Urban farming model in South Jakarta

E Indrawati
Environmental Engineering, Faculty of Architecture Landscape and Environmental Technology, Universitas Trisakti, Jakarta, Indonesia

Corresponding Author: ettyindra@trisakti.ac.id

Abstract. The development of infrastructure rapidly, large of population and large of urbanization. Meanwhile, agricultural land is decreasing and agricultural production continues to decline. The productive crops is needed for consumption and it is also to improve the environment from oxygen provisioning, antidote to air pollution and to improve soil conditions. The use of yard land for horticultural crops (vegetables, fruits and ornamental plants), spices, medicines, herbs etc. can benefit for the owners of the yard particularly and the general public. The purpose of this research is to identify the model of home yard utilization, mosque yard, office, school, urban park and main road and sub main road, which can improve environmental quality in Pesanggrahan district. The method of analysis used descriptive analysis method by observation. Then analyzed the percentage of the use of yard with productive crops as urban farming. The results showed that the most productive crops were planted in Kelurahan Pesanggrahan 67% which compared with in Kelurahan Ulujami 47%, and in Kelurahan Petukangan Utara 27%. The most types of productive crops were grown as fruit trees and vegetable crops.

Keyword: horticultural, produktive crops, urban farming, yards

1. Introduction

Very rapid infrastructure development, large population and high levels of urbanization. Meanwhile, agricultural land is decreasing and agricultural production continues to decline. The need for productive crops other than for consumption is also to improve the environment from oxygen provisioning, antidote to air pollution, improve soil conditions. The use of yard land for horticultural crops (vegetables, fruits and ornamental plants), spices, medicines, herbs etc. can benefit the owners of the yard in particular, as well as the benefits to the general public.

Reduced agricultural land converted into settlements and industrial land, has become a threat and challenge for Indonesian to become an independent nation in the field of food. The food security situation in our country is still weak. This is indicated by: (a) the number of food insecure population (consumption level <90% of recommendations 2,000 kcal / kap / hari) and very food insecurity (consumption level <70% of recommendations) is still quite large, 36.85 million and 15.48 million people for the year 2002; (B) malnourished children under five are still quite large, ie 5.02 million and 5.12 million people for 2002 and 2003 [1].

BPS population data shows that the percentage of urban population. In 1990 reached 30.9%, in 2010 reached 49.8%, and this year has reached 56%. Indonesian Economic Vision 2025 estimated at 65% of Indonesian population are living in the city. Acceleration of urbanization and city development in Jakarta will certainly cause various problems. Significant increases in urban population without
support and offset by the amount of food supply, employment, housing, facilities and infrastructure, law enforcement officials, etc. are issues that must be handled properly.

State Regulation No. 26 of 1997 on spatial planning, the increase of agricultural land conversion due to urban development is very worrying and a threat to agricultural business. Urban development can not be prevented, so it is necessary to think that agricultural activities can be integrated into other sectors within the urban development plan. Integration of agricultural development in urban development can create better urban ecosystems and can play a role in urban poverty reduction.

Urban farming can be one solution because it not only makes empty land useful but also provides cheap and flexible solutions for people who are financially difficult [2].

Sustainable agricultural development seeks to achieve sustainable agricultural production, rural economic sustainability and long-term environmental sustainability. Based on the definition of sustainability, the development of sustainable urban agriculture is the development of urban agriculture that integrates the economic, social and environmental aspects in an integrated manner in order to achieve economic sustainability, social sustainability and environmental sustainability within the framework of urban development [3].

The purpose of research is to identify the model to use of home yards, mosque yards, office yards, school yards, community park, main road yards and side road yards, three sub district in Pesanggrahan district.

2. Research Method
This research was conducted in Pesanggrahan sub district of South Jakarta, with three samples of Pesanggrahan, Ulujami and North Petukangan sub-districts. Primary data was obtained by field survey on home yard, school yard, mosque, office, green space and roadside green open space, to see the type of plants planted in each yard. The method of analysis used is descriptive analysis method by observation. The data were analyzed whether the planted plants were productive crops or non-productive crops. Productive crops planted in the form of fruit trees, vegetable crops, food crops and medicinal plants. Planting of productive crops planted in the yard, indicating urban farming (urban farming). Secondary data obtained from the searching of Pesanggrahan district.

