URBAN FARMING: HARVESTING THE FUTURE AS CAPITAL FOR FINDING A PARTNER

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Abstrak: The influence of digital technology has made many young people less motivated to work. However, the role of the younger generation, particularly Generation Z, in adopting technology in the concept of urban farming could provide an innovative solution to food security in Indonesia, despite concerns about the negative impact of digitalization on their work ethic. This study aims to examine the efforts of the younger generation in utilizing digital technology to develop urban farming as an innovative solution to the challenges of urbanization, limited agricultural land, and the growing need for future food security. The research uses a literature-based approach with qualitative analysis to explore the potential and role of the younger generation in advancing urban farming as a solution for food security in Indonesia, based on relevant secondary data sources related to urban farming, agricultural digitalization, and the role of the younger generation. The findings of the study indicate that urban farming, which utilizes limited urban land supported by technology, not only addresses food security challenges but also creates sustainable new business opportunities. This positions the younger generation as a driving force for change, capable of harvesting the future by creating environmentally friendly agricultural solutions and boosting the local economy.

INTRODUCTION

The role of the younger generation in agricultural development is crucial, not only because young people are the future heirs of the nation's ideals, but also because, without their potential and creativity, agricultural development could lose its direction. Amid the high expectations for the younger generation's role in agricultural development, concerns have arisen that digitalization may negatively impact their work ethic. This is reflected in numerous reports indicating that young people, particularly Generation Z, are often seen as less productive and more inclined to idleness due to excessive focus on gadgets.

Recently, many reports have emerged highlighting the negative effects of digitalization on youth. Many young people are perceived as lazy, spending too much time on their gadgets.

According to a report from netralnews.com, Generation Z (Gen Z) has been criticized for having a lower work ethic compared to previous generations, sparking debates on social media platforms, especially on X (formerly Twitter). Some posts claim that Gen Z is considered lazy and less resilient under work pressure, leading to disagreements among netizens. Some criticize this generation as "soft" in the workplace, while others appreciate their openness and directness in expressing their desires and needs. Gen Z, individuals born between 1997 and 2012 and aged 11 to 26 years in 2023, is often compared to the millennial generation (Gen Y), born between 1981 and 1996. These debates reflect diverse views on the changing work patterns and values held by the younger generation in the modern era.

In contrast to Indonesia, many young people in Japan have successfully developed innovative agricultural techniques that utilize a transparent, porous polymer membrane originally designed for kidney dialysis. This membrane allows plants to grow more efficiently by storing fluids and nutrients optimally while using up to 90% less water compared to traditional farming methods. Furthermore, this technique does not require the use of pesticides, as the polymer membrane can inhibit viruses and bacteria. This patented invention, by the company Mebiol and recognized in nearly 120 countries, exemplifies Japan's agricultural revolution, focusing on optimizing technologies such as artificial intelligence (AI) and the Internet of Things (IoT) to address land and human resource limitations. Through this approach, Japan seeks to improve food production efficiency while addressing global challenges, including environmental damage and the water crisis, which are projected to significantly impact 40% of grain production and 45% of global GDP by 2050, according to the latest UN report.

In Japan, young people have embraced technological advancements to offer innovative solutions in the agricultural sector. Unlike the concerns about digitalization's negative effects on the work ethic of the younger generation in Indonesia, Japanese youth demonstrate how technology can be optimized to support sustainability and efficiency in agriculture, which is vital for global food security.

Innovative approaches, such as those implemented in Japan, can also inspire other agricultural concepts relevant to urban life, such as urban farming. Unlike conventional agriculture, urban farming focuses on urban communities as the main actors and utilizes planting media suitable for urban environments, making it a viable solution for food security in the face of limited land and resources.

Urban farming is a concept that shifts conventional agriculture into urban areas, differing primarily in the actors involved and the planting media used. While conventional farming focuses on production outcomes, urban farming centers on the urban community as the main participant. Urban farming involves the cultivation, processing, and distribution of food within or around cities and can include livestock, aquaculture, agroforestry, and horticulture.

