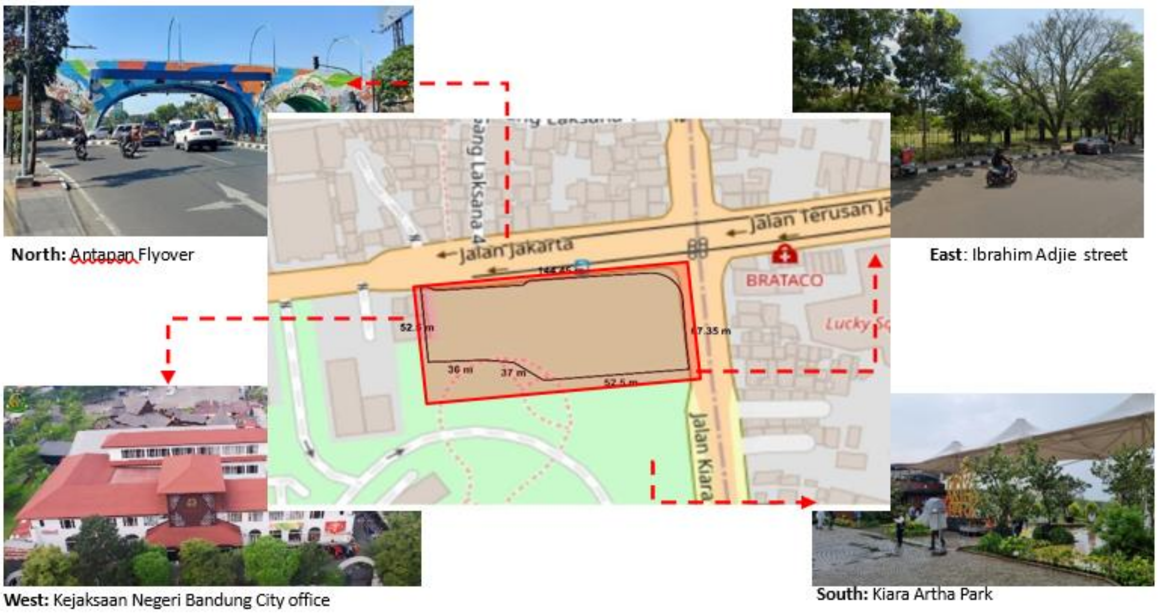


Figure 2.4. Buildings around the project Site ((Bagaskara, 2024; Kejari Kota Bandung, 2022)(Bagaskara, 2024; Kejari Kota Bandung, 2022); Author documentation, 2026)

3. Discussion

3.1 Observation of Urban Farming Practices in Bandung

The urban farming program in Bandung, known as *Buruan Sae*, is a successful integrated initiative that effectively utilizes limited residential land. These community-led urban farming activities fall under the category of "community gardens" (Kaethler, 2006). Successful urban farming sites in Bandung include: 1) Antapani *Tengah* (Antapani District); 2) Neglasari *Asri* Integrated Farming (Neglasari urban village, Cibeunying *Kaler* District); and 3) Cisaranten *Kidul* urban village (Arcamanik District).

1. *Buruan Sae* “Sweet Antapani Farm” group (Antapani *Tengah* urban village, Antapani District)
   The urban farming initiative is located in a densely populated residential area. It covers a relatively large area and focuses on both commercial and consumption-oriented horticulture. Its primary commodities include leafy greens, medicinal plants, and micro-scale freshwater aquaculture. The farm is managed by a local farmers' group and residents through an internal supply chain, with support from the *Dinas Ketahanan Pangan dan Pertanian* (Food Security and Agriculture Agency) of Bandung City (Fig.3.1).
2. *Buruan Sae* “Neglasari Asri” group in Neglasari urban village (Cibeunying *Kaler* District)
   Residential areas in Neglasari Urban Village are densely populated, and urban farming activities face land constraints; consequently, residents utilize home yards, alleyways, and vacant lots, maximizing available space through techniques such as polybags and a vertical farming method. The commodities managed by PKK (*Pemberdayaan dan Kesejahteraan Keluarga* or Family Welfare Empowerment) cadres—with guidance from agricultural workers—include leafy greens, red ginger, poultry, and aquaculture (specifically tilapia and catfish). They prioritize the produce to improve children's nutrition and prevent stunting, while any surplus is sold to neighbors. Activities at Neglasari are integrated with waste management (Fig.3.1).
3. *Buruan Sae* group “04 Pacing” and “Belover” in Cisaranten *Kidul* urban village (Arcamanik District)
   The urban farming initiative in Cisaranten *Kidul* manages available land by optimizing shared public spaces and spacious home yards. It employs integrated techniques, including cultivating fruits and vegetables in pots, raising catfish in buckets, and micro-scale chicken farming. Residents collaborate to manage these activities, utilizing the produce for their own consumption or distributing it—both socially and commercially—to the surrounding community to strengthen the local economy and food security (Fig.3.1).