3. Results and Discussion
The development of the city is closely related to infrastructure development, the existence of toll road construction passing Pesanggrahan district greatly affect the land use, so that land conversion occurs. In general, land conversion is divided into four zones [4]:

a. The downtown zone, the zone in a predominantly urban center of urban buildings and infrastructure, such as government buildings, squares, department stores, trade and services. In this zone, the conversion rate of agricultural land to non-agricultural is very high (> 90%) is characterized by agricultural activities dominated by landscaping and ornamental farming trade for gardening. In this zone can be developed a market center that sells agricultural products.

b. City frame zone, This zone is directly adjacent to the city center. Most of these zones are residential areas where conversion rate of agricultural land to non-agricultural land reaches > 75%, 25% remains can be used agricultural activities. It is a land that is not ready for housing. Some of this land is still used agricultural land with high value agricultural commodities, especially horticultural crops (vegetables, fruits and ornamental plants).

c. The city-village zone. This zone is a mixed area between urban and rural situations. Urban situation is seen in the growth of modern residential buildings mixed with traditional relics of the house with yard and surrounding rice fields. The conversion rate of agricultural land in this zone ranges from 25-75%.

d. Village zone. This zone is an area that describes the countryside with level of land use for farming > 75%. Agricultural activities dominate the business community, with diverse agricultural commodity business. This area is relatively close to the city, so the development of commodities cultivated is strongly influenced by demand of the city.
The existence construction of Outer Ring Road infrastructure will reduce agricultural land, green open space, yard, settlement and other open spaces. On the other hand new housing develops newcomers in different customs with indigenous people in managing the yard. The existence of the construction of the Outer Ring Road infrastructure will reduce agricultural land, green open space, yard, settlement and other open spaces. On the other hand new housing develops newcomers and customs are different from the indigenous people in managing the yards. In the big yards of the population usually plant various types of fruit trees. South Jakarta is one of the largest fruit producers in Jakarta. With the outer ring road, fruit garden and large yards turned into housing. New housing with different characters utilizes pages with productive and non productive plants.

The yard as a plot of land that has a certain boundary, on which there are residential buildings and is a layered canopy ecosystem. The yard is a neighborhood around the house that can be cultivated for agricultural commodities. Planting productive crops such as horticultural crops (fruits, vegetables and ornamental plants), spices, medicines, spices etc. can provide benefits that can meet physical and spiritual satisfaction [5].

Based on observation in Pesanggrahan district, the productive crops planted in Pesanggrahan sub district are 67% at most, compared with 47% in Ulujami sub district and 27% in Petukangan Utara sub district.

Figure 2 shows that Pesanggrahan sub district has the most yard planted with productive crops such as medium house yard, community park and roadside yards (100%). In Ulujami sub district of big yards house and community park is planted with productive plants 100%, while in Petukangan Utara sub district only community park in planted with productive plants (100%). In general, the yard of small houses, yard of mosques, school yard, office yard planted trees and decorative plants only a few plants grow productive plants.
Community parks in three sub district are planted with productive crops. Roadside yards in Pesanggrahan sub district also planted with productive crops. Community parks, main road yards and roadsite yards, are common areas, indicating that people use land for primary human needs. The main roads yards in the three sub district are planted with shade tree, such as *Polyanthian longifolia* and *Pterocarpus indicus* (angsana), but there are *Mangifera indica* (mango) and *Artocarpus heterophyllus* (jackfruit) in Pesanggrahan sub district. The yard is quite prospective in supporting people's lives on an ongoing basis. The sustainable benefits of the yard system can be obtained from several aspects [9]:

1) Maintaining and improving crop yields sustainably
2) Supplying energy derived from local resources, especially firewood
3) Produce a wide range of ingredients that can be utilized to meet day-to-day or market-sold needs, including wood, vegetables, toga, fruits and others
4) Protection and simultaneously improve the quality of the environment, especially land, water, flora and fauna
5) Improving socio-economic condition of farmers in accordance

Table 1 shows the types of plants grown in three sub district dominated by fruit plants such as *Musa paradisiaca* (Pisang), *Carica papaya* (Papaya) and *Mangifera indica* (Mangga). Generally fruit trees grown on a large land that is on the big yard of a house and community park. In the small yard and medium yards house planted many vegetables and herbs. Like *Brassica rapa* (mustard), *Solanum lycopersicum* (tomato). *Capsicum annuum* (chili), *Cymbopogon citratus* (lemongrass), *Zingiber officinale* (Ginger) etc. Fruit trees are grown also in accordance with existing land. Variety of business yard and the number of perennials show enough diversity of business which of course also require various treatment from farmer. There is a tendency that the more household-dominated land the more trees and types of timber trees are cultivated [8].
Table 1. Urban farming model in Pesanggrahan district.

