

Development Strategy of Urban Farming in Encouraging the Implementation of Circular Economy in Bandung City

Author:

Wasifah Hanim

Fakultas Ekonomi dan Bisnis. Universitas Muhammadiyah Bandung. Indonesia

Email: wasifah.hanim@umbandung.ac.id

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ABSTRACT

Circular Economy implemented in urban farming will improve the welfare of the community. The purpose of this research is to develop a strategy for the development of urban farming to encourage a circular economy. The method used was to conduct a SWOT analysis by identifying internal and external factors as the development of urban farming to encourage a circular economy. Based on the results of the analysis, it was found that the urban farming development strategy to realize a circular economy combines elements of weakness (weakness) with threats (threat), namely collaborating with the education office and the women's empowerment and child protection office to introduce urban farming activities and collaborating with the education office and the women's empowerment and child protection office to introduce urban farming activities.

Keywords: urban farming; circular economy; SWOT; city of Bandung

INTRODUCTION

Circular economy is an economic system in which society builds a consumption-production system with the aim of maximizing the value of goods/services produced. The success of the circular economy has a positive impact on all three dimensions of Sustainable Development. In this context, the concept of circular economy is closely related to Sustainable Development because its success depends on addressing issues of economic growth, social equality, environment, and legal governance collectively (Nurul Islami, 2022).

Circular economy is an economic system aimed at promoting growth while maintaining the value of products, materials, and resources within the economy for as long as possible, with the goal of reducing the social and environmental damage caused by linear economic models. Unlike production economy, which prioritizes economic growth alone, circular economy emphasizes the importance of minimizing the negative impacts of sustainable production ([Korhonen et al., 2018](#)).

Circular economy became important and popular in the 1990s as an effort to address various economic development challenges with the goal of reducing the exploitation of natural resources. Circular economy aims to leverage the use of production goods alongside economic growth while promoting environmental development and natural resource utilization. It is an economic system with a focus on the end-of-life cycle of products, with the primary concept of reducing, reusing, and repairing materials in the production, distribution, and consumption processes. The concept of circular economy is described as a green economic concept to reduce carbon economies ([Fadhillah & Fahreza, 2023](#)).

Unlike the linear economic concept that neglects environmental care as a resource, resulting in environmental stagnation, the global economy is increasingly paying attention to the importance of

preserving resources for sustainable development for future generations ([Purwanti, 2021](#)). The linear economy comes with a consumptive take-make-use-dispose model, causing various social, economic, and environmental factors to be unsustainable ([Syarif Agustin & Rianingrum, 2021](#)).

Circular economy is a concept aimed at utilizing resources while minimizing waste, emissions, and wasted energy by reducing the production-consumption cycle through systems extending product life, design innovation, maintenance, reuse, remanufacturing, and recycling to turn products back into raw materials and recycle them into other products (upcycling). The linear economy comes with a consumptive model take-make-usedispose ([Syarif Agustin & Rianingrum, 2021](#)).

The implementation of a circular economy through recycling industries in Indonesia is estimated to generate around 1000 new companies and create over 3 million jobs. These projections also indicate a potential contribution of around US\$14 billion, equivalent to a GDP of 200 trillion, by the year 2030. Additionally, through these efforts, it is hoped that waste can be reduced by up to 50% and greenhouse gas emissions can be reduced by 90% by 2030 ([Fadhillah & Fahreza, 2023](#)).

In 2022, over 70 countries had implemented various Circular/Green/Blue Economy policies across the lifecycle of their productive sectors, including: resource extraction; food and commodity systems; energy production; buildings and construction; transportation and tourism; marine and fisheries; health; procurement; and chemical and waste management. Reducing food waste would save \$1.3 trillion annually, enough to feed 2 billion hungry and malnourished people ([UNDP, n.d.](#))

The District/City Government and the Community are the spearheads in achieving the goals of Sustainable Development. The concept of a circular economy can be implemented at various levels of economic activities. This includes within the scope of companies, consumers, and industrial sectors, and even this concept also presents a good opportunity for implementation in rural areas, urban areas, or even at a national level. One of the activities that can be carried out in a circular economy is Urban Farming.

Urban farming is an agricultural activity involving the cultivation of plants, fisheries, and/or livestock in an integrated manner that can be done in limited spaces. This activity is considered as one of the solutions to meet food needs, especially in unused areas such as marginal land, road medians, or urban residential yards. Urban farming can be carried out by utilizing relatively small plots of land, using methods such as polybags or vertical gardening concepts ([Septya et al., 2022](#)). Bandung City, like many other urban areas, tends to have very limited land, making urban farming a beneficial activity for urban residents, including enhancing food security and providing employment opportunities. Urban farming activities in Bandung City are known as "Buruan Sae."

