

The Implementation of Urban Farming as the Transition Space in Mix Use Market of Astana Anyar Flats, Bandung, Indonesia

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Abstract: The decrease of the area quality caused by the lack of green outdoor space becomes the focus of Bandung city government in improving the area and the surroundings. Referring to the recent laws and opportunities, the city government points at the improvement of vertical building development by combining the public function in the form of Astana Anyar market and private housings which have contradictive characteristics. Transition spaces are needed as the connectors between public and private spaces, so that there will be no contamination between the two.

Urban Farming is the concept which is implemented as the contents of transition space, so that the space will be more efficient and effective. It is an innovation that can be implemented to improve the continuity of the area, surroundings, economy, social and culture of the society. It was done through the analysis process on the objects of the study on the private public theories and also theories related urban farming, and studies resulting some design principles which are the result of synthesis. The principles of the design are expected to become the reference in arranging the design concepts which combine the function of traditional market and housings.

Keywords: green outdoor space, transition spaces, public spaces, private spaces, urban farming

1. Introduction

1.1 Background of the study

Nowadays, density problem is one of the focus of Bandung city government, especially in downtown. It affects directly the spatial density which narrows the green outdoor space of the city, so that it creates slums. One of the places to improve about the city space in Bandung is in the area of Astana Anyar market. Astana Anyar market is a district market in which its surroundings are full of illegal houses and housings standing in the government land.

Not only very crowded, the surroundings condition is also considered as inappropriate. It can be seen from the narrow access, the lack of outdoor space, and unhealthy surroundings which decrease from time to time. This condition is not good because Astana Anyar district has the land function allocation for housing and strong effort reaching 69.28% [1]. The score shows that the location has economical activities which are relatively high. With the important role, now the government focuses on the effort to improve the Astana Anyar market and its surroundings.

This study focuses on Astana Anyar market and its surroundings in the market area (dark brown) of 1 Ha and housings (light brown) in an area of 1,4 Ha which includes 287 families.



Figure 1. Research Object Map

Based on the analysis on the research object, there are some potentials which can be developed in improving the surroundings. They are presented as follows.

- a. Citepus and Cikakak Rivers have the possibility to create flood in the housings surroundings and market, it can be used as the potential for riverfront if it is arranged and managed better.
- b. Astana Anyar Market is a district market which has ultimate commodity which is well-known meat. This strong point have to be developed for the prosperity of the sellers and the processors.
- c. Astana Anyar market is a traditional market Class I selling many wet goods, such as vegetables and fruits.

Referring to the President instruction No. 5 in 1990 about the principles in relocating the slum housings in the country's land, it is stated that the considerations for relocating the slum housing is to speed up the quality improvement of the society, especially for those who have low income living in the slum housings on the government land.

The rejuvenation of the slum housings based on the president instruction in 1990 includes a partial destruction or an entire one which is on the country's land. Then, at the same place, it was built some infrastructures and facilities of the flats and the buildings based on the plan of city space [2], and was supported by RDTR (detailed spatial plan) of Bandung, where the land has mixed function with high intensity. So, the rejuvenation is directed to housing buildings which are at the top of the Astana Anyar traditional market function.

Based on those possibilities, Mix Use concept is the concept which is very suitable to be implemented in developing the area of Astana Anyar Market. However, in its implementation, the biggest challenge to develop this concept is about how to combine the different mix use concept in which the characteristics are very different and becomes a unity of one building considering the traditional market and apartment has activity patterns which are very different. There is a change in the relation between public and private gradually. Therefore, access, circulation, and open space become very important as the transition space which will link the public and private spaces [3]. There are six types of transition spaces in a building which is the public oriented margin zone, the private oriented margin zone, the street/plaza/courtyard, the staircase, the gallery and the corridor [3] which can be developed into an innovation in designing the buildings with mix use combining public and private functions.