Urban farming is highly feasible for the younger generation, who possess great potential to lead its development. Young people, particularly Gen Z and millennials, have advantages in accessing technology and innovation, such as the use of IoT, hydroponic systems, or plant monitoring applications to improve efficiency. Additionally, their creativity in utilizing limited space in urban areas, such as rooftops or vertical walls, supports the implementation of urban farming in alignment with modern lifestyles prioritizing sustainability and healthy food consumption. The younger generation also has the ability to build communities and collaborate, allowing for the collective implementation of urban farming through community-based programs, providing both social and economic benefits. Their awareness of environmental conservation motivates them further, as urban farming can reduce carbon footprints and increase greenery in cities. Furthermore, entrepreneurial opportunities, such as selling organic produce or offering training services, make urban farming an attractive field for young people with a spirit of innovation and entrepreneurship. With adequate education, training, and access to resources, the younger generation can play a key role in developing urban farming as a solution for future food security.

While the younger generation plays a strategic role in agricultural development, numerous studies show that digitalization often has a negative impact on their work ethic, particularly in Indonesia. Gen Z is frequently criticized for being less productive and less resilient to work pressure, potentially hindering innovation in the agricultural sector. In contrast, in developed countries like Japan, young people have managed to harness technology to support sustainable agriculture, even amidst resource limitations. However, research connecting the potential of the younger generation, technology, and urban farming concepts as a solution for future agriculture is still limited, particularly in the context of urbanization in Indonesia.

With the growing urbanization and the decreasing availability of agricultural land in Indonesia, urban farming becomes an urgent solution to ensure national food security. Moreover, it is crucial to integrate the role of the younger generation so they can utilize technology positively, thus driving the transformation of the agricultural sector to be more

adaptive to modern challenges. This research is also relevant in addressing the projected global food crisis due to environmental damage and resource limitations.

This research introduces a new approach to examining how urban farming can be adapted by the younger generation in Indonesia to address challenges in the agricultural sector. By combining modern technology with urbanization principles, this study will explore the potential of urban farming as an innovative solution that not only increases agricultural productivity but also strengthens the role of the younger generation in the development of sustainable agriculture.

RESEARCH METHODS

This study uses a literature review approach, aiming to examine the potential and role of the younger generation in developing urban farming as a solution to the challenges of food security, particularly in Indonesia. In this study, the data and information collected come from relevant secondary sources, such as books, scientific articles, research reports, academic journals, and other publications discussing related topics, including urban farming, digitalization in agriculture, the role of the younger generation in agricultural development, and the technologies applied in the agricultural sector. The analysis in this study is conducted using a qualitative approach, aimed at identifying and critiquing various ideas, theories, and practices related to urban farming and the role of the younger generation within it. The data sources used will be analyzed in-depth to understand the relationship between the development of digital technology, the role of the younger generation in agricultural development, and the potential of urban farming in creating sustainable food security.

RESULTS AND DISCUSSION

Urban farming is an agricultural method in urban areas that does not rely on land for cultivating vegetables and fruits. As an industry, urban farming has two main perspectives: resource management and economics. The optimization of resource use (water, land, labor, infrastructure) is essential to ensure optimal economic benefits. Technical innovations that need to be provided include the availability of high-value, economically viable plant varieties; irrigation and fertilization systems; eco-friendly pest control innovations; bio-intensive cultivation systems (e.g., integration of fish/livestock with plants through aquaponics, intercropping, crop rotation); innovations in waste management to convert organic waste into growing media, fertilizers, and animal feed; the use of wastewater for irrigation; land-saving

cultivation systems (vertical farming, aquaponics, hydroponics, etc.); and innovations in independent seed production to address space limitations and zoonotic diseases in livestock, such as integrated rabbit and vegetable farming, among others.

Urban farming in urban areas can be carried out by utilizing narrow or limited spaces available, such as building rooftops, vertical walls, balconies, or small yards. One popular method is hydroponics, where plants are grown without soil but instead in a nutrient solution that flows through specific media like rock wool or gravel. Additionally, vertical farming techniques allow plants to be grown in layers to save space while improving efficiency. The use of technologies like the Internet of Things (IoT) can also be implemented to automatically monitor moisture, temperature, and the nutritional needs of plants. Urban farming is not limited to growing vegetables; communities can also develop aquaponics, which combines fish farming and plant cultivation in a mutually supportive ecosystem. To support sustainability, the use of kitchen waste as compost and the recycling of water systems can be applied. In addition to providing fresh food, urban farming offers social benefits, such as strengthening communities through collaborative projects, as well as environmental benefits like urban greening and reduced carbon footprints.