Currently, there are 303 Buruan Sae locations spread across all neighborhoods in Bandung. According to the Department of Agriculture and Food Security of Bandung City, out of 30 districts and 85 neighborhoods, only 11 districts and 27 neighborhoods have successfully implemented urban farming, while the rest have not been fully operational. Urban farming is a strategic activity that provides benefits in supporting circular economy. Therefore, there is a need for strategies in developing urban farming as an application of circular economy that is not only beneficial for food security but can also become a commercial activity in Bandung City.

LITERATURE REVIEW

The Concept of Circular Economy

Circular economy is an economic model aimed at promoting economic growth while preserving the value of products, materials, and resources to endure over time, with minimal impact on the social and environmental damages often associated with linear economic approaches. In addition to optimizing waste management through recycling practices, circular economy also involves various interventions across the supply chain. In a circular economy, the value and benefits of a product are intended to be continuously utilized within a cycle, thus extending the product's lifespan. Circular

economy aims to minimize the consumption of resources and the amount of products ultimately disposed of in landfills through reuse and efficiency of all renewable and non-renewable resources within a product cycle. (BAPPENAS, 2022).

The concept of circular economy is a framework for utilizing resources, waste, emissions, and wasted energy that can be minimized by reducing the production-consumption cycle through systems extending product lifespan, design innovation, maintenance, reuse, remanufacturing, and recycling to turn products back into raw materials (recycling) and recycle them into other products (upcycling). The main goal is to transform the linear economy into a circular economy. Circular economy can be achieved through long-term design, maintenance, repair, reuse, remanufacturing, refurbishment, and recycling as depicted in the following diagram:

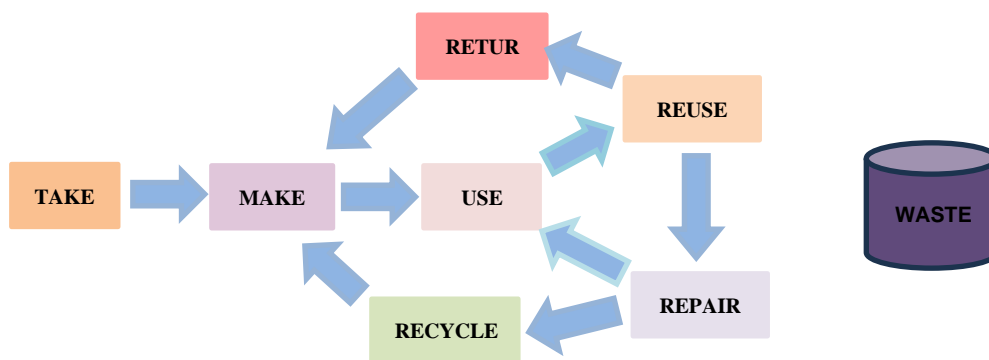


Figure 1. The Concept of Circular Economy

Based on the Figure, it shows that the circular economy approach consists of 5(five) Rs, namely (Reduce, Reuse, Recycle, Refurbish, and Renew), each element is as follows: (Tarmidzi Anas, 2022):

1. Reduce aims to decrease the use of goods, eliminate waste in the production chain, virtualize products and services, enhance energy efficiency, and redesign products to reduce input usage.
2. Reuse involves using an item more than once, including shared asset usage, utilizing reusable items that are still in good condition, and repairing assets with different product service.
3. Recycle is the effort to process previously generated waste by reusing existing materials and implementing anaerobic digestion and biochemical extraction methods for organic waste.
4. Repair/Refurbish involves the renewal of products by returning them from consumers to manufacturers for reevaluation of their functionality, then remanufacturing the product or its components, and applying the concept of longer product lifespan through proper maintenance.
5. Renew focuses on prioritizing the use of renewable energy and materials in all aspects of economic activities, such as replacing plastic packaging with paper, and similar actions.

The concept of circular economy aims to expand economic growth by preserving the values of products, materials, and resources to the maximum extent possible in creating economic value. Therefore, reducing environmental impacts caused by economic growth should be strategically pursued through the use of well-planned tools and methods (Adziem & Nurhasanah, 2021).