1.2 Why Urban Farming

Space is the aspect which is the base of slum surroundings problem in Astana Anyar market. The utilization of the space efficiently is needed in the implementation of mix use market and housing concepts. Urban farming is an alternative method to improve, process and distribute foods through the cultivation of plants and animals farming in urban city. [4] Seeing the business of the citizens, urban farming is potential for linking the citizen which tend to be individualist through nature, supporting biodiversity, and improving the city resilience. [5]

Nowadays, the implementation of urban farming increases in the rooftop of skyscrapers which uses synergy between buildings and agriculture [6]. If it is linked with the mix use market function and flats in Astana Anyar, Urban Farming can draw the farmers closer to the market, other farmers, and the organization linked to be able to exchange information and resources to improve the sales [8]. Most local people are sellers in the market [1] which sells many kinds of goods such as vegetables, fruits, meats and many more. The implementation of Urban Farming in Astana Anyar market mix use pasar Astana Anyaris potentially to improve the efficiency and effectivity of the space, so it will be able to play a role to make the continuous surroundings because people can independently produce, process and distribute the products in their lives by using the transition spaces. Urban Farming can be used as an alternative occupation for the local people which majority have low income. It is because Urban Farming includes producing, processing and distributing. Urban farm projects served as catalysts for entrepreneurial projects that benefited residents and gardeners, and produce more micro-businesses [7]. Urban Farming can reduce trashes, especially wet trashes from the market to be used as fertilizer. Farming bags can also use empty spaces so that they will be useful in the process of revitalization of the city. Urban farms can also become community hubs that celebrate and raise awareness about local food, increased awareness about where food comes from, and training for farmers, all of which are in great need as older generations of farmers continue to retire and urbanization continues to rise. [8] However, in its implementation, Urban Farming includes also new roles for local governments, in which co-operation, co-creation and co-responsibility between local administrations, civil society and market parties [9].

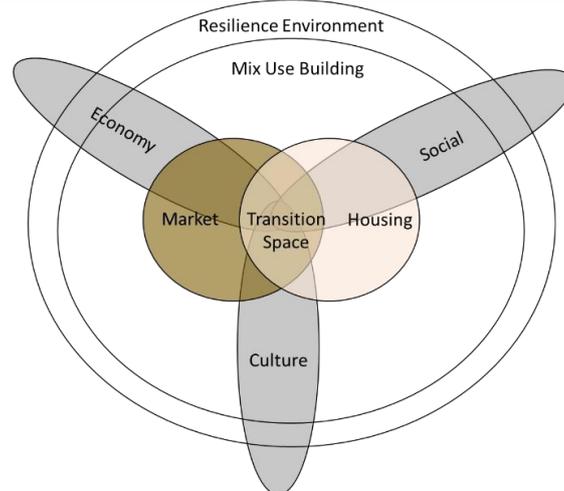


Figure 2. Ultimate Concept

The implementation of Urban Farming as the transition spaces on the building and surrounding of market and flats mix use in Astana Anyar includes economics, social and culture aspects which are hand in hand in keeping the surroundings resilient by implementing a principle of “from people, for people” through people’s big role in the movement of Urban Farming.

1.3 The Purpose of the Study

This study aims at studying and investigating the design innovation which can be done to the transition spaces using urban farming approach. Therefore, the design principle can be implemented in the surrounding and building by combining the market and housing.

2. Theory, and Method

2.1 Public Private Theory

The public private theory is closely related to the relation between the market functions which are public and private functions in which the two are contradictive one another. The privateness and publicness of the function are not static, so it creates confusion, especially in deciding the territory [10]. There are seven kinds of territories, namely primary, secondary, public, object, idea, interactional and the body which keeps the territory which is able to prevent, react and respond to interference, violation and contamination [11]. This territory is closely related to the transition spaces which directly linked to the public and private spaces. These two characteristics contradicts one another and it is a big challenge to be able to combine the market and housing function in an area and even in a building. The appearance and development of an ‘atrium’ and a ‘vestibulum’ in typical roman urban villas were the first formal spaces between the public and the private, introducing a gradual change of the user status of spaces. A vestibulum was a formal transition between the public and the private while the atrium represented the private to the public and the peristilium were private outdoor, informal living rooms [3]. With the roman principle, the territory can be found clearly, so that the transition rooms can be easily defined.

2.2 Urban Farming Theory

As an ultimate concept to solve the existing problems, theories related to urban farming are presented as the literature base to be implemented in the defined transition spaces. Those theories are related to Urban Farming Hierarchy including Urban scale, Urban Residential, Inner Urban, dan Inner Urban Core [12] which definitely have different implementation methods. Besides, theories related to how to realize the continuous Urban Farming such as Integrate Urban and regional planning, Integrate urban and regional planning, Support local agriculture and urban gardening, Ensure that educational opportunities are in place, and Develop a sustainable urban food strategy should also be reviewed.