Table 2. Comparison of Urban Farming Activities Implementation

Atribut	Antapani Tengah	Neglasari	Cisaranten Kidul
Geographical and land conditions	A densely populated residential area with flat topography	Densely populated settlement (partly on slopes); very limited flat land.	A developing residential area utilizing shared public space and home yards.
Land area	Relatively quite spacious, utilizes vacant land.	Limited; utilizing alleyways and walls	Medium, utilizing shared public space and home yard
Planting Method	Conventional soil beds and medium-scale hydroponics	Vertical farming, pots, and polybags.	A mix of garden beds, potted fruit plants, and polybags.
Commodity	Horticulture & Fisheries: leafy vegetables, medicinal plants, fish.	Integrated Farming: leafy vegetables, red ginger, hens, and fish ponds.	Integrated Farming: Vegetables, potted fruit, catfish, micro-scale chickens.

Management focus	Group internal supply chain and strengthening of production volume	Integrated waste management, source of children's nutrition and stunting prevention.	Mutual cooperation, household food security, and local social-commercial activity.

Source: Author analysis, 2026.

Figure 3.1 Urban Farming (*Buruan Sae*) activities in Antapani *Tengah*, Neglasari, and Cisaranten *Kidul* (Author documentation, 2023)

Based on the distinct characteristics of the three studied *Buruan Sae* locations in Bandung (Antapani *Tengah*, Neglasari, and Cisaranten *Kidul*), the practices observed at these sites can be integrated into a comprehensive and educational architectural design for an Urban Farming Center. The following are the architectural and spatial concepts that can be developed based on these three locations:

1. Zoning Concept (From Antapani *Tengah* Site)

Applications that can be implemented in building design are an Agricultural Demonstration Plot as a visual focal point on the ground floor or outdoors, and modern plantations such as Raised Bed Systems & Hydroponics, designed as an open communal space where visitors can directly observe vegetable cultivation processes and commercial or educational hydroponic systems.

2. Green Facade & Verticulture Concept (From Neglasari Site)

Applications that can be implemented in building design are: Facades featuring green walls that serve not only aesthetic purposes but also produce food and reduce solar heat gain; and Greenroof Farming & Garden in building voids: Rooftop areas and building voids utilized for aeroponic or vertical hydroponic tower garden installations (Mudofi et al., 2024) that leverage natural light from skylights.

3. Micro-scale Concept & cultivation technique (Based on the Cisaranten *Kidul* Model).

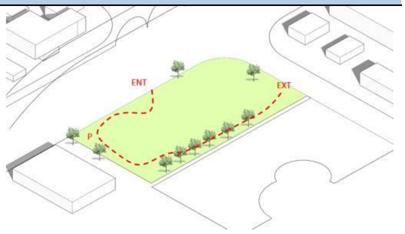
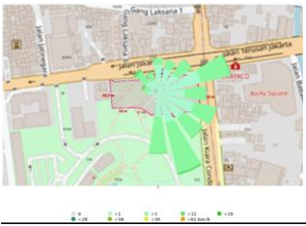
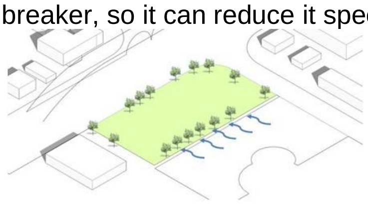
Cisaranten *Kidul* demonstrates how to integrate farming practices, such as cultivating fruit plants in pots and raising fish in buckets. Applications that can be implemented in building design are: an Educational Lab that provides a micro-scale simulation space within the building to educate the public on how to implement potted fruit gardening and bucket-based fish farming in their own homes; and Modular Design, such as Plant installations that can be assembled and disassembled to suit the spatial constraints of urban living.