Urban Farming as an Application of Circular Economy

Urban farming not only transforms spaces in homes or settlements into gardens but also provides ecological benefits by creating green spaces in urban areas, economic benefits with the potential for profit and sustainable income, and educational benefits as a source of knowledge. Additionally, it also provides opportunities for communities to remain productive while at home and utilizes the Indonesian community's gathering habits to form communities that support urban farming in cities, despite limited land not being a barrier to developing creativity in producing something beneficial ([Wulandari et al., 2023](#)).

Urban farming has dual benefits, not only fulfilling the food needs of families and providing additional income through the sale of its products but also beautifying the city. Additionally, this activity helps reduce poverty and unemployment resulting from rural-to-urban migration by providing employment opportunities. Vegetables are often the choice in urban farming because they are easy to cultivate, meet family needs, and can grow in various growing media besides soil, making them suitable for urban communities with limited land ([Septya et al., 2022](#)).

A study in Philadelphia shows that low-income residents with yards can save an average of USD 150 per growing season on food costs. Additionally, productive yard farming not only serves nutritional consumption but also improves air quality and soil conditions. Utilizing yards for various types of plants such as vegetables, fruits, herbs, and medicinal plants can benefit both yard owners and the general public. Therefore, urban farming can be considered as one of the city's national policies with significant impacts ([Nasruddin et al., 2022](#)).

Urban farming is widely implemented in cities in developing countries, generating many socio-economic benefits including but not limited to food security, social equity, environmental quality, and health. Additionally, traditional farming practices, which have caused several issues such as the loss of wildlife due to the expansion of fertile land and the decline in soil quality resulting from intensive land use, have led to urban farming as a way to reduce dependence on traditional agriculture. With high levels of urbanization, urban farming plays an increasingly significant role as a food source in urban areas ([Yuan et al., 2022](#)).

The benefits of Urban Farming will be further enhanced by implementing a circular economic system. This economic system is based on the primary concept of reducing, reusing, and repairing materials in every production process, including distribution and production processes. The concept of circular economy can be implemented at various levels of economic activities, including within the scope of companies, consumers, and the industrial world, and it can even be applied in rural and urban areas or at a national level ([Khasanah, 2021](#)).

Urban Farming, as an element of the agricultural sector, has the potential to be a circular economy by applying circular economic principles to agricultural activities. Through the application of circular economy, the core value or value added from Urban Farming lies in the implementation of environmentally friendly agricultural systems by utilizing waste in their surroundings for business development. Additionally, through Urban Farming with a circular economic system, environmental pollution issues will be addressed in its business development.

A more efficient and optimal Urban Farming business scheme in generating income can be achieved by implementing a circular economy. In everyday life, the circular economy plays a crucial role in creating sustainability and reducing negative environmental impacts. It is a model designed to reduce waste and improve the efficiency of natural resource usage. The benefits of the circular economy play a vital role in replacing the linear economic model, where goods are produced, used, and then disposed of as waste. By adopting circular economic principles in Urban Farming, it can contribute to environmental protection and create a more sustainable and environmentally friendly economy ([Masruroh & Fardian, 2022](#)).

Implementing a circular economy in Urban Farming not only contributes to reducing environmental pollution but also enhances efficiency. This technique utilizes various growing media such as soil, pots/polybags, hydroponics, and aquaponics without requiring land as a growing medium, thus producing food sources without adding pressure on the environment. Communities can enjoy the availability of vegetables as a source of nutrition while also contributing to environmental greenery and reducing the impacts of global warming. Additionally, Urban Farming practices also strengthen community cohesion and foster a culture of mutual assistance in urban environments. By integrating agriculture, farming, and animal husbandry through the Integrated Urban Farming System (IUFS), we not only produce resources sustainably but also utilize all generated waste. Agricultural waste can be used as animal feed, while animal waste can be processed into compost fertilizer. If the location is close to a water source, farming techniques can also be integrated with fish farming, such as catfish, to enhance the efficiency and productivity of the farming system ([Syarif Agustin & Rianingrum, 2021](#)).

RESEARCH METHODS

This research is qualitative descriptive in nature, meaning it involves collecting descriptive data in the form of written or spoken words or from policy action ([Subandi, 2011](#)). Data collection is conducted through Focus Group Discussions using questionnaires. The questionnaire contains identification of factors that are strengths, weaknesses, opportunities, and threats in the implementation of urban farming in supporting circular economy in Bandung City. Respondents consist of employees from all local government agencies whose work areas are related to urban farming development and urban farming practitioners in Bandung City.