2.3 Analysis and design synthesis

The method used in this study is an analysis on the existing research object which includes the physical, social, economy and culture of the surroundings/area in relation to the need of transition spaces and Urban Farming approach which later are synthesized into some design principles which can be developed into design concepts.

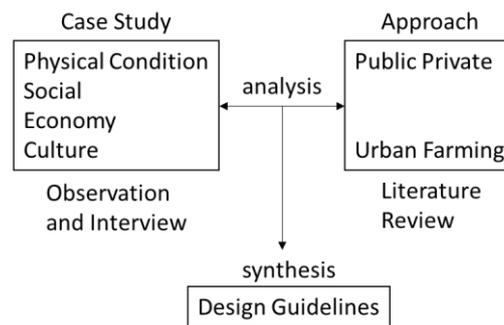


Figure 3. Research Methods

3. Analysis, Results and Discussions

3.1 Case Analysis

3.1.1. Physical Condition

Based on the RDTR of Bandung city, the housing area in the Astana Anyar Market has a high density which is BCR 40% dan FAR 3,6, so it is possible to build housings with the area of floor reaches 50.400 m² and the base floor reaches 5.600 m². However, in fact, the floor area buit is only 25% of the area permitted. Meanwhile, the market area is used for mix use market with high intensity reaching BCR 65% and FAR 6,5, so it is possible to build housings in a floor area of 65.000 m² and the base floor of 6.500 m². However, now, it is only about 20% of the floor. With limited land area, and floor area which still has not been maximized, the vertical building process can still be done and developed as an effort to maximize the building values so that the land values will also be higher. Here is one of the alternative zoning plan and density to improve the area of the market and surrounding housings.

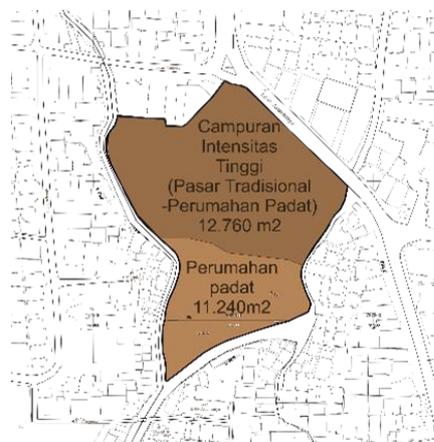


Figure 4. Zoning Plans

Table 1. Area Block' Distribution

Area	Width (m)	BCR	FAR	Ground Floor Area	Whole Floor Area (m)	GCR	GCR area
Housing	11.240	40%	3.6	4.496	40.464	40%	4496
Mix Use	12.760	65%	6.5	8.294	82.940	30%	3828

The intensity and the density are determined by the calculation of floor area that is permitted on a mixed function on this plot, which is 82.940 m². However, because it is placed in the collector road, the maximum building's floor area is 40.000 m².

By the implementation of mix use method to combine market and residential functions, the biggest challenges that have to be faced are as follows: [13]

(a) Permeability

As a public building, the market must have a high permeability, which is by having good access and also having a building that can attract the visitors to the market. On the other hand, the flats are tend to be private in order to keep the residents’ privacy and also the security. The privacy of flats will be disrupted if everyone can freely access their territory.

(b) Noise

Home is the place to rest, study, and get together with family, so it must be quiet. It is different from the market that can be visited by everyone, and free to interact. The market tends to be noisy, which is about 50 db to 60 db, where the noise is caused by the activity of the sellers and buyers making the transaction. While the flats need to be quiet, it requires about 45 db to 55 db.

(c) Odor

The main difference between the characters of traditional market and the flats is the generated odor. This is because many traditional markets sell wet stuff, such as vegetables, fruits and meats. However, the odor is dominated by the smell of birds, such as chickens and ducks. It is different from the flats that are clean and have a good smell, because the odor is highly disturbing.

3.1.2. Social

With the narrow alleys as the main access in a residential neighborhood, the alleys are inappropriate for the society. The people are rarely to gather and interact in the narrow and dirty alleys. The corridors seem quiet and there is no special social space provided in the neighborhood, such as parks, multipurpose buildings, restaurant, and others. In fact, the local society is a friendly people and they love to work together and get to know each other. Unfortunately, they do not have any suffice place to gather.