3.2 Design Process

The analysis was carried out in several stages, namely: 1) Analysis of the strengths and weaknesses of the project site location (Table 4); 2) Analysis of space requirements carried out by grouping the types of activities on the site, then continued by calculating the space requirements for each facility group (Table 4-6) using several standards, namely NAD (Neufert Architect Data) and TSS (Time Saver Standard). The decision to use these two standards is intended to ensure ergonomic comfort and spatial efficiency in the design. After the analysis stage, the next step is to compile the building concept that will be implemented, followed by the creation of a schematic design (zoning, mass composition, and then the final design.

Site analysis

Table 3. Strengths and Weaknesses of the Site

Data	Strength	Weakness	Respond
Circulation 	The site is flanked by two arterial roads: Jl. Jakarta and Jl. Ibrahim Adjie. This can be an advanta-ge because the building location is easily accessible.	Vehicle circulation on Jl. Jakarta and Jl. Kiaracon-dong is quite congested, especially in the afternoon, due to the narrow road lanes.	 Vehicle entry and exit access is separated to prevent crossing and accumulation.
Sun orientation 	The absence of tall buildings around the site means the site gets sufficient sunlight.	Lack of protection from the hot sun throughout the day	 Greenwall as a secondary skin can reduce heat and maintain air temperature in the building.
Wind direction 	Wind direction analysis can be used to determine room openings that require natural ventilation.	Wind gusts are not much of a problem; the strongest are from the south > 28 km/h	Vegetation can be used as a wind breaker, so it can reduce it speed 
Noise 		The large number of vehicles passing through Jl. Jakarta and Jl. Kiaracon-dong results in noise that is very disturbing to the auditory comfort in the building.	Vegetation can be used to reduce noise 
Drainage 	No need to create new drainage channels at the edge of the site		There are city drains to the north and east of the site, so wastewater can be channeled to the city sewers.

Source: (Google Map, Proceed, 2024; Author documentation and design, 2024)

Analysis of Space Requirements

Urban farming is the practice of cultivating plants or raising livestock within and around large cities (Bareja, 2010, cited in Wunawarsih et al., 2025). The sectors developed under the Bandung City Food and Agriculture Agency's *Buruan sae* program include fish farming, vegetable cultivation, composting, livestock rearing, plant propagation, medicinal plant cultivation, and fruit growing (https://buruansae.bandung.go.id/). Based on previous studies and field observations, the activities planned for the Urban Farming Center facility are: 1) agricultural activities; 2) fishery activities; 3) educational and laboratory activities; 4) management; 5) sales and public activities; and 6) service and parking. The activities accommodated in both indoor and outdoor areas are expected to attract students, academics, farmers, and the general public interested in urban farming. Analysis of the spatial requirements for the activities provided in this building is presented in Table 4-6.

Table 4. Space Requirements of Urban Farming Center

Activities type	Activities group	Room type	Room Facilities	Zone
Main	Public/Farmer	Agricultural Area floor Plant area floor	Agricultural preparation room Plant space Agricultural warehouse Pool Water reservoir Pump station Control room Aquaponics	*Indoor & Outdoor*
	Management	Office		
Support	General	Parking lot Information service Hall	Car, Motorcycle, and Bicycle Parking, Hall Prayer Room, Canteen Farming Type 1-4, Park Toilet	*Indoor & Outdoor*
	Management	Administration office	Director room Manager room Meeting room Administration room Guest room Discussion room Relax room Toilet	*Indoor*
	Service	Visitor Services and facility maintenance	Staffs room AHU & MEE room R. Pengolahan Loading Dock Water Filtration Room Lavatory Information room Security room Warehouse Toilet	
Agricultural Education	Research	Plant research	Discussion room Rest room Research room	*Indoor*
	Education	Study, workshop, seminar, discussion, and research	Auditorium Workshop room Research room Seminar room Showroom, Library	*Indoor*
	Park	Farming and Nursery	Nursery room Hydroponic room Verticulture room Monitoring room	*Indoor & Outdoor*
Security	Security	Activities Monitoring	Security guard room Monitoring room/ CCTV	

