



## Measuring Performance of Urban Farming for Sustainable Urban Development in the City of Surabaya, Indonesia

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### **Abstract:**

*Urban Agriculture is an effort to realize the sustainable urban development with the focus to optimize limited vacant land for the farming activities. Urban agriculture has a positive impact on people's livelihood in urban areas, both in social, economic, and environmental perspectives. In addition, urban agriculture also helps to contribute to the urban greenery, healthy open space and food security. Surabaya city since 2009 has been implementing urban farming program that is designed to be developed in densely populated urban areas and do not have a large amount of vacant land. The targets of this Urban Farming Program are poor families, which spread over 31 districts in the city of Surabaya. The benefit of this program is to improve the food security of poor families through the fulfillment of nutrient availability and poor families independently by utilizing the yard for urban farming activities. Critical success factors must be considered this program for the urban sustainability, how to synergize the social, economic, and environmental benefits on the community level. The study is necessary to identify the important factors that must be considered in supporting the urban sustainability. The factors are used to analyze the performance of the urban farming activities on the community level. The importance factor analysis measure the performance based on the gap between the perceptions and expectations. The SERVQUAL instruments can be used to measure the performance of urban farming program. The data source is obtained by sampling to the community in the city of Surabaya that have implemented urban farming program. Thus the results of performance measurement of this critical success factors can be determined step forward to improve the urban farming program in the city of Surabaya.*

*Keywords: urban agriculture, urban farming, sustainable urban development, performance measurement*

### **1.0 Introduction**

Urban Agriculture is an effort to realize the sustainable urban development with the focus to optimize limited vacant land for the farming activities. Urban agriculture has a positive impact on people's livelihood in urban areas, both in social, economic, and environmental perspectives. In addition, urban agriculture also helps to contribute to the urban greenery, healthy open space and food security. Urban agriculture will never replace or compensate for rural agriculture, but should be seen as a livelihood that enhances food security, nutritional health, and creates employment (Redwood, 2009). The potential for urban agriculture to play a substantial role in urban poverty and food insecurity reduction should not be overemphasized, as its share in income and overall agricultural production is often quite limited (Zezza, and Tasciotti, 2010).

Agriculture in towns, cities, and metropolitan areas can convert urban wastes into resources, put vacant and under-utilized areas into productive use, and conserve natural resources outside cities while improving the environment for urban living (Smit and Nasr, 1992). The main focus of micro-scale urban agriculture is on building a safety net and securing access to nutritious food for disadvantaged categories

of the population while enhancing livability and resilience of the slum areas (De Zeeuw, Van Veenhuizen and Dubbeling, 2011).

Surabaya city since 2009 has been implementing urban farming program that is designed to be developed in densely populated urban areas and do not have a large amount of vacant land. The targets of this Urban Farming Program are poor families, which spread over 31 districts in the city of Surabaya. The benefit of this program is to improve the food security of poor families through the fulfillment of nutrient availability and poor families independently by utilizing the yard for urban farming activities. The study case in Surabaya shows the positive impacts of urban farming toward the increasing of citizen prosperity (Nirwana, Lewi, Ulum, Santosa, 2014).

Civil society organizations require their members to contribute resources and the poor are either reluctant or unable to invest scarce resources in endeavors that they perceive as risky because of their dependence on social relationships characterized by trust, reciprocity, and cooperation (Beard, 2005). Sustainable communities require unprecedented and simultaneous emphasis on the efficient use of urban space, on minimizing the consumption of essential natural capital, on multiplying social capital, and on mobilizing citizens and their governments toward these ends (Roseland, 2000). Development and Use of Indicators are to inform the community about the impact of its programs and investments upon the sustainable development of the community.

## 2.0 Methodology

The study is necessary to identify the important factors that must be considered in supporting the urban agriculture sustainability. The factors are used to analyze the performance of the urban farming activities on the community level. The Factors of Urban Sustainability in Urban Farming are based on the economic, social, and environmental aspects.

Table 1: Factors of Urban Agriculture Sustainability

Variables					
Economic Aspect		Social Aspect		Environmental Aspect	
1.1	Income Generating	2.1	Improving Healthy Life	3.1	Green Open Space Area
1.2	Poverty Reduction	2.2	Social Capital	3.2	Energy Efficiency
1.3	Diversification of Economic Activity	2.3	Community Participation	3.3	Land Use Development
1.4	Marketing Network	2.4	Quality Of Human Resources	3.4	Supporting Infrastructure
1.5	Program Sustainability			3.5	Applied Technology

The study aims to identify the performance of urban farming activities on the community level by using SERVQUAL instruments. SERVQUAL is a multi-item scale developed to assess the respondent perceptions of service quality in service and retail businesses. SERVQUAL measures service quality as the discrepancy (gap) between a customer's expectations for a service offering and the customer's perceptions of the service received. The SERVQUAL customer perception tool requires customers to answer questions about both their expectations and their perceptions and to assign a numerical weight to each of the five service quality dimensions (Parasuraman, Berry, and Zeithaml, 1988). The importance factor analysis measure the performance based on the gap between the perceptions and expectations. The SERVQUAL instruments can be used to measure the performance of urban farming program.

