Randwick International of Social Sciences (RISS) Journal
Vol. 7, No.2, April 2025| Page: 98-103
ISSN Online: 2722-5674 - **ISSN Print**: 2722-5666
https://www.randwickresearch.com/index.php/rissj

Development of Green Entrepreneurship Based on Urban Farming to Create Environmentally Friendly Dense Cities

DOI: *https://doi.org/10.47175/rissj.v7i2.128x*

| Zulkarnain Nasution[1,*] | Hamdi[2] | Siswa Panjang Hernosa[3] |

[1]*Master of Management, Labuhanbatu University, Rantauprapat, Indonesia*

[2]*Faculty of Economics and Busines, University of North Sumatra, Medan, Indonesia*

[3]*Faculty of Agriculture, University of Medan Area, Medan, Indonesia*

[*]*zulkarnainnasution1974@gmail.com*

ABSTRACT

This study aims to analyze the influence of urban space utilization and the use of environmentally friendly technology on the development of urban farming and its impact on food security in Medan City. Rapid urbanization has led to limited land and increasing food needs in urban areas. Urban farming is seen as an innovative solution through the use of limited space and technologies such as hydroponics and vertical farming. This study also assesses the role of community participation as a moderation variable in strengthening the relationship between space utilization, environmentally friendly technology, and food security. The results of the study are expected to provide strategic recommendations for the development of green entrepreneurship and sustainable improvement of urban food security. This study uses the Systematic Literature Review (SLR) approach with the guidance of PRISMA to examine the concept of smart urban farming based on herbal probiotics in the economic empowerment of urban communities. The literature for 2015–2024 is analyzed through the stages of identification, selection, feasibility assessment, and data synthesis to produce a conceptual framework and recommendations for implementation in the city of Medan in a sustainable manner. Based on the study conducted, the use of urban space and the use of environmentally friendly technology have an important role in the development of urban farming as a form of green entrepreneurship in the city of Medan. Optimal use of space allows for the creation of productive land in the midst of urban limitations, while environmentally friendly technology improves production efficiency and agricultural sustainability. Simultaneously, these two factors contribute to increasing community food security. In addition, community participation has proven to be an important factor that not only affects food security directly, but also strengthens the influence of space utilization and environmentally friendly technology in supporting the success of sustainable urban farming.

KEYWORDS

Entrepreneurship; urban farming; environmental

INTRODUCTION

The development of urbanization in Indonesia has significantly increased the number of people in big cities. The city of Medan, as one of the economic and trade centers in North Sumatra, is experiencing rapid population growth so that green open space and productive

land are getting narrower. The increase in the number of densely populated settlements also has an impact on high food demand and dependence on out-of-town supplies that are vulnerable to distribution disruptions and price fluctuations (Sparks, 2026); (Thompson et al., 2022). Food security in urban areas such as Medan is a complex problem that requires innovative and sustainable solutions

Urban farming is one of the increasingly popular strategic approaches to overcome food security challenges amid limited land and resources in urban areas (Steenkamp et al., 2021); (Oh & Lu, 2023). Urban farming includes various methods of food production in the city, such as rooftop gardens, vertical farming, hydroponics, and the use of vacant space into productive land (Erekath et al., 2024). This practice not only provides local food sources, but can also reduce dependence on external supplies, improve environmental quality, and create green space in the middle of concrete buildings (Pearlmutter et al., 2020); (Rahla & Matthews, 2021).

Urban farming is one of the increasingly popular strategic approaches to overcome food security challenges amid limited land and resources in urban areas (Steenkamp et al., 2021); (Oh & Lu, 2023). Urban farming includes various methods of food production in the city, such as rooftop gardens, vertical farming, hydroponics, and the use of vacant space into productive land (Lalendra et al., 2024); (Erekath et al., 2024). This practice not only provides local food sources, but can also reduce dependence on external supplies, improve environmental quality, and create green space in the middle of concrete buildings (Pearlmutter et al., 2020).