Table 5. Analysis of Parking Area Requirements

No	Room	Nature of Space	Capacities	Room area (m^2)	Source
Commercial and trade parking area calculation: 1 car / 60 m² Total: Building area / 60 = 17,657.67 m² / 60 = 294 cars Vehicle distribution: 130 cars + 226 motorcycles					Kep. Dirjen Hubdar No.272/HK.105/DRJD/9
1.	Management staff and	Public	30 cars	180.00	Analysis
	farmers		50	100.00	Analysis
2.	Visitors	Public	motorcycles	600.00	Analysis
			100 cars	352.00	Analysis
			176	336.00	Analysis
3.	Driver's waiting room	Public	motorcycles	51.30	Analysis
4.	Guard Post	Non-	2 buses	4.00	Analysis
5.	Circulation	public	9 persons	811.60	Analysis
		Public	2 posts		
	Total area			**2435.00**	

Source: Author analysis, 2026

Table 6. Total Area Requirements

No	Facilities	Areas (m^2)
1.	Agricultural and fishing facilities	724.78
2.	Public facilities	1468,23
3.	Management facilities	210.70
4.	Service area facilities	612.70
5.	Parking area facilities	2435.00
	Total area	5451.41

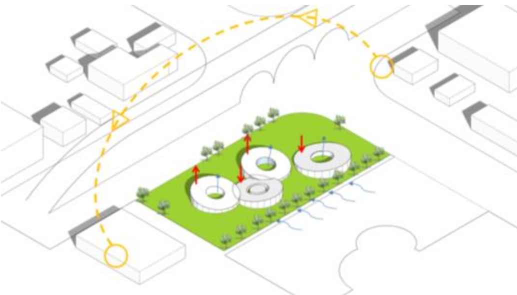
Source: (Author Analysis, 2026)

Building Design Theme and Concept

The theme applied to the building's design is "Go Green Living", while the concept is "Sustainable architecture". It aims to create environmentally friendly buildings that benefit the surrounding environment. The principles of sustainable architecture applied to the design of the Urban Farming Center in Bandung are:

a. Beauty and Freshness: Applying vertical plants and hydroponic vertical gardens as facade decoration.
b. Green Building: Using new and renewable energy to save on fossil fuel use and consumption and Water-Independent Buildings (processing and utilizing rainwater resources in buildings).

Mass composition



The arrangement of interconnected, circular building masses – inspired by Hongkong's K-Farm - creates a more natural composition and symbolises mutual interconnectedness

Figure 3.2. Mass Composition

The design of this building aims to reflect the unity between the city and nature, so the architects used the analogy of interlocking fingers to unite nature and the city.

There are two aspects to the composition of the building's mass (Fig.3.2), as described above:

1. Technical Aspects.
   The circular shape creates an open and inclusive atmosphere where the community can interact easily. This can be an important aspect of the Urban Farming Center, as it can involve residents in agricultural activities. The circular shape makes better use of sunlight. To ensure sunlight reaches all spaces, the building's mass is sloping. To let in sunlight, the circles at the center of each building mass also function as cross-ventilation.
2. Aesthetic Aspects.
   The sloping and sloping building mass adds aesthetic value, and the circular elements create a strong visual identity for the Urban Farming Center.

Site Plan

This site plan incorporates green building principles and maximizes land use through an efficient circular form (inspired by Hongkong K-Farm), thereby leaving ample remaining land (over 30%) suitable for cultivation and aquaculture. The repeated use of circular shapes creates visual cohesion within the site plan (Fig. 3.3) and will provide a clean, understandable appearance for visitors and managers. By repeating similar shapes, infrastructure and resources can be combined and shared among similar zones, thus conserving energy and resources.