3.1.3. Economy

There are many society who live around the Anyar market settlement and also work in Anyar market as sellers or officers. With such close proximity, the society rely on the Anyar market for their basic needs. Most of them also open the shops at their home (*warung*) with the stocks that they get from Anyar market. Opening shop in the houses is a society livelihood that cannot be removed, it is because there are many people who rely on their life with this shop business. Nevertheless, the majority of people belong to low-income societies and have not been able to afford a more decent home with legal certificates. Almost all commodities sold in the market are from outside the market, whereas, the market is very famous for its meat and processed commodities, but the environment has not been able to produce commodities independently.

3.1.4. Culture

The shopping culture at the traditional markets in Bandung is very high. This is because the societies believe that the the traditional market has lower price for the commodity. However, this is very unfortunate because the commodities sold in the market Anyar Astana do not have good quality. Bargaining culture is also a matter of encouraging people to shop at traditional markets.

3.2.1. Development Scale

Looking at the development scale that include the market environment and the residential around it, the development belongs to the residential urban scale, inner urban, and inner urban core. The environmental improvement refers to the superblock consists of a mixture of market and residential functions which are divided into several building masses connected by the circulation access.

Table 2. Urban Farming Program Based on Program Urban Farming Berdasarkan Hierarchy Development Scale

	urban residential	inner urban	inner urban core.
Food production	<ul style="list-style-type: none"> • Backyard Gardens • Edible landscaping in parks and public right of way • Community gardens and orchards • Possibly bees and hens (pilot) 	<ul style="list-style-type: none"> • Community gardens • Rooftop gardens • Private (condo) food gardens • Edible landscaping in parks and public right of way 	<ul style="list-style-type: none"> • Rooftop gardens • Private (condo) food gardens • Edible landscaping in parks and public right of way

Processing	<ul style="list-style-type: none"> • Neighbourhood Food Hub / satellites 	<ul style="list-style-type: none"> • Food Hub (community food centre) 	<ul style="list-style-type: none"> • Food Hub (community food centre)
Storage & distribution	<ul style="list-style-type: none"> • Cellars 	<ul style="list-style-type: none"> • Community root cellars • Fresh box delivery 	<ul style="list-style-type: none"> • Community root cellars • Fresh box deliver
Buying & selling	<ul style="list-style-type: none"> • Farmers' markets • Grocery stores 	<ul style="list-style-type: none"> • Farmers' markets • Grocery stores • Food programs 	<ul style="list-style-type: none"> • Farmers' markets • Food programs
Eating & celebration	<ul style="list-style-type: none"> • Home consumption • Restaurants 	<ul style="list-style-type: none"> • Food trucks, Restaurants, Patios • Cooking programs • Community kitchens 	<ul style="list-style-type: none"> • Street festivals, Food trucks, Restaurants, Patios • Community kitchens
Waste & recovery	<ul style="list-style-type: none"> • Residential composting • Restaurant food waste pick • Reduced packaging 	<ul style="list-style-type: none"> • Condo / home composting • Reduced packaging • Office composting 	<ul style="list-style-type: none"> • Reduced packaging • Office composting program
Education & governance	<ul style="list-style-type: none"> • Training for urban gardeners • School programs • University programs • Urban gardener training • Food preparation • Nutritional advic 	<ul style="list-style-type: none"> • Training for urban gardeners • School programs • University programs • Urban gardener training Food preparation • Nutritional advice 	<ul style="list-style-type: none"> • Training for high tech urban gardeners • Urban gardener training • Food preparation • Nutritional advice

Source: Edmonton's Food & Urban Agriculture Strategy (2012)

These are the kind of plants which can be developed to each scale:

Table 3. The Comodity Lists of Urban Farming

	Open	Mix	Controlled
Building	Microclimates in and around the built environment (mushrooms, vines)	Rooftop gardens (vegetables)	LED light cabinets (vegetables) Urban livestock (rabbits) Aquaponics
Inner City	Permaculture gardens (vegetables, fruits, nuts, roots) Urban livestock (bee keeping)	Kitchen and community gardens (vegetables) Urban livestock (chickens, sheep)	Urban livestock (worms, insects, etc.)
City Fringe	Forest gardens (vegetables, fruits, nuts, roots)	Market gardens (vegetables)	Greenhouse nursery (vegetables)