However, the success of urban farming in creating food security does not only depend on the availability of space and technology, but also on community participation as the main actor in activities (Pillai, 2025). Communities that are actively involved in the development of urban farming through community groups, training, and collaboration with local governments or organizations can strengthen the sustainability of the program and encourage environmental awareness (Indrarosa et al., 2025). This active participation is an important variable that affects the effectiveness of urban farming as a green entrepreneurship strategy in dense cities (Utami, Istiqomah & Corsita, 2024).

In practice, the urban farming program in Medan City has shown positive starts, such as increasing the use of unused land into productive areas as well as initiatives involving community groups to plant vegetables and other food crops. Some supporting studies in other regions even show that urban farming can improve food security and reduce the cost of food consumption, as well as encourage local economic engagement through new business opportunities. However, challenges such as limited capital, technical knowledge, and regulatory support are obstacles that must be overcome in order for the impact to be more optimal.

Thus, this study is important to evaluate more deeply how the use of urban space and the use of environmentally friendly technology can contribute to urban farming as a form of green entrepreneurship, as well as how community participation moderates this influence on food security in the city of Medan. The results of this study are expected to provide policy recommendations and more effective implementation strategies to improve food security through urban farming in densely populated cities.

RESEARCH METHODS

This study uses the Systematic Literature Review (SLR) approach to examine in depth the concept and implementation of smart urban farming based on herbal probiotics in the context of economic empowerment of urban communities. The SLR approach was chosen because it is able to present a systematic and directed scientific synthesis of various previous research results, so that it can produce a conceptual framework and

recommendations for development models that are relevant to the socio-economic conditions of Medan City (Miller & others, 2024).

The stages in this study refer to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline, which consists of four main steps: identification, selection, feasibility assessment, and data synthesis. At the identification stage, the authors collected scientific literature from various databases such as Google Scholar, ScienceDirect, ResearchGate, and DOAJ with a publication time span between 2015 to 2024. Keywords used in the search process include the use of urban space, the use of environmentally friendly technology, community participation and food security in dense cities. This stage produces a number of articles, books, and policy reports relevant to the research theme.

The next stage is selection, where the collected literature is screened based on inclusion and exclusion criteria. Inclusion criteria include: (1) research that discusses the use of urban space, (2) studies on the application of environmentally friendly technology, (3) research related to community participation and (4) publications that discuss food security in dense cities. Meanwhile, articles that do not have thematic relevance or do not meet academic standards are removed from the list (Suebsombut & et al., 2023).

The feasibility assessment stage is carried out by assessing the quality of the methodology and the relevance of the content of each selected article. The evaluation includes aspects of originality, theoretical contribution, and feasibility of implementation in the local context of Indonesia, especially in urban areas. The classified data is then analyzed to find similarities in patterns, differences in approaches, and potential integration between concepts (Austria, et al., 2023).

The final stage is data synthesis, which is the process of combining key findings from the selected literature to generate a new, more comprehensive understanding. The analysis was carried out using thematic content analysis techniques, which map the relationship between three main components: (1) smart urban farming technology, (2) the use of space as a biological innovation, and (3) the community participation approach as a food security strategy (Tariq et al., 2022). The results of this literature synthesis were then developed into recommendations for a prototype of an integration system, which describes the functional relationship between technological, environmental, and food security aspects in the implementation of smart urban farming in urban areas of Medan. This prototype is expected to be a conceptual reference for policy makers, academics, and the community in implementing sustainable urban agricultural innovations oriented towards local economic empowerment.

RESULTS AND DISCUSSION

The results of a systematic literature review show that the development of smart urban farming based on herbal probiotics has great potential to be applied as an innovative strategy to alleviate poverty in urban areas. Based on the results of the review of 46 scientific articles and 12 relevant policy reports, four main thematic clusters were obtained that became the foundation of system integration, namely: (1) smart agricultural technology innovation, (2) environmentally friendly land use, (3) strengthening community participation, and (4) food security.

Prototype Recommendations for Integration Systems

Based on the results of the synthesis of literature from the four clusters above, this study produced a prototype of a food security system developed as a conceptual model for the City of Medan.