Design of the site plan incorporates a sustainable architectural approach – adopting green building principles

Figure 3.3. Site Plan

The main building mass is divided into 2 zones, namely the public zone (including 1. Hall; 2. Community Garden; 3. Gallery; 4. Auditorium; 5. Laboratory) and the private zone on the left, specifically as a management area. To prevent congestion during drop-off and pick-up, the main building entrance and exit are separated. Building mass 2 serves as an entertainment area, featuring a food court, souvenir shop, organic market, greenhouse, and a roof garden for relaxation and study.

Building Façade

The sunscreen and vine plants that form a green wall are used to cover the building façade (Fig. 3.4), serving as sun shading and thereby maintaining a comfortable temperature inside the building by protecting it from excessive exposure to the sun's heat. The use of sun shading is an implementation of the concept of sustainable architecture, which aims to reduce energy consumption in buildings. The green wall facade serves not only an aesthetic purpose but also produces food and reduces solar heat gain. This façade concept applies the Active Green Facade & Vertical Architecture Concept, inspired by the Urban Farming Office in Vietnam and the Neglasari *Buruan sae*. In the Neglasari area, limited land effectively utilized for urban farming can still produce food commodities for the community.

Figure 3.4. (a) Façade of building mass, (b) Greenwall of building mass, (c) Detail of greenwall

Bird's Eye View

Viewed from above, the most dominant feature is green roof of the Urban Farming Center. This helps increase the percentage of green open space in Bandung city, which currently faces a shortage of such areas.

Figure 3.5. Bird's-eye View

In this bird's-eye view perspective image (Fig. 3.5), the dynamic and interesting composition of the building mass is visible. A massing composition dominated by green roofs and expanses of greenery provides significant support for Bandung city's efforts to become a sustainable city.

Green Roof

A green roof structure refers to the use of plants and vegetation growing on a building's roof covering (Fig. 3.6). This involves creating a layer of soil as a growing medium, several types of plants, and a specially designed drainage system to encourage plant growth on the roof.

The main components of a green roof structure are: a) Water Retention Layer: this is the first layer on top of the roof, acting as a barrier to prevent water from seeping into the underlying layers. This layer is often made of waterproof materials, such as bitumen membranes or waterproof sheets; b) Drainage Layer: this layer is placed above the water retention layer and serves to drain excess rainwater and prevent waterlogging. It usually consists of porous or hollow materials such as geotextiles, polymer foam, or ceramic balls; c) Root Protection Layer: this layer is placed above the drainage layer to protect the underlying layers from damage caused by plant roots. This layer is usually made of materials resistant to root penetration, such as geomembranes or polymer sheets; d) Planting Media Layer: this is the layer where plants are planted and take root. The growing media layer in a green roof typically consists of a mixture of materials such as soil, sand, fiber, and other organic materials. This layer must have good drainage characteristics, water retention capacity, and be suitable for supporting plant growth. Other components are vegetation, the plants that live and grow on the green roof structure. Plants selected for green roofs must be tolerant of dry roof conditions, resistant to heat and sunlight, and have roots that can grow in the shallow growing media layer. Succulents, grasses, and sedums are some common examples of plants often used in green roofs.

Greenroof structures are designed to provide various benefits, such as thermal insulation, rainwater absorption, improved air quality, roof protection from extreme temperatures and UV rays, and creating a greener and more aesthetically pleasing environment. In planning and constructing a green roof, it is important to consider design aspects, drainage systems, plant care, and local environmental demands to ensure the success and sustainability of the green roof structure.

