Hydroponics in Coastal Urban Areas as a Means of Preserving Pancasila Values in Semarang City

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Abstract: *Climate change has become one of the global challenges threatening the survival of living beings on Earth. One of its main causes is the increasing carbon dioxide emissions resulting from human activities. To address this issue, environmentally friendly solutions that can be implemented at the community level are needed as a concrete form of Pancasila value implementation. This study aims to introduce and implement hydroponics as a solution to climate change while simultaneously strengthening the application of Pancasila values through community cooperation in RW 05, Karangayu Subdistrict, Semarang City. A qualitative approach was employed through observations and interviews with residents before and after the socialization and hydroponic practice sessions. The results show an increase in residents' knowledge and awareness of climate change issues, as well as the direct application of hydroponic techniques in their daily lives. The community's enthusiasm and active participation in this program fostered a spirit of collaboration that reflects the practice of Pancasila values. These findings demonstrate that hydroponics can serve not only as an adaptive solution in urban areas but also as a tool for enhancing the implementation of Pancasila in community life. The people showed a strong sense of mutual cooperation by helping one another throughout the hydroponic cultivation process.*

Keywords: *climate change, coastal hydroponics, Spirit of Pancasila*

Abstrak: Perubahan iklim menjadi salah satu tantangan global yang mengancam kelangsungan hidup makhluk hidup di bumi. Salah satu penyebab utamanya adalah peningkatan emisi karbon dioksida dari aktivitas manusia. Untuk mengatasi hal tersebut, dibutuhkan solusi yang ramah lingkungan yang dapat diterapkan di lingkungan masyarakat sebagai bentuk nyata dari penerapan nilai Pancasila. Penelitian ini bertujuan untuk mengenalkan dan mengimplementasikan hidroponik sebagai solusi dalam menghadapi perubahan iklim sekaligus meningkatkan implementasi nilai-nilai Pancasila melalui gotong royong yang dilakukan di RW 05, Kelurahan Karangayu, Kota Semarang. Metode yang digunakan adalah pendekatan kualitatif melalui observasi dan wawancara terhadap warga sebelum dan sesudah dilakukan sosialisasi serta praktik pembuatan hidroponik. Hasil menunjukkan adanya peningkatan pengetahuan dan kesadaran warga terhadap isu perubahan iklim serta penerapan langsung teknik hidroponik dalam kehidupan sehari-hari. Antusiasme dan partisipasi aktif masyarakat dalam program ini menimbulkan semangat kerja sama yang mencerminkan penerapan nilai Pancasila. Temuan ini membuktikan bahwa hidroponik tidak hanya mampu menjadi solusi yang adaptif di wilayah perkotaan, tetapi juga mampu meningkatkan implementasi nilai Pancasila dalam kehidupan

bermasyarakat. Masyarakat memiliki rasa semangat gotong royong dengan saling membantu dalam sepanjang proses menanam hidroponik.

Kata kunci: Perubahan iklim, Hidroponik pesisir, Nilai Pancasila

Introduction

Climate change is becoming increasingly evident and affects various aspects of community life, especially in urban areas. Unpredictable weather, rising temperatures, and declining environmental quality have become serious challenges faced by many major cities in Indonesia, including the city of Semarang. As a coastal city, Semarang faces dual pressures: ecological and social. Pollution, flooding, and the decreasing availability of green open spaces are problems that directly impact residents' quality of life. Several urban villages along the coast have even begun to lose open land that was once used for productive community activities. The demand for food continues to rise, while society's dependence on supplies from outside the region creates vulnerabilities when distribution is disrupted.

Alternative farming systems such as hydroponics have become a relevant solution to these conditions. Hydroponics is a form of urban agriculture that does not require large tracts of land and can be practiced in small yards, rooftops, or unused corners of neighborhoods. Hydroponics is also an environmentally friendly and efficient planting method, as it does not use soil and can produce healthy food products in a relatively short time. According to FAO & RUAF (2022) in Fauzia, et al. (2024), urban agriculture is the process of producing food and other products carried out within urban areas, which can address the growing needs of urban communities. The presence of urban farming such as hydroponics not only serves to meet food needs, but also impacts the ecological and social sustainability of the city. The declining environmental quality and limited green space drive the need for solutions like hydroponics, which can improve air quality, rebuild social interactions, and realize community-based food independence.

