

RESEARCH ARTICLE



Bandung Gardening: Hydroponic Salads

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Abstract: Urban agriculture not only plays an important role in creating sustainable cities but also influences the spatial structure of urban landscapes and communities. One of the small-scale (community) urban agriculture activities is community gardening. In Bandung City, this activity was initiated by the Bandung Gardening community. One of the work programs that can be done for the Bandung gardening community is to make a hydroponic salad. Hydroponics is the cultivation of plants using water without using soil. This research used a descriptive qualitative approach. The results showed that hydroponics is an efficient and effective method to produce high-quality salads in an urban environment like Bandung. Hydroponic plants tend to grow faster than those in soil, with higher yields and better nutritional quality. The success of this hydroponic technique is supported by the reduced use of water and less land compared to traditional farming. Hydroponic systems work by allowing control over environmental conditions, such as temperature, pH balance, and maximizing exposure to nutrients and water. Despite being grown in a water medium, hydroponic farming can actually save water. This is because the water used is not absorbed by the soil. The water is absorbed by the plants better. Hydroponic farming is also more energy-efficient because it is done without non-renewable energy such as electricity

Keywords: Urban farming, Bandung Gardening, salad hidroponik

Abstrak: Pertanian perkotaan tidak hanya memainkan peran penting dalam menciptakan kota yang berkelanjutan tetapi juga mempengaruhi struktur spasial lanskap perkotaan dan masyarakat. Salah satu kegiatan pertanian perkotaan skala kecil (masyarakat) berupa kebun masyarakat. Di Kota Bandung kegiatan ini digagas oleh komunitas Bandung Gardening. Salah satu program kerja yang dapat dilakukan untuk komunitas berkebun Bandung adalah membuat salad hidroponik. Hidroponik adalah budidaya tanaman dengan menggunakan air tanpa menggunakan tanah. Penelitian ini menggunakan pendekatan kualitatif deskriptif. Hasil penelitian menunjukkan bahwa hidroponik merupakan metode yang efisien dan efektif untuk menghasilkan salad berkualitas tinggi di lingkungan perkotaan seperti Bandung. Pertumbuhan tanaman hidroponik cenderung lebih cepat daripada yang dalam tanah, dengan hasil panen yang lebih tinggi dan kualitas nutrisi yang lebih baik. Keberhasilan teknik hidroponik ini didukung oleh pengurangan penggunaan air dan lahan yang lebih sedikit dibandingkan dengan pertanian tradisional. Sistem hidroponik bekerja dengan memungkinkan kontrol atas kondisi lingkungan, seperti suhu, keseimbangan pH, dan memaksimalkan paparan nutrisi dan air. Meski ditanam di media air, bercocok tanam hidroponik sebenarnya bisa menghemat air. Hal ini dikarenakan air yang digunakan tidak terserap oleh tanah. Air diserap oleh tanaman lebih baik. Pertanian hidroponik juga lebih hemat energi karena dilakukan tanpa energi tak terbarukan seperti listrik.

Kata kunci: Pertanian perkotaan, Bandung Berkebun, salad hidroponik

INTRODUCTION

Urbanization and urban population growth that is difficult to control each year have increased the number of urban residents (Rakuasa et al., 2023). This has led to

changes in land use change for open space into built-up space (Achmadi et al., 2023). Agricultural land conversion occurs due to competition between the agricultural sector and the non-agricultural sector in utilizing land (Wahdah, & Maryono, 2018). In competing land use due to economic and social phenomena, namely population growth, limited land resources, and economic growth (Manakane et al., 2023).