Analysis of SERVQUAL data can take several forms: item-by-item analysis (e.g. P1 - E1, P2 -E2); dimension-by-dimension analysis (e.g. (P1 + P2 + P3 + P4/4) - (E1 + E2 + E3 + E4/4), where P1 toP4, and E1 to E4, represent the four perception and

expectation statements relating to a single dimension); and computation of the single measure of service quality  $((P1 + P2 + P3 + \dots + P22/22) - (E1 + E2 + E3 + \dots + E22/22))$ , the so-called SERVQUAL gap (Ahuja, Mahlawat and Masood, 2011).

The data source is obtained by sampling to the community in the city of Surabaya that have implemented urban farming program. The number of samples consists of 18 communities from the districts that have the urban farming program. There are 14 items of questions asked to respondents associated with urban agriculture sustainability indicators. There are 14 items The scores for each item ranged from "1" for "strongly disagree" to "4" for "strongly agree" on a four-point Likert scale.

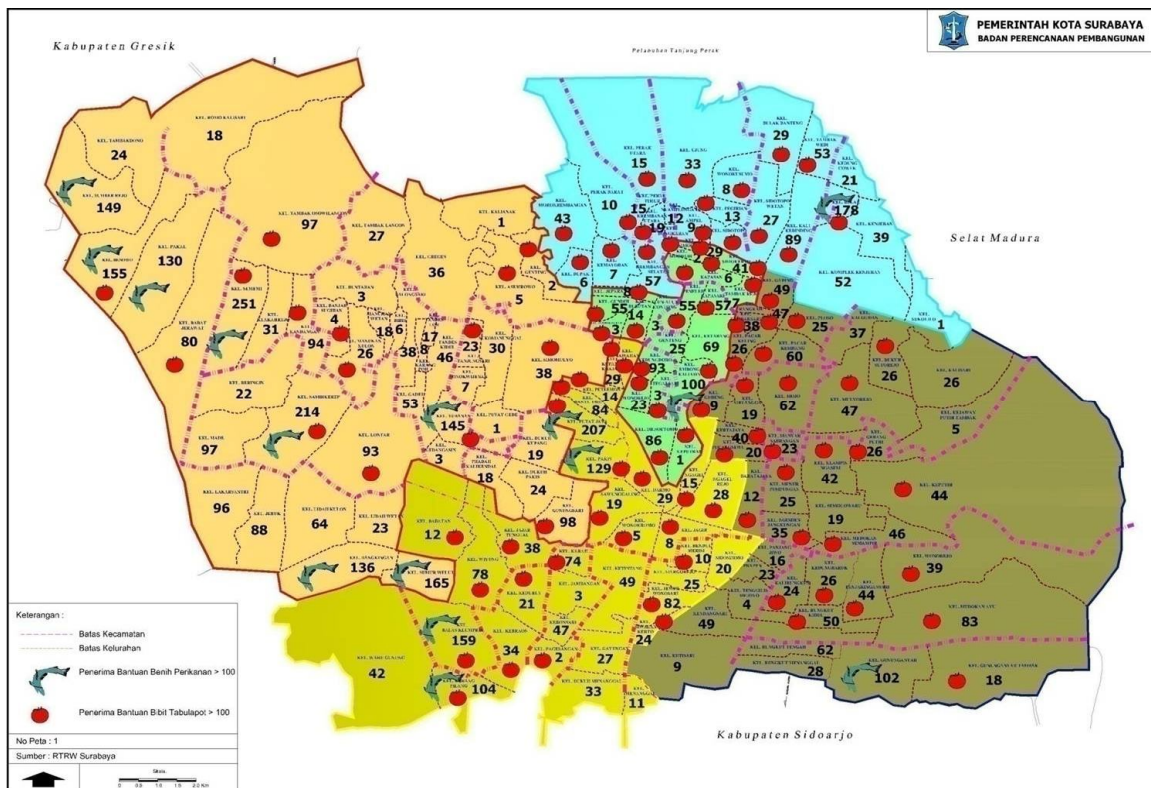


Figure 1: Distribution of Urban Farming Activities in Surabaya

### 3.0 Results and Discussions

Servqual analysis results indicate that the economic aspect with gap value 0.844 is still a major concern desired by the community, followed by social and environmental aspects with gap value 0.597 and 0.489. Among the variables were assessed also showed that poverty reduction and income generating with gap value 1.111 and 1.000 are remains important in the urban farming program. While the environmental aspects shows lowest value based on the perceptions and expectations of community. This is caused by the variables green open spaces and land use development in accordance with the perceptions and expectations of community.