The data collected is analyzed using the SWOT method, which involves formulating strategies based on Strengths, Weaknesses, Opportunities, And Threats. The initial step of this method involves identifying internal and external environments in developing the circular economy in the context of urban farming in Bandung City. Essentially, formulating strategies using the SWOT method involves identifying two main factors: internal factors and external factors. Internal factors are identified by identifying weaknesses and strengths in developing the circular economy in the context of urban farming. The results of identifying internal factors serve as the basis for formulating the IFAS (Internal Factor Strategy) matrix. External factors are identified by identifying opportunities and threats in developing the circular economy in the context of urban farming. The results of identifying external factors serve as the basis for formulating the EFAS (External Factor Strategy) matrix ([Kusbandono, 2019](#); [Lois Putra Laka & Nuswantara, 2023](#)).

The results of identifying internal and external factors in the SWOT Analysis are presented in the SWOT matrix, as shown in the following table:

Table 1. The Analysis Matrix SWOT

External Factors \ Internal Factors	Internal Factors	STRENGTHS (S)	WEAKNESS (W)
OPPORTUNITIES (O)		Strategi SO <i>Growth</i>	Strategi WO <i>Stability</i>
THREATS (T)		Strategi ST <i>Diversification</i>	Strategi WT <i>Defend</i>

Source: Nur Khasanah, 2021

Based on the SWOT matrix, several strategies can be formulated. Firstly, there is the SO strategy, which involves utilizing all strengths to capitalize on existing opportunities. Secondly, the WO strategy involves addressing all weaknesses by capitalizing on existing opportunities. Thirdly, the ST strategy involves utilizing all strengths to mitigate against all threats. Lastly, there is the WT strategy, which involves mitigating all weaknesses and preventing all threats.

To analyze SWOT more deeply, it is necessary to identify external and internal factors as essential parts of SWOT analysis, namely:

1. External Factors.

These external factors influence the formation of opportunities and threats (O and T), involving conditions outside the company that affect corporate decision-making. These factors encompass the industrial environment, economy, politics, law, technology, demographics, and socio-cultural aspects.

2. Internal Factors

These factors affect the formation of strengths and weaknesses (S and W), involving conditions within the company that also influence decision-making. Internal factors encompass all functional management areas: marketing, finance, operations, human resources, research and development, management information systems, and corporate culture.

RESEARCH RESULTS AND DISCUSSION

Identification Result of SWOT

Reviewing the analysis using the SWOT analysis method (strengths, weaknesses, opportunities, threats) to support the implementation of the Urban Farming concept in supporting the circular economy, and based on the data collected, the strengths, weaknesses, opportunities, and threats existing in Urban Farming activities are identified. Based on the results of data collection related to the identification of internal and external factors of urban farming activities, so the strengths, weaknesses, opportunities, and threats are described as follows:

A. Strength

Strengths of Urban Farming are as follows:

1. Public awareness and desire to produce self-sustaining food.
2. Contribution to improving community welfare.
3. Access to equipment and materials for conducting activities.
4. Urban Farming activities produce healthier organic products
5. The practitioners have Technical skills of Urban Farming.
6. Urban Farming can developed in limited land areas.
7. The Bandung City Government Support policies towards food security through Urban Farming.

B. Weaknesses:

1. The Lack of quality human resources among Urban Farming practitioners to market harvest yields.
2. The Lack of institutionalization to develop Urban Farming.
3. The Lack of synergy among Bandung City Government agencies in managing Urban Farming businesses.
4. Inadequate agricultural facilities and infrastructure.
5. Access to Bank credi/capital is Limited
6. Ineffective promotion and marketing activities for Urban Farming products.
7. The Department of Food Security and Agriculture Program has not yet explicitly formulated an Urban Farming activity program.

C. Opportunities:

1. Significant demand for organic products.
2. Potential for agrotourism and educational tourism.
3. Government commitment to implementing activities and partnering with all stakeholders in the development of Urban Farming businesses.
4. Potential business opportunities for the community.

5. Networking opportunities with various parties.

D. Threats:

The threats faced by Urban Farming are as follows:

1. Trends in urban life that are not in the agricultural sector
2. Young people tend not to be interested in agricultural activities
3. Government policies do not favor the agricultural sector

The Strategy Matrix IFAS & EFAS

Determination of the value of internal and external factors using the first column there are criteria for each internal factor and external factor. The second column is the weight, that starts from 0.0 (not important) to 1.0 (very important). The rating value is based on the results of the interview, the rating of the opportunity factor is positive, when the value of a small opportunity is given a rating of 1 and when a large opportunity is given a rating of 4. Similarly, from the threat value element, the smaller the threat, the rating is 4, the greater the threat, the value is 1. Next, calculate the multiplication between the weight and rating of each criterion, the result is the score value of each criterion. Furthermore, the score of each element is summed up, the formulation of strategies that can be done is obtained by calculating the difference between the elements of the internal factors and the difference between the elements in the external factors ([Kusbandono, 2019](#)).