Hydroponics is not merely a modern planting technology but also a tangible representation of the practice of Pancasila values in daily life. Pancasila, as the ideology of the Indonesian nation, is not rigid but open, dynamic, and anticipatory of changes over time. The values of Pancasila can be actualized through social actions that are relevant to the current challenges faced by society. In this context, the practice of hydroponics in coastal communities is a concrete form of applying these values, especially mutual cooperation (gotong royong), deliberation, and social justice. Collective farming activities, the sharing of knowledge among residents, and the building of food security together are real manifestations of the spirit of togetherness and social concern taught by Pancasila.

The values of Pancasila are inherently inseparable from the social life of the Indonesian people. As social beings, humans require cooperation and interaction for the sake of shared welfare (Firdasari et al., 2022). Hydroponics, as a community-involving activity, becomes a platform for actualizing these values from tolerance in working together, justice in sharing yields, to collective responsibility in caring for the environment. Thus, hydroponics in the coastal areas of Semarang City not only responds to the challenges of climate change and land limitations but also serves as a medium for reviving the nation's foundational values that remain relevant throughout time.

Research Methods

This study employs a qualitative approach with interviews as the primary data collection technique. The interviews were conducted to explore the understanding, attitudes, and experiences of the community after participating in the socialization activities and the practice of building hydroponic installations. The main informant in this study is a housewife aged between 35 and 50 years old, residing in RW 05, Karangayu Urban Village, West Semarang District, Semarang City. The criteria for selecting the informant include: (1) not having a large yard, (2) showing an interest in gardening activities, and (3) actively participating in the hydroponic socialization activities.

This data collection method is in line with the research conducted by Rabbani (2024), which also used in-depth interviews and observation to obtain data related to the hydroponic community mentoring process. This approach allows the researcher to gain rich and in-depth data regarding the community's perceptions and experiences in implementing hydroponics. Out of 25 socialization participants, the researcher selected five residents as interview samples. The interviews were conducted in person using open-ended questions aimed at exploring changes in perception, interest, and the potential for hydroponic application in the informants' living environment. Documentation in the form of interview notes and photos was used as supporting data. The collected data were analyzed using descriptive qualitative methods to understand the community's understanding and attitudes toward hydroponics as a means of climate change mitigation.

Results and Discussion

Hydroponics is a plant cultivation method that does not use soil as a growing medium and instead utilizes water as the main medium. This method is highly suitable for densely populated areas such as RW 05, Karangayu Urban Village, which faces land limitations. Prior to the socialization activity, most residents already had basic knowledge of hydroponics. However, this understanding was limited to technical aspects and had not yet touched on its broader contributions to environmental issues. The conducted socialization broadened the residents' perspectives, particularly regarding hydroponics' role in

supporting food security and efforts to mitigate climate change. Residents became more open to practicing sustainable agriculture at the household level.

A significant improvement in residents' understanding was observed after participating in educational and field practice activities. Residents began to realize that hydroponics can contribute to carbon emission reduction through the creation of green spaces and more efficient use of resources. The use of recycled materials, such as used plastic bottles and flannel cloth, in hydroponic installations demonstrated the community's ability to adapt the practice to local potential. The technical knowledge acquired was not only absorbed passively but was also directly applied in daily life. Residents understood that hydroponic systems could still function optimally under uncertain climate conditions. This application became a concrete step in building food independence and promoting an environmentally friendly lifestyle.