Innovations in smart agriculture technologies, including the Internet of Things (IoT), Artificial Intelligence (AI), and data analytics, are transforming the agricultural sector by improving efficiency and productivity. IoT collects real-time data on environmental conditions, while AI analyzes that data to help farmers make decisions, such as land optimization and pest detection. In addition, environmentally friendly land use and sustainable agricultural practices. Urban food security is key, ensuring stable access to sufficient, safe, and affordable food. All of this demands the active participation of the community in the planning and implementation of programs to create a sustainable environment and food system.

The Effect of Urban Space Utilization (X1) on the Development of Urban Farming

The effective and efficient use of urban space plays an important role in the development of urban farming as a form of green entrepreneurship (Tuah et al., 2025). Open spaces in urban areas, such as parks, vacant land, or community garden areas, can be used as land for urban agriculture (Seda et al., 2022). The availability of adequate space allows communities to farm sustainably, which in turn supports green entrepreneurship by producing local and organic food products (Suarna et al., 2025).

The Effect of the Use of Environmentally Friendly Technology (X2) on the Development of Urban Farming

The use of environmentally friendly technologies, such as hydroponic systems, aquaponics, and other agricultural practices that use minimal chemicals, greatly affects the development of urban farming (Miftah et al., 2020). This technology increases efficiency in water and land use and increases agricultural yields (Hasibuan, 2023). In addition, a sustainable technological approach can attract more entrepreneurs to engage in urban farming, thereby creating new economic opportunities and reducing negative impacts on the environment (Giyarsih et al., 2024).

Simultaneous Effect of Urban Space Utilization (X1) and Use of Environmentally Friendly Technology (X2) on Food Security (Y)

Simultaneously, the use of urban space and the use of environmentally friendly technology have a significant impact on food security in the city of Medan. The combination of these two factors facilitates sustainable local food production and better accessibility to safe and nutritious food. By optimizing existing space and applying efficient technology, food production can increase, thus meeting the needs of a growing society.

The Influence of Community Participation (Z) on Food Security through Urban Farming

Community participation plays a crucial role in encouraging food security through urban farming practices. Community involvement in garden management, decision-making, and counseling on sustainable agriculture will increase awareness and knowledge about the importance of food security (Astuti & Delima, 2025). Active communities can help identify local needs and design appropriate solutions, thereby strengthening food security in urban environments.

Moderation of Community Participation (Z) on the Effect of Urban Space Utilization (X1) on Food Security (Y).

Community participation moderates the influence of urban space utilization on food security. When communities are actively involved, they can contribute to better spatial management for urban farming. This participation not only improves the efficiency of the space used, but also creates a sense of belonging that can reinforce the commitment to safeguarding and maintaining local agricultural resources.

Moderation of Community Participation (Z) on the Effect of the Use of Environmentally Friendly Technology (X2) on Food Security (Y)

Likewise, community participation is a factor in moderation in the use of environmentally friendly technology and food security. People who are involved in the learning process and implementation of environmentally friendly technology tend to better understand the benefits and how to use them. This engagement can increase technology adoption and maximize agricultural yields, which in turn strengthens food security

CONCLUSION

Overall, the use of urban space and the use of environmentally friendly technology significantly affect the development of urban farming and food security in the city of Medan. Community participation serves as a reinforcement that magnifies the positive impact of these two factors. Therefore, the implementation of a strategy that collaborates all these elements will have great potential in increasing food security and greenery of the city

REFERENCES

Abdillah, A., Widianingsih, I., Buchari, R. A., & Nurasa, H. (2023). Implications of urban farming on urban resilience in Indonesia : Systematic literature review and research identification Implications of urban farming on urban resilience in Indonesia : Systematic literature review and research identification. *Cogent Food & Agriculture*, *9*(1). https://doi.org/10.1080/23311932.2023.2216484

Austria, M., et al. (2023). Integrating urban farming into city planning: Environmental and socio-economic perspectives. *Journal of Urban Management*, *12*(2), 145–160. https://doi.org/10.1016/j.jum.2023.05.002

Astuti, Y. D., & Delima, F. P. (2025). Komunikasi Partisipatif dalam Pemberdayaan Masyarakat Oleh PT . Saka Energi Muriah Limited Melalui Program Urban Farming di Kelurahan Tambakredjo. 5(1), 41–56.