Source: Agriculture Economics Institute, Wageningen based on de Graaf (2011)

3.2.2. Transitional Space Design

There is a hierarchy for the transitional space in the environment, which is as follows:

(a) Macro

In macro scale, the transition spaces that can be used for urban farming media are the green open spaces belonging to the green area. Beside of its function as interaction space, the green open space can be designed and used for communal gardens for some groups of environmentalists. The land can be planted with a variety of superior plants that are suitable for open space exposed to direct sunlight and using soil-based systems, such as various vegetables, fruits, nuts, and sweet potatoes. Beside that, the open space can also be used as farm fields, such as birds and cows, which would be more ideal when it is placed outside the building. Therefore, it would not disturb the residents because it tends to cause odors and dirt.

(b) Messo

On messo scale, the transition spaces that still can be used are theruangtransisi yang dapatdigunakanadalah the corridors within the building and atrium spaces as the transition between public and private space. Atrium in the

form of a closed wide space that connects public and private space can be functioned as a medium of planting crop either with soil-based or with hydroponic systems for plants that can not be exposed to direct sunlight. Atrium can be used as a farming medium for some smaller groups, such as for some residential units that surround it. Beside the atrium, the peristilium in the form of open space can surrounded by some private space can also be used. Peristilium can be functioned as farming medium for soil-based for plants that need be exposed to direct sunlight. Similar to atrium, the peristilium can be functioned as the farming medium for small groups, such as for some residential that surround it. In building corridors, the whole corridor wall can be functioned as a hydroponic medium or plant using pot media that can be placed along the corridor. Beside the corridor, atrium, and peristilium within the building, urban farming can also be used in roof top buildings. Roof top building can be functioned as the plant medium for the soil-based system plants that need to be exposed to the direct sunlight.

(c) Micro

On micro scale, the urban farming can be done in residential unit and also in the terrace of each residential. The division is based on the needs of sunlight and also the planting medium, whether the plant requires direct sun or not, and also requires the land or not. On macro scale, urban farming is more ideal if it is privately used by each unit owner.

3.3. Discussions

The urban farming implementation is a sustainable implementation that not only stops in the early procurement of planting and also farming. Some continuation systems starting from production process, processing, until distribution are needed. The purpose is to make the urban farming system be rotated and continuous, not stop at one process. A good management is needed to determine who is involved in each process, from the production, processing, and distribution processes and those who supervise the process.

In the production process, it is necessary to note the location of cultivation and livestock needed, especially for the planting media (soil, water, etc.), as well as the needs of the sun, humidity, and air temperature. Beside that, the risk of pests, weeds, and dirt that can disrupt residents is needed to be supervised. The circulation of plant and animal care should also be taken into account, which is by designing the water supply, and disposal properly. In the processing process, the environment must provide 'space' to cultivate crops and livestock products. It is necessary to sort out which commodities are distributed directly in raw, semi-finished, and finished goods. Raw items include vegetables, fresh fruit and birds that can be directly sold in the market. The cutting room for meat processing is needed before it is sold in the market, and it also need a kitchen to process the meat into processed meat that can be sold at a higher price.

The distribution process can be done internally and externally. After processing, the commodities can be sold in Astana Anyar market itself, or even distributed outside the region through a system that must be well prepared, such as in and out of the truck, and others.

4. Conclusion

Urban Farming concept is very suitable to be applied in the improvement of Astana Anyar market environment and the surrounding residential. With very limited land, urban farming can be done in the building because nowadays, a new technology has been found, such as Zfarming. Urban farming can form a sustainable round in the environment. Residential act as a producer and processor, while the market plays a role in the distribution process. In addition to its role in the economic aspect, the application of urban farming in transitional spaces also has a positive impact on environmental sustainability as it affects reforestation.

Besides, it also have social aspect because the agriculture and the communal farm can be as media of interaction, as well as in processing process. The continuity of social interaction that occurs in the transition space due to urban farming, encourages the culture of mutual cooperation and interest in shopping in traditional markets that will continue to increase because the quality of sold commodities are maintained.

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6. Author Profile

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7. Terminology

BCR (Building Coverage Ratio)
FAR (Floor Area Ratio)
GCR (Green Coverage Ratio)