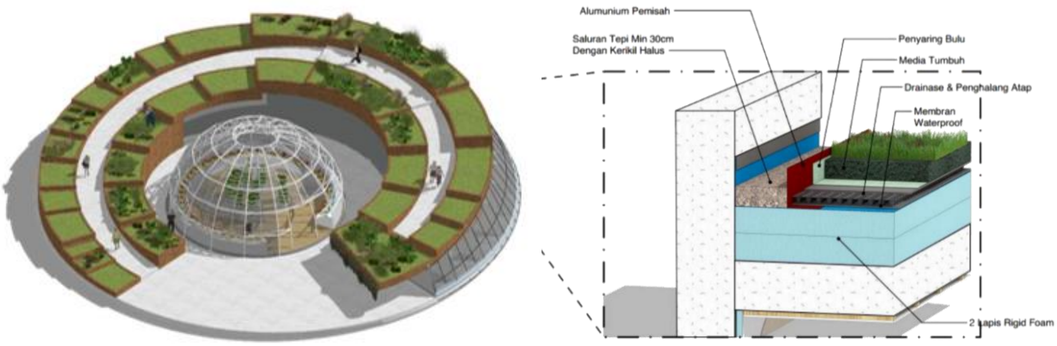


Figure 3.6. (a) Greenroof area (b) Detail of greenroof layer

Greenhouse Interior

In the interior of the Greenhouse (Figure 3.7), vegetation can be seen at the edges of the room and in the middle of the greenhouse, which is arranged circularly.

The vertical garden in the building's void was inspired by the organic tower garden created by the *buruan sae* grup in Neglasari, Bandung

Figure 3.7 (a) Greenhouse area

Utilities

- **Clean Water & Waste Water Management**

Clean water use at the Urban Farming Center is divided into two sources: 1} Water from the municipal water company (PDAM), which is the primary source because it requires no special treatment and is intended to prevent water wells from drying out; 2) Deep well water, which is used as a backup in the event of a water outage. Water is pumped from the deep well and undergoes preliminary treatment before being pumped to the groundwater tank; from there, it is pumped to the water tower and subsequently distributed (Fig 3.8).

The clean water network system used is a downfeed system because it conserves water within a certain amount. The water pump automatically turns on when the tank runs low. Wastewater management planning is guided by an optimal system, with initial actions aimed at reducing organic pollutants and bacterial counts so the wastewater meets wastewater quality requirements.

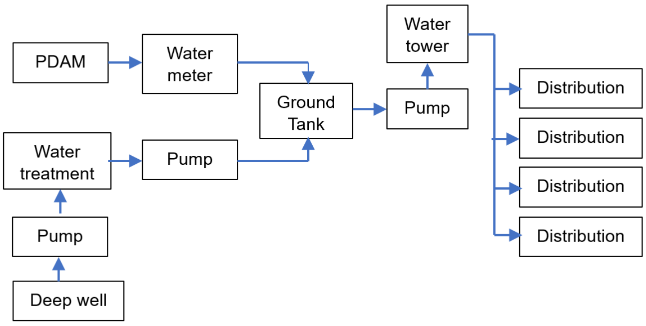


Figure 3.7 Clean Water Scheme

- **Rainwater harvesting management**

Rainwater harvesting management planning involves releasing rainwater as quickly as possible onto flooded land. Drainage system planning involves channeling rainwater through gutters around buildings and then diverting it to the city's drainage system. Therefore, the following factors must be considered: rainfall intensity, rainwater drainage system, and rainwater disposal system. Rainwater can also be reused effectively as a water conservation measure, including for watering plants during the dry season. Rainwater collected in a water storage tank above the Supertree is channeled to a groundwater tank for distribution and reuse (Fig. 3.9).

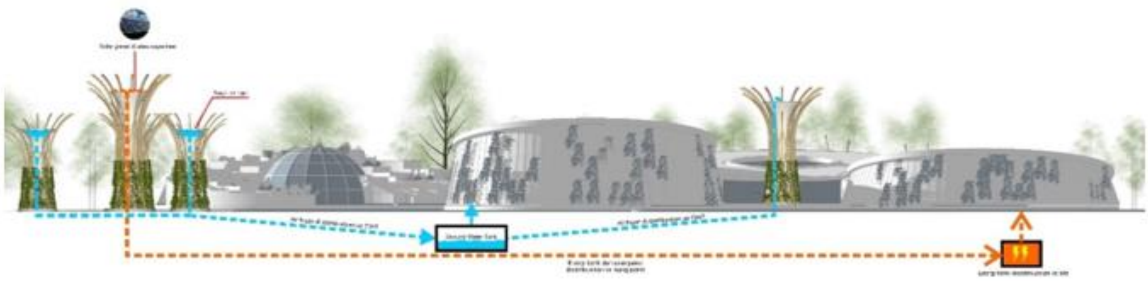


Figure 3.9 Utilization of rainwater

- **Electricity**

The Supertree also serves as a solar panel installation site, providing a new and renewable energy source. Solar energy is channeled into the panel room and distributed throughout the building.