The average values of all variables are 3.48 for the expectation value and 2.83 for the perception value. There are 8 variables that have a value above the average of expectation value, while only 6 variables that are below the average value. This suggests that community expectations of the variables that support the sustainable development of urban agriculture are still high.

The community has high expectations on the urban farming with the aim of reducing poverty and at the same time is able to become one of the family's incomes. The benefits can be obtained community through the urban agriculture program such as food for consumption of the family members that can improve the family nutrition. With the fulfillment of foodstuffs from own farm can improve the livelihood of community. The main objective of urban farming activities is to improve the food security of poor families through the nutrient availability independently by utilizing the yard for aquaculture and agriculture activities. So that urban agriculture program can be developed in the future to improve the economy of communities.

Table 2: Variable distribution based on servqual analysis, 2015

No.	Variables	Expectation Values		Perception Values		SERVQUAL Values
		Score	Average (y)	Score	Average (x)	Gap (y-x)
<b>Economic Aspect</b>			<b>3.489</b>		<b>2.644</b>	<b>0.844</b>
1	Income Generating	67	3.722	49	2.722	1.000
2	Poverty Reduction	65	3.611	40	2.500	1.111
3	Diversification of Economic Activity	48	2.667	39	2.167	0.500
4	Marketing Network	68	3.778	53	2.944	0.833
5	Program Sustainability	66	3.667	52	2.889	0.778
<b>Social Aspect</b>			<b>3.486</b>		<b>2.889</b>	<b>0.597</b>
1	Improving Healthy Life	60	3.333	48	2.824	0.510
2	Social Capital	62	3.444	50	2.778	0.667
3	Community Participation	69	3.833	34	3.400	0.433
4	Quality of Human Resources	60	3.333	46	2.556	0.778
<b>Environmental Aspect</b>			<b>3.467</b>		<b>2.978</b>	<b>0.489</b>
1	Green Open Space Area	66	3.667	66	3.667	0.000
2	Energy Efficiency	53	2.944	47	2.611	0.333
3	Land Use Development	60	3.333	60	3.333	0.000
4	Supporting Infrastructure	70	3.889	55	3.056	0.833
5	Applied Technology	63	3.500	40	2.222	1.278

The success of this program could not be separated from the high level of community participation. Good response from the community to participate in the urban agriculture program can be identified from the development of green and clean society movement. Eco-community is one thing that can support sustainable development in the urban agriculture. The people are involved in area development to maintain the quality of the environment. The communities utilize together the vacant land around their house to plant trees and vegetables that provide value-added economy.