Indirectly, the decreasing agricultural area causes the availability of food in urban areas to decrease, which has an impact on food security issues. In accordance with Government Regulation No. 68 of 2002 concerning food security which states that food security is a condition for meeting food needs for households that can be seen from the availability of adequate food, both in quality and

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quantity, evenly distributed, affordable, and safe (Harding et al., 2022). Over the past few decades, urban farming has developed in urban areas to take advantage of limited land. With the aim of mobilizing urban residents who have minimal land to still be able to carry out agricultural cultivation activities. Urban agriculture is an agricultural activity in or around urban areas with skills, innovation, and expertise in cultivation in managing food by utilizing yards, vacant land to meet nutrition, economic levels and family welfare (Khasanah, 2021). Agricultural activities in urban areas aim to provide food supply for urban areas.

Urban farming is an innovation that was first introduced in the United States to overcome the worsening situation and economic conditions in several countries when vegetable prices soared during the world war. By doing a victory garden, America was able to overcome the food needs of its citizens by up to 40% (Hussain et al., 2020). So urban farming can be one of the many options in addressing household food security in urban areas. One part of urban agriculture used in Indonesia over the past decade is Urban Gardening. Urban Gardening is an activity that utilizes land and home yards for gardening (Mousa et al., 2020).

Bandung is one of the largest cities in Indonesia, and as a big city, it cannot avoid the problems of food security and social disorganization. Many residents around Bandung seek their fortune in this city. The increasing flow of urbanization causes various problems such as unemployment, poverty, malnutrition, overcrowding, increasing food needs, and so on. Bandung can utilize narrow land or abandoned land as Urban Gardening land to increase food security, control the economy and increase biodiversity (Mousa et al., 2020).

Bandung Gardening is one of the innovations developed by community gardening in Bandung. By utilizing home gardens, this community makes hydroponic plant cultivation using water without soil. This can provide an answer to the question of limited land in the Bandung area. The hydroponic method is one of the most feasible in urban areas because planting can be done in every house and yard to realize a healthy and environmentally friendly life. Based on the above background, the purpose of this study is to identify the characteristics of Bandung Gardening which conducts hydroponic salad cultivation as one of the urban agricultural innovations to support urban development in utilizing land conversion.

METHODS

This research uses a descriptive qualitative approach. Qualitative research is a research procedure with descriptive data results in the form of written or oral words (Hamilton & Finley, 2019). Qualitative research aims to analyze the qualities of a study. The type of research used is a literature study which is research that has been carried out previously by collecting books, journals, magazines, and scientific papers that are interrelated with the research problems and objectives.

Literature study is a data collection technique carried out by conducting a study of books or literature related to the problem being solved (Roller, 2019). The literature review database used is by searching on Google Scholar, Scopus, and Google Book. The search was conducted using the keywords urban farming, hydroponics and bandung gardening.

RESULTS AND DISCUSSION

Urban Agriculture for Sustainable Food Security

The Food and Agriculture Organization (FAO) defines urban farming as an industry that produces, processes, and markets agricultural products to meet the daily demands of urban communities using intensive methods that utilize urban resources and waste to produce a variety of crops for the food needs of urban communities (Setiawan et al., 2015). The role of the government is very important to help develop urban farming, one of the efforts made by the government is to establish narrow land as sustainable food agricultural land is to protect and develop consistently to produce staple food for community food independence in accordance with Article 1 of Law Number 41 of 2009 concerning Protection of Sustainable Food Agricultural Land. Urban agriculture can be realized by balancing the management of urban areas which is the responsibility of the government, and the role of residents is very important to form a community that cares and participates in supporting urban agriculture.

Bandung is one of the largest cities in Indonesia, as a big city Bandung cannot avoid the problem of food security and the problem of social disorganization. So the Bandung City government through the Bandung City RPJMD 2018 - 2023 which regulates the spatial plan has a goal in the utilization of green open space, one of which is the profit of space for cultivation functions. The RPJMD emphasizes the role of the government until the Bandung City RTRW to support the achievement of the vision, mission, medium and long-term goals of the city of Bandung. One of the urban farming activities on a small scale is community gardening or Community Garden initiated by Ridwan Kamil. Bandung Gardening is one of the innovations developed by community gardening in Bandung. The community introduced Bandung's gardening style to the public and eventually spread to other cities throughout Indonesia. In its activities there are principles of ecology, economy and education.