Follow-up observations over two weeks showed changes in community behavior toward the environment. Residents actively evaluated which hydroponic techniques were most effective, such as transferring plants from used bottle installations to larger reused gallon containers that could hold more seedlings. The community began to show a greater sense of responsibility toward the surrounding environment, including reducing organic waste and utilizing narrow spaces. This project demonstrated that community-based educational approaches can foster active participation in addressing global issues at the local level. These efforts align with the principles of sustainability promoted in Sustainable Development Goal (SDG) 13: Climate Action. This experience proves that simple innovations such as hydroponics can bring about real changes in people's mindsets and behaviors.

The implementation of hydroponics in RW 05 also reflects the practice of Pancasila values, particularly the second and third principles. The second principle, "Just and Civilized Humanity," is evident in the growing awareness among residents of the importance of protecting the environment as a moral responsibility across generations. Residents understood that creating green spaces and reducing carbon emissions are part of civilized behavior toward other living beings. Practicing ecological farming shows empathy and justice for the increasingly threatened condition of the Earth. This awareness was not born from pressure, but from shared understanding built through learning and hands-on practice. The value of humanity became the foundation for sustainable behavioral change.

The third principle, "The Unity of Indonesia," is reflected through the spirit of mutual cooperation (*gotong royong*) and solidarity among residents during the implementation of the activities. The community actively participated in every stage from counseling sessions and installation construction to plant maintenance all carried out collectively. Social relations among residents grew stronger through the interactions established during the process. This spirit of

togetherness strengthened mutual trust and encouraged collaboration in creating a healthy and sustainable environment. The hydroponic project served not only as an educational medium but also as a means to reinforce national identity through collective action. The unity that emerged became an essential foundation for building a resilient community in facing environmental challenges.

Conclusion

The research findings highlight the importance and effectiveness of hydroponic planting techniques for residents in urban areas, particularly in regions with limited land availability. The socialization activities conducted with the community successfully increased public awareness regarding the importance of sustainable agriculture while also implementing Pancasila values in real-life practice. The learning process managed to enhance residents' understanding from a basic level to a more comprehensive one, covering technical aspects, advantages, and hydroponics' contribution to addressing climate change. The active involvement of the community in this program not only supported the success of the activities but also served as a tangible reflection of Pancasila implementation through a culture of cooperation and an inclusive approach involving all layers of society. These findings reinforce hydroponics' position as an appropriate alternative for land-constrained urban areas such as Semarang.

This socialization activity functioned not only as a medium for delivering information but also as a means to strengthen the social relationships among residents based on Pancasila values. Together with the community, the author succeeded in applying several Pancasila principles, particularly the second and third. The second principle of Pancasila, "Just and Civilized Humanity," was reflected in residents' awareness of the importance of environmental preservation as a moral responsibility across generations. They realized that creating green spaces and reducing carbon emissions are forms of civilized behavior toward other living beings. Hydroponic farming practices also demonstrated justice and empathy for the increasingly damaged Earth. This awareness emerged naturally through the shared learning process, making humanitarian values the foundation for sustainable behavioral change.

Meanwhile, the third principle, "The Unity of Indonesia," was evident in the spirit of mutual cooperation (*gotong royong*) and solidarity among residents throughout each phase of the socialization activity from counseling and installation building to plant maintenance. These interactions strengthened social ties, built trust, and encouraged collaboration to create a sustainable environment. The hydroponic project served not only as an educational tool but also as a medium for reinforcing national identity through collective work, thus forming a unity that became an essential foundation for jointly facing environmental challenges.

This study has several limitations, particularly in the number of respondents, which was not yet ideal, and the relatively short observation period, so the data obtained regarding hydroponic plant growth and changes in community behavior were not yet optimal. Future research should expand the study area, extend the observation period, and improve environmental impact measurement systems. Continuous assistance is also crucial to ensure the program's sustainability. Further studies should not only focus on technical aspects but also analyze the social and environmental impacts in depth, thereby demonstrating the dual role of hydroponics as both a climate change solution and a medium for reinforcing Pancasila values, especially the second and third principles. With a comprehensive approach, hydroponics can evolve into a sustainable innovation that is relevant to the needs of urban areas in Indonesia.

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