Figure 2: Urban Farming Activities in Surabaya

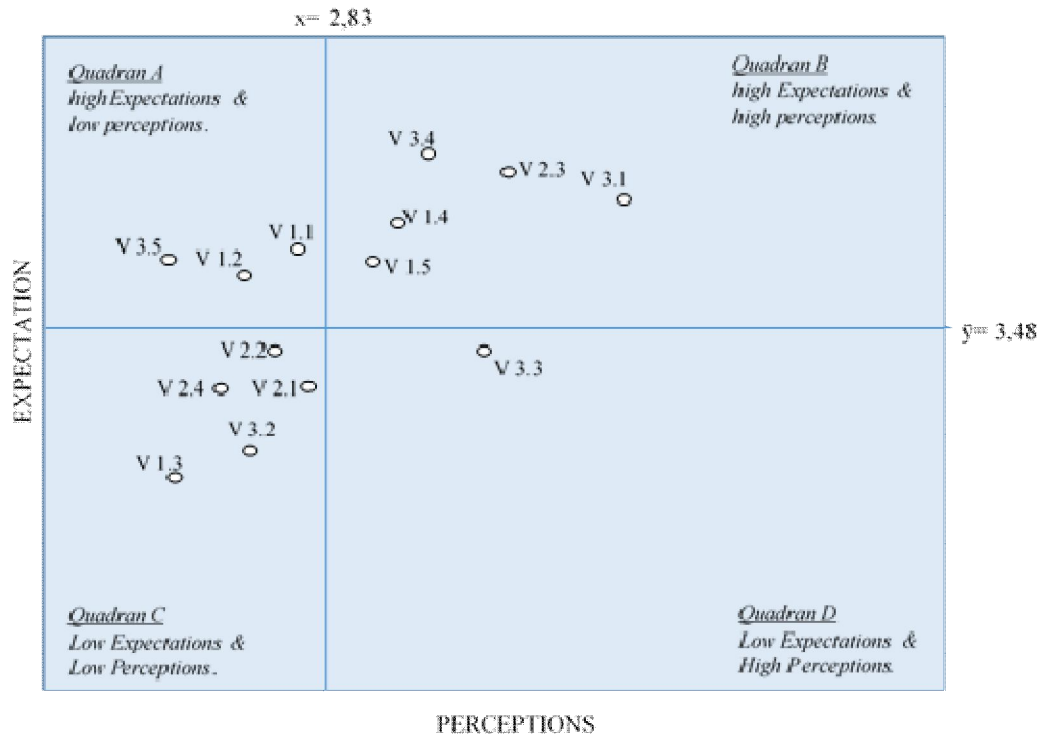


Figure 3: Variable distribution based on servqual analysis, 2015

The result of servqual analysis is further illustrated in the form of four quadrants which each variable will be mapped based on perceptions and expectations. Quadrant A is a group of variables that have the characteristics of high expectations and low perception. In this group consists of variables:

- Variable 1.1 : Income Generating
- Variable 1.2 : Poverty Reduction
- Variable 3.5 : Applied Technology

The variables in quadran A is the primary focus should be improved in order to achieve successful urban farming program. These three variables are considered very important by the community but have a low actual performance. Thus, the development efforts of urban farming should be oriented towards performance improvement of the variables. Variable income generating and poverty reduction have the same goal, namely how to improve the welfare of the community through productive economic activity. When a household produces food, its expenses are reduced, which it can lead to increase savings on the poor urban households spend of their household budgets on food. Households that produce more than they need for their own consumption will sell their surpluses and eventually generate an income, complementing income from other sources (De Zeeuw, Van Veenhuizen and Dubbeling, 2011).

Moreover, community also need support applied technology to improve economic productivity and quality of their environment. Urban agriculture offers the potential for a classic win-win situation in which one of the major urban management problems, i.e. waste disposal, can be tackled at the same time as increasing food security through exploitation of the nutrient potential of the 'wastes' (Drechsel, and Kunze, eds. 2001). The effort of community to implement the concept of 3R (reuse, reduce, recycle) is important to reduce wastes include from the urban agriculture. The communities need the support of applied technology from the local government and any institutions on the waste management. The utilization of

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waste materials such as waste recycling, composting is conducted by the community as the effort to improve the quality of economic communities themselves (Nirwana, Lewi, Ulum and Santosa, 2014).

Quadrant B is a group of variables that have the characteristics of high expectations and high perception. In this group consists of variables:

- Variable 1.4 : Marketing Network
- Variable 1.5 : Program Sustainability
- Variable 2.3 : Community Participation
- Variable 3.1 : Green Open Space Area
- Variable 3.4 : Supporting Infrastructure

The variables in quadrant B have a good performance. The state of these variables is important considered and have appropriate performance expectations of community. So that the performance of these variables shall be maintained in order to maintain the achievement of the program. Although the current condition of marketing network, the program sustainability and the community participation has been running well, but the community still need better attention to these variables as well as green open space and supporting infrastructure.

Quadrant C is a group of variables that have the characteristics of low expectations and low perception. In this group consists of variables:

- Variable 1.3 : Diversification of Economic Activity
- Variable 2.1 : Improving Healthy Life
- Variable 2.2 : Social Capital
- Variable 2.4 : Quality of Human Resources
- Variable 3.2 : Energy Efficiency

The variables in quadrant C based on the judgment of community are variables that are less prioritized for development of urban farming. So that people feel less need to improve the performance of the variable. This variables are actually important in supporting urban agriculture, but today the community still feel not require as seen from the result of analysis. Although the condition of variable is still not sufficient to support the sustainable development on urban agriculture, but the community has not enough to pay attention.

Variable in quadrant D has the characteristics of low expectations but high perception. In this quadrant, there is only a Variable 3.3: Land Use Development. This variable can be ignored in the development of urban farming in the city of Surabaya due to the community opinion is less important (low expectation) despite having a good performance. Thus, according to the community are not required always to pay attention to this variable. The community does not directly understand the benefits of land use development, because this variable is the domain of the government and the development policies toward the city scale.

#### **4.0 Conclusions and Recommendations**

The results of servqual analysis indicate variables income generation, poverty reduction, and applied technology remains a strategic issue in order to improve the performance of sustainable urban agriculture program. It is important to note in view of the communities who involved in urban agriculture program is a lower middle income people and living in dense residential areas. Even so these communities have a high level of participation so that the community participation still needs to be maintained in the future as well as developing the green open space areas and supporting infrastructures. What the priorities in the sustainability of urban farming program is the view of the community, although other variables also quite important in supporting sustainable development.

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The government should provide a better understanding to the public related to the variables in quadrant C, due to expectations of these variables still low. The government can do the socialization about the importance of variables in quadrant C to support the sustainability of the program.

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