3.3 The Contribution of Urban Farming Design Research to the Sustainable Cities Discourse

Realizing a sustainable city requires the participation and contribution of all urban stakeholders—the "penta-helix" comprising the city government, academia, mass media, the business and industrial sectors, and the general public. This research serves as a medium to communicate and disseminate academic knowledge and insights regarding an urban farming facility that can benefit the public and support that goal. The research—focused on the design of an urban farming center—contributes to Bandung's sustainability objectives primarily through education on urban farming practices and building design; the proposed design showcases solutions for building elements and facilities—such as green roofs, green walls, and cultivation techniques—that can serve as practical references for the community.

The research contribution regarding the design of an Urban Farming Center in support of the sustainable city discourse—particularly for Bandung—includes the following: 1) The Urban Farming Center can serve as a design solution model for food security initiatives, wherein the facility provides source of fresh produce for residents—a crucial factor given that Bandung currently relies on external sources for 96% of its vegetable and horticultural supplies`; 2) This Urban Farming Center research offers a design solution to mitigate the urban heat island effect—specifically by moderating the microclimate, particularly in city centers dominated by concrete and asphalt—through the integration of green walls and green roofs. It also serves to increase the amount of urban green open space, which is currently limited; 3) the solar-powered design of the Urban Farming Center also provides the public with insights into the use of new and renewable energy to meet energy needs and enhance efficiency; 4) Designs incorporating cultivation methods such as hydroponics, aquaponics, verticulture, and hydroculture—which conserve water through rainwater harvesting and maximize limited land—are expected to encourage urban residents to utilize their own limited space and participate in urban agriculture initiatives; 5) By producing local food within the city, communities can help shorten supply chains, thereby reducing the city's carbon footprint and supporting sustainable city goals; 6) The research on the design of the Urban Farming Center contributes to public education on sustainable cities, particularly by fostering environmentally conscious practices among urban residents, transforming them from passive consumers into active producers.

4. Conclusion

The design of the Urban Farming Center building in Bandung City adopts a sustainable architecture concept with the theme of "Go Green Living", applying green walls, green roofs, and natural materials, along with surrounding vegetation and water conservation measures such as wastewater and rainwater harvesting within the building. The facilities provided are agriculture and fisheries, public facilities, management facilities, service areas, and parking. This building design is expected to benefit not only the academic community but also inspire the urban community about the importance of urban farming for food security.

The urban farming center is expected to serve as a research and training center for urban farming in Bandung City and to assist urban farmers by providing complete urban farming equipment. The building is designed to be as attractive as possible to attract visitors and thus increase public interest in training and research on urban farming. It is hoped that this will help the community meet their daily food needs. This research contributes to sustainable city development through design solutions that enhance urban food security, mitigate the urban heat island effect by increasing green open space, improve energy efficiency, reduce carbon footprints, and foster community education and participation in urban agriculture initiatives.

5. References

ArchDaily. (2023). Urban Farming Office / VTN Architects. *January 31, 2023*. https://doi.org/ISSN 0719-8884

Astbury, J. (2023). *Vo Trong Nghia Architects wraps own office in urban fruit and vegetables farm*. De Zeen. https://www.dezeen.com/2023/01/25/vo-trong-nghia-architects-vietnam-office-urban-fruit-vegetables-farm/

Avoid Obvious Architect. (2018). *K-Farm: Smart Urban Farming*. https://aoarchitect.us/projects/k-farm-smart-urban-farming/

Bagaskara, B. (2024). Malam Ini Flyover Pelangi Antapani Bandung Ditutup! *Detikjabar*.