To start urban farming in urban areas, the first step is to identify a suitable location, such as a building rooftop, balcony, or empty area around the house. The location must receive at least 4–6 hours of sunlight per day for optimal plant growth. Once the location is determined, the next step is to choose the appropriate planting method based on space and needs. For instance, the hydroponic system is suitable for limited spaces since it does not require soil and allows for more efficient nutrient control. If vertical space is available, vertical farming techniques can be applied using tiered racks or walls with plant pots. Next, prepare growing media like rock wool, cocopeat, or gravel, as well as a simple irrigation system to consistently deliver water and nutrients to the plants.

The next step is to choose the types of plants that are suitable for the urban environment, such as leafy vegetables, herbs, or small fruits like cherry tomatoes and strawberries. It is also essential to use organic fertilizers or compost made from kitchen waste to support sustainability. Regular monitoring of the plants' water, nutrition, and protection from pests should be carried out, either manually or with the help of technologies such as IoT sensors. In addition, the management of waste from harvests or leftover plants must be considered to ensure that the urban farming process does not negatively impact the surrounding environment. With these

steps, urban farming can offer benefits not only in providing fresh food but also in creating greener, more sustainable urban environments.

A young person in an urban area can start urban farming by utilizing available spaces, such as a home yard, building rooftop, or even an apartment balcony. The first step is to determine which plants are suitable for the environment, such as leafy vegetables, herbs, or easy-to-care-for ornamental plants. With the help of simple technologies like hydroponic pots or vertical systems, this young person can optimize small spaces to produce productive plants. Additionally, they can use smart farming apps to monitor the plants' needs, such as moisture, lighting, and nutrients. Social media also becomes an important tool for learning from other urban farming communities, sharing experiences, and marketing the harvest. With little capital, creativity, and a willingness to learn, urban farming becomes not only a way to produce healthy food in urban areas but also a concrete step toward a more sustainable lifestyle. Urban farming also offers promising business opportunities for the younger generation. Selling produce through e-commerce platforms, developing processed products, and providing consultation or installation services for urban farming systems are new business fields that are not only economically profitable but also contribute to environmental sustainability. The long-term impact of urban farming includes strengthening national food security, reducing the impact of climate change through urban greening, and boosting the local economy. With all the potential and opportunities available, Generation Z can be a driving force for change, bringing urban farming as a sustainable future solution.

With the increase in urbanization and changes in consumption patterns, the younger generation in Indonesia, particularly Generation Z, can take advantage of urban farming as a solution for food security. With digital technology, they can not only optimize farming processes but also market their harvests through e-commerce platforms, develop processed products, and even provide consultation or installation services for urban farming systems for other communities. Selling produce online or through smart farming apps allows them to reach a broader market, introduce sustainable urban farming concepts, and create new business opportunities that support the local economy.

Moreover, urban farming can contribute to reducing carbon footprints and strengthening national food security. By utilizing limited urban spaces, the younger generation can create more efficient and environmentally friendly farming solutions. The use of technology also enables improved agricultural production efficiency, which in turn can reduce dependence on external food supplies, while supporting more local food security.

Ultimately, urban farming is not just about producing food but also creating a more sustainable lifestyle. Generation Z can be a driving force for change in facing urbanization challenges, introducing more efficient and eco-friendly farming models, and building a digital ecosystem that supports sustainable urban agriculture. By integrating digital technology, urban farming not only provides solutions to space limitations and food security but also opens up sustainable business opportunities, supports the local economy, and strengthens environmental sustainability for the future.

CONCLUSIONS AND RECOMMENDATION

Urban farming, as a form of urban agriculture that utilizes technology and innovation to optimize the use of limited space, is an initiative that not only focuses on meeting food needs amid rapid urbanization but also opens up opportunities for the younger generation to create economically beneficial and environmentally friendly sustainable solutions. By leveraging technologies such as hydroponics, vertical farming, and aquaponics, along with the use of organic waste and efficient irrigation systems, urban farming offers a new approach to strengthening food security, reducing carbon footprints, and creating job opportunities. For Generation Z, urban farming is a way to "harvest the future" in a greener, more self-sufficient, and sustainable manner, where every step taken in urban food cultivation can directly contribute to environmental improvement and the local economy.

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