Through this community, Bandung City can utilize narrow land or abandoned land as plantation land to increase food security, control the economy and increase biodiversity. This is because agriculture plays an important role in sustainable development. Bandung Gardening started urban farming activities in 2011 by utilizing abandoned land in Bandung so that it becomes productive and invites more people to garden.

Hydroponics

One of the activities carried out by Bandung Gardening is to utilize the garden in the yard of the house, this community makes plant cultivation using water without soil. As an alternative to modern agriculture, hydroponics is a cultivation system by growing plants without using soil and can be done indoors (Hafijah et al., 2019). Besides being able to utilize minimal land, hydroponic plants are environmentally friendly plants. The hydroponic system has many advantages over other planting methods because it will get a much larger harvest than other planting methods.

Hydroponics comes from the Greek word *Hydroponous* which contains two meanings, namely *hydro* which means water and *ponous* which means power. Hydroponics is also known as soilless culture with the understanding of the process of cultivating plants without using soil as a medium (Singgih et al., 2019). So farming with a hydroponic system is a planting technology using water, nutrients and oxygen

because in hydroponic cultivation the need for nutrients must be available in appropriate amounts and easily absorbed by plants. Nutrients come from organic or inorganic materials that will be given in the form of a solution on the surface of the planting media or plant roots.

Plants that can be hydroponized are increasing, ranging from ornamental plants, vegetables and fruit plants. Hydroponics in ornamental plants are philodendron, dracaena, aglonema, and spathyphilum, hydroponic vegetables are peppers, tomatoes, cucumbers, lettuce, mustard greens, kale, beans, broccoli, celery, chili, and spinach, and hydroponic fruit plants are melon, water guava, Bangkok mondong and star fruit. However, research continues to add other types of plants that can be grown using hydroponic systems, both with the use of media, plant types, nutrients, water discharge, and so on. Hydroponic systems have several advantages compared to other farming methods, namely as follows.

- 1) It does not use pesticides or pest drugs that damage the soil so it is environmentally friendly
- 2) Does not require soil and does not require a large area
- 3) To ensure plant growth can be done periodically by checking the roots of the plant.
- 4) More efficient use of water as water application is not done every day.
- 5) Free from pests so that the harvest can be utilized in its entirety including the roots of the plant
- 6) Cost-effective in various aspects ranging from water use, fertilizer use, and land
- 7) Plant quality is maintained so that plant growth becomes faster.
- 8) Do not get problems with plant pests because the planting media used does not use soil.

Vegetables grown with hydroponic growing media will be healthier, this is because the plants receive balanced nutrition. Plants spend less energy searching for water and nutrients so they are much healthier with a wider, crunchier, and more nutritious production compared to soil growing media. So instead of soil, hydroponic plants will usually use sterile media such as sand, gravel, coconut fiber, pumice, or a combination of these media. Media that has a neutral pH condition and the addition of nutrients with the appropriate size in the form of a solution will produce the best quality plants.



Figure 1: Hydroponic Cultivation

Hydroponic Salad

The hydroponic cultivation developed by Bandung Gardening is hydroponic salad. Salad is a word derived from the Latin "herba salata" which means salted or salted vegetables. According to Dwi Djelantik (1999), salads are a variety of mixtures consisting of fresh green vegetables, fruit, poultry, meat, and fish served with dressings or just fresh vegetables and fruit (Nanda et al., 2023).

However, along with the times, salads are only a mixture of fresh vegetables or fruits that are given a sauce. Various types of vegetables grown using a hydroponic system by Bandung Gardening members will then be used as hydroponic salads. The salad will have the best quality because it is much healthier than vegetables grown by other

methods. Salads will be fresher and every part of the vegetable can be utilized without wasting any part because it has good nutritional content through a good planting system. Hydroponic vegetables are vegetables that contain high minerals because they do not require soil as a growing medium. The fresh vegetables are picked directly on the community plantation and then mixed with sauce to produce a salad with fresh quality and proper nutrition.