Belinda, N., Perencanaan, D., Teknik, F., & Teknologi, I. (2017). Pengembangan Urban Farming Berdasarkan Preferensi Masyarakat Kecamatan Semampir Kota Surabaya. *Teknik ITS*, *6*(2), 511–514. https://doi.org/10.12962/j23373539.v6i2.25008

Cahya, D. L. (2014). Kajian Peran Pertanian Perkotaan Dalam Pembangunan Perkotaan Berkelanjutan (Studi Kasus : Pertanian Tanaman Obat Keluarga di Kelurahan Slipi , Jakarta Barat). *Forum Ilmiah*, *11*(3), 323–333.

DKPP. (2020). *Buruan Sae: Integrated Urban Farming*. https://buruansae.bandung.go.id/

Ekawati, J., & Ardiyanti, T. S. (2023). Application of Sustainable Architecture Principles to Urban Green Open Spaces (Case : The Teras Cikapundung , Bandung , West Java). *The 2nd Lawang Sewu International Symposium on Engineering and Applied Sciences (LEWIS-EAS 2023)*, 79–96. https://doi.org/10.2991/978-94-6463-480-8

Ekawati, J., Wijaya, K., Rahmat, A., Muchamad, A. N., Suparyogi, D., Sofari, H., Permadi, Y., Naufal, M., & Cikal, B. (2025). Perencanaan Ruang Terbuka Hijau sebagai Area Pengembangan Urban Farming dari Gerakan Ekonomi Mandiri (GEMI 0418) Cimahi. *Penelitian Dan Pengabdian Kepada Masyarakat*, *12*(1), 20–28. https://doi.org/https://doi.org/10.32699/ppkm.v12i1.8786

Hadi, P. (2016). Konsep prototype integrated verticulture aquaponic city farming di kampung batik surakarta. *Kearifan Lokal Nilai Adiluhung Batik Indonesia Untuk Daya Saing Internasional*, *10*, 978–979.

Kaethler, T. M. (2006). *Growing Space: The Potential for Urban Agriculture in the City of Vancouver* (1st ed., Issue August). University of British Columbia.

Kejari Kota Bandung. (2022). *Kejaksaan Negeri Kota Bandung*. https://kejari-bandung.kejaksaan.go.id/

Listyowati, E. A., Kamilah, A., Budiono, H., & Lutfiadi, R. (2023). Urban Farming Development Strategy of Hydroponic Vegetables in Bekasi City. *Agritepa*, *10*(2), 469–486. https://doi.org/10.37676/agritepa.v10i2.4932

Lovell, S. T. (2010). Multifunctional Urban Agriculture for Sustainable Land Use Planning in the United States. *Sustainability*, *2*, 2499–2522. https://doi.org/10.3390/su2082499

Luthan, P. L. A., Nikman, Y., Hasibuan, H. N., & Malau, J. P. A. (2019). Pelatihan Urban Farming sebagai Solusi Ruang Terbuka Hijau di Lorong Sidodadi Medan Helvetia. *Pengabdian Kepada Masyarakat*, *25*(1), 1–5. https://doi.org/https://doi.org/10.24114/jpkm.v25i1.13933

Mudofi, A. Z., Hardiana, A., & Setyaningsih, W. (2024). Wisata Edukasi Urban Farming dengan Pendekatan Biofilik Desain di Kecamatan Grogol Kabupaten Sukoharjo. *Senthong*, *7*(1), 101–112.

Rahdriawan, M., Wahyono, H., Yuliastuti, N., & Ferniah, R. S. (2019). Sustainable Urban Farming through Community Based Aquaponics. Case : Kandri Village , Semarang. *Advances in Social Science, Education and Humanities Research (ASSEHR)*, *216*(Assdg 2018), 107–117. https://doi.org/10.2991/assdg-18.2019.10

Wunawarsih, I. A., Rosmawaty, Sriwahyuni, I., Mapasomba, S. M., Resman, Batoa, H., Azida, S., Ramadini, K., Basoka, S. W., Ningsih, M. L., Kandari, A. M., & Alwi, L. O. (2025). *Teknologi Pertanian Perkotaan* (1st ed.). Eureka media aksara.