| Yard                | Ulujami sub district                                                                 | Pesanggrahan sub distric          | Petukangan Utara sub district                                      |
|---------------------|---------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------|
| Big yards house     | Musa paradisiaca, Carica papaya, Mangifera indica, Manihot utilisima, Brassica juncea, Curcuma longa | Musa paradisiaca, Carica papaya, Nephelium lappaceum, ornamental plants, Capsicum annum, Cariaca longa | Bambusa sp, Musa paradisiaca, Tectona grandis, Mangifera indica, Oleana syzygium |
| Medium yards house  | Musa paradisiaca, Carica papaya, Nephelium lappaceum, ornamental plants                | Gnetum gnemon, Syzygium aqueum, Musa paradisiaca, Ipomoea reptana, Brassica juncea, Solanum lycopersicum, Alpinia galanga, Cybopogon citratus, Zingiber officinale | Bambusa sp, Nephelium lappaceum, Diffenbachia sp, Ornamental plants, Dypsis lutescens, Piper betle |
| Little yards house  | Ornamental plants, Momusops elengi, Mangifera indica, Passiflora edulis, Syzygium aqueum | Bambusa sp, Piper betle, Manihot utilisima, Mangifera indica, Oleana syzygium, Palmae, Polyanthia longifolia | Carica papaya, Manihot utilisima, Psidium guajava, Plumeria, Oleana syzygium, Palmae |
| Mosque yards        | Ornamental plants, Cocos nucifera, Palmae                                               | Ornamental plants, Tectona grandis, Mangifera indica | Oleana syzygium, Palmae, Roystone regia, Plumeria, Piper betle, Mangifera indica |
| School yards        | Ornamental plants, Psidium guajava, Mangifera indica, Cocos nucifera, Star Fruit        | Mangifera indica, Polyanthia longifolia, Bambussa sp, Plumeria, Oleana syzygium, Cordline fraticosa | Mangifera indica, Oleana syzygium, Plumeria, Lavender, Tamarindus indica, Panax, Cymbopogon citratus |
| Office yards        | Ornamental plants, Palmae, Mangifera indica, Capsicum annuum, Psidium guajava           | Mangifera indica, Oleana syzygium, Helianthus annuus, Schefflera actinophylla, Capsicum annuum, Ficus benyamina | Oleana syzygium, Pithospermum macarthuri, Plumeria, Syzygium aqueum, Polyscia scuetelia |
| Community park      | Musa paradisiaca, Nephelium lappaceum, Carica papaya, Sandoricum koetjape              | Ornamental plans, Psidium guajava, Mangifera indica | Musa paradisiaca, Areca catechu, Carica papaya, Erythrina variegata, Tectona grandis, Mangifera indica |
| Main road yards     | Pterocarpus indicus, bambusa sp, Palmae                                                 | Mangifera indica, Artocarpus integra, Polyanthia longifolia | Polyanthia longifolia, Palmae |
| Side road yards     | Samanea saman                                                                           | Mangifera indica, Cocos nucifera, Musa paradisiaca, Averrhoa | Ornamental plants, Aloe vera, dracaena, Samanea samani, Prunus avium |
4. Conclusion
The development of the Toll Outer Ring Road and the community's need for agricultural products can make changes to the planting model in south Jakarta, especially in Pesanggrahan district. Productive crops planted in Pesanggrahan sub district are 67% at most, compared with 47% in Ulujami sub district and 27% in Petukangan Utara sub district.

The big yard house and the community park are generally planted productive plants in the form of fruit trees. The yard of the small house, the yard of the mosque, the yard of the school, the yard of the office is planted by a protective tree and the ornamental plant produces only a few productive crops. Green open space in Pesanggrahan sub district, has applied the model of urban farming by planting fruit trees and productive plants.

References
[1] Cahaya L Darmawan. 2014. Kajian Peran Pertanian Perkotaan dalam Pembangunan Perkotaan Berkelanjutan (Studi Kasus: Pertanian Tanaman Obat Keluarga di Kelurahan Slipi, Jakarta Barat). Forum Ilmiah. 11(3).
[2] Juli M Slabinki. 2013. From Waste land To Oasis: How Pennsylvania can Appropriate Vacant Urban Land Into Functional Space Via Urban Farming. Widener Law Journal. 22:253-287,
[3] Li M. 2009. The choice of Sustainable development model of China’s. Agriculture Asian Social Science. 5:91-93,
[4] Rachmat M, 2011, Potensi Lahan Pertanian Perkotaan dalam Penyediaan Pangan. Dalam Buku MembangunPengelolaan Kemampuan Lahan Pertanian Pangan Keberlanjutan. Badan Penelitian dan Pengembangan Pertanian Kementerian Pertanian. IPB Press
[5] Adiyoga, 2003. Prospek Pengembangan Pertanian Urban (perkotaan). Disampaikan pada Diseminasi Prospek Penemmbangan Sayuran di Perkotaan, Balai Penelitian Tanaman Sayuran, Lembang, Bandung, 11-13 Agustus 2003.
[6] Hubert De Bon, et al, 2010, Sustainable Urban Agriculture in Developing Countries”, A Review, Agronomy for Sustainable Development, 30:21-32
[7] Novitasari E, 2011, Studi Budidaya Tanaman Pangan Di Pekarangan Sebagai Sumber Ketahanan Pangan Keluarga (Studi Kasus di desa Ampel Gading Kecamatan Tirtoyudo Kabupaten Malang). Skripsi. Universitas Brawijaya Malang.
[8] Penny D H, and M Ginting, Pekarangan Petani dan Kemiskinan. Gajah Mada University Press. Yayasan Agro Ekonomika, 1984.
[9] Sutanto R, 2002, Penerapan Pertanian Organik Pemasyarakat dan Pengembangannya. Kanisius. Yogyakarta, 2002.
[10] FAO, Urban and Peri Urban Agriculture, Report to The FAO Committee on Agriculture (Coag), Meeting from January 25-26, FAO, Rome, 1999.