The implementation of Bandung Gardening has been followed by various RT/RW in Tamansari Bandung through the Urban Farming Village program. The program is carried out by utilizing vertical farming installations. The materials used in vertical farming can be used pipes or bottles. The community plays a very active role in determining the work plan, namely choosing the plants to be planted, seeds, placement of pipes and plant pots. The interest of residents has reached 88.6% who are able to develop potential skills with hydroponic systems. This program has not covered all residents so the government through RT / RW needs to provide assistance and socialization gradually to the community to get involved.

The hydroponic salad activity carried out by Bandung Gardening consists of several factors in the planning process that are not only about technical activities but also cover before implementation (Figure 2). The ability of the community in gardening and the selection of the location used are two very important things to create sustainable urban agriculture. The selection of land can be done by utilizing the narrow land around the house yard, but the ability of residents in gardening will be a consideration because it must be socialized gradually in order to get the appropriate resources. Media selection is based on the availability of available tools and materials with the intention of using existing items with the principle of reuse such as leftover paralon or used bottles (Lukito et al., 2021).

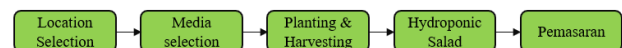


Figure 2. Flow of hydroponic salad activities

Salads with hydroponically grown vegetables and fruits have the added value of being fresher and cleaner because they are picked at the time of consumption. Salad is synonymous with healthy food and spoils quickly so it requires fast and reliable marketing. In marketing, the packaging used will also affect the selling value of the salad (Juliana et al., 2020). This activity was assisted by members of the Bandung Gardening community and family welfare development (PKK) mothers in Tamansari, Bandung. The first activity was carried out by PKK mothers with assistance from the Bandung Gardening community. The first hydroponic salad will be distributed to the surrounding community. The process of community education occurs when marketing products to the surrounding environment (Lukito et al., 2021) with the hope of spreading the same spirit so that later the results of hydroponic gardens will increase and can be marketed with a wider and more profitable market.

Bandung Gardening's hydroponic cultivation activities are able to help sustainable urban agriculture activities although it has not been able to create activities independently (Fauzi et al., 2016). This community must be more critical to reflect its movement behind the many industrialized food systems. The presence of hydroponic cultivation through the Bandung Gardening community is one of the signs of the transition process of the food movement to urban areas that will provide an open opportunity to include food sovereignty in the sustainable development system. Comprehensive policies are needed to

develop urban agriculture to support sustainable development. Some of these policies are as follows.

- 1) Commodity development. It is necessary to develop commodities in order to produce the best agricultural products by utilizing minimal land conditions. A more selective policy is needed, namely hydroponic cultivation which has many advantages compared to cultivation with other planting media so that it is suitable for urban areas
- 2) Marketing or trading. Aiming to meet urban food needs, marketing can be done by establishing cooperative relationships between agricultural activists in urban areas.
- 3) Cooperation between stakeholders. Cooperation and coordination to implement cultivation goes well, starting from the basic level of the RTRW to the government in an effort to develop sustainable urban agriculture.

CONCLUSIONS AND RECOMMENDATION

Hydroponic salad is one of the cultivations carried out by Bandung Gardening by utilizing home yards or narrow land for gardening. Various types of vegetables grown using a hydroponic system are then made into hydroponic salads that have more nutrients contained in the salad. The hydroponic salad is able to improve the economy of the people of Bandung, especially Bandung Gardening members, thus helping to develop a better city. Support from the government and various parties is needed to develop sustainable urban agriculture, especially land policy and market protection. To produce healthy and high-quality products, intensive guidance is needed for residents even in the midst of limited land. Because urban agriculture not only plays a role in improving the household economy but also in regional food security.

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