To formulate alternative strategies that can be implemented in developing urban farming, SWOT analysis is used. The SWOT matrix clearly illustrates how external factors, namely opportunities and threats, can be combined with internal factors, namely strengths and weaknesses, to generate strategic formulations in developing Urban Farming to support the circular economy in Bandung City.

Table 2. The Matrix of Internal Strategy Factors (IFAS)

Internal Strategy Factors	weight	ratings	weight x ratings
A. Strength			
1. Public awareness and desire to produce self-sustaining food.	0,2	2	0,4
2. Contribution to improving community welfare.	0,2	3	0,6
3. Access to equipment and materials for conducting activities.	0,05	2	0,1
4. Urban Farming activities produce healthier organic products	0,1	2	0,2
5. The practitioners have Technical skills of Urban Farming..	0,15	3	0,45
6. Urban Farming can developed in limited land areas.	0,1	4	0,4
7. The Bandung City Government Suppor policies towards food security through Urban Farming	0,2	4	0,8
Total	1		2,95
B. Weakness			
1. The Lack of quality human resources among Urban Farming practitioners to market harvest yields.	0,15	2	0,3
2. The Lack of institutionalization to develop Urban Farming.	0,05	2	0,1
3. The Lack of synergy among Bandung City Government agencies in managing Urban Farming businesses.	0,15	4	0,6
4. Inadequate agricultural facilities and infrastructure.	0,1	3	0,3
5. Access to Bank credi/capital is Limited	0,2	4	0,8
6. Ineffective promotion and marketing activities for Urban Farming products.	0,1	2	0,2
7. The Department of Food Security and Agriculture Program has not yet explicitly formulated an Urban Farming activity program.	0,2	2	0,4

Total	0,95	2,70
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Table 3. The Matrix of External Strategy Factors (EFAS)

External Strategy Factors	weight	ratings	weight x ratings
C. Opportunity			
1. Significant demand for organic products.	0,25	4	1
2. Potential for agrotourism and educational tourism.	0,2	4	0,8
1. Government commitment to implementing activities and partnering with all stakeholders in the development of Urban Farming businesses.	0,2	4	0,8
2. Potential business opportunities for the community.	0,2	3	0,6
3. Networking opportunities with various parties.	0,15	2	0,3
	1		1,7
D. Threats)			
1. Trends in urban life that are not in the agricultural sector	0,3	3	0,9
2. Young people tend not to be interested in agricultural activities	0,3	2	0,6
3. Government policies do not favor the agricultural sector	0,4	3	1,2
Total	1		2,7

From the results of the SWOT matrix above, it can be concluded that UD. Gudang Budi for internal factors is at (0.25), and external factors are at (-1). Based on the SWOT analysis that has been carried out, the appropriate strategy in the implementation of Urban Farming to realize a circular economy is a strategy that combines elements of weakness (weakness) with threats (threat) or W-T strategy. The formulation of the W-T strategy is as follows:

1. Collaborate with the Education Office and the Women's Empowerment and Child Protection Office to introduce Urban Farming activities.
2. Involve all stake holders to encourage the younger generation to be interested in urban farming activities.

The implementation of the strategy involves engaging all stakeholders, including academics, government, and the community, to encourage the younger generation to be interested in developing urban farming. Similarly, the media also participates in promoting urban farming as an important and profitable sector in the future. In addition, collaboration between regional organizations in Bandung City, such as the Department of Education, the Department of Agriculture and Food Security, and the Department of Women's Empowerment and Child Protection, is needed to introduce and encourage urban farming activities as part of daily routines even with limited land.

CONCLUSION AND RECOMMENDATION

Based on the results of research that has been carried out on internal and external factors using SWOT analysis, it can be concluded that the development of urban farming to encourage a circular economy is between quadrant 3 (weaknesses and threats) so that it focuses on defensive strategies, namely efforts to encourage the development of urban farming by minimizing existing weaknesses and avoiding threats, that is by involving all stakeholders to develop urban farming activities and collaborating all local government organizations to encourage urban communities in Bandung City to engage in urban farming as part of their daily activities.

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