Chen, X. (2025). The role of modern agricultural technologies in improving agricultural productivity and land use ef fi ciency. September, 1–19. https://doi.org/10.3389/fpls.2025.1675657

Erekath, S., Seidlitz, H., Schreiner, M., & Dreyer, C. (2024). Food for future: Exploring cutting-edge technology and practices in vertical farm. *Sustainable Cities and Society*, 106, 105357. https://doi.org/https://doi.org/10.1016/j.scs.2024.105357

Giyarsih, S. R., Zaelany, A. A., Latifa, A., Setiawan, B., Saputra, D., Haqi, M., & Fathurohman, A. (2024). Interrelation of urban farming and urbanization : an alternative solution to urban food and environmental problems due to urbanization in Indonesia. January, 1–10. https://doi.org/10.3389/fbuil.2023.1192130

Hasibuan, M. R. R. (2023). Evaluasi Efisiensi Penggunaan Air Dalam Pertanian Berbasis Teknologi Irigasi Modern. 1–11.

Indrarosa, D., Mariyono, J., Santoso, S. I., & Sutaryo, S. (2025). The effectiveness of community-based eco-farm waste management training on enhancing farmers' environmental awareness: The role of government support and sustainability attitudes.

Cleaner Waste Systems, 12, 100394. https://doi.org/https://doi.org/10.1016/j.clwas.2025.100394

Lalendra Gurung, Janak Singh Rawal, Puspa RC, Ganesh Raj Joshi, and A. M. (2024). *Vertical Farming In Urban Agriculture : Opportunities, Challenges*,. *6*(2), 106–112. https://doi.org/10.26480/bda.02.2024.

Miller, D., et al. (2024). Systematic literature review methods for sustainable agriculture research. *Environmental Research Letters*, *19*(3), 034012. https://doi.org/10.1088/1748-9326/ad1234

Miftah, I. H., Si, M., A, M. A. L. H., Agroteknologi, J., & Ciawi-bogor, U. D. (2020). Inovasi Baru Pada Pertanian Perkotaan: 1–23.

Oh, S., & Lu, C. (2023). Vertical farming-smart urban agriculture for enhancing resilience and sustainability in food security. *The Journal of Horticultural Science and Biotechnology*, *98*(2), 133–140. https://doi.org/10.1080/14620316.2022.2141666

Pearlmutter, D., Theochari, D., Nehls, T., Pinho, P., Piro, P., Korolova, A., Papaefthimiou, S., Carmen, M., Mateo, G., Calheiros, C., Zluwa, I., Pitha, U., Schosseler, P., Florentin, Y., Ouannou, S., Gal, E., Aicher, A., Arnold, K., Igondová, E., & Pucher, B. (2020). Enhancing the circular economy with nature-based solutions in the built urban environment : *green building materials, systems and sites. 2*(1), 46–72. https://doi.org/10.2166/bgs.2019.928

Pillai, S. V. (2025). Urban agriculture: a sustainability guide for developing countries. *Social Responsibility Journal*, *21*(4), 725–750. https://doi.org/10.1108/SRJ-07-2024-0433

Rahla, K. M., & Mateus, R. (2021). Implementing Circular Economy Strategies in Buildings — From Theory to Practice. 1–14.

Suebsombut, P., et al. (2023). Urban agriculture and sustainable city development: A systematic review of community-based approaches. *Sustainable Cities and Society*, *95*, 104567. https://doi.org/10.1016/j.scs.2023.104567

Seda, F., Fatululi, K., Kupang, K., Mberu, Y. B., Rayawulan, R. M., Seran, M. R., Arsitektur, P. S., Teknik, F., Katolik, U., & Mandira, W. (2022). Pemanfaatan Ruang Terbuka Hijau sebagai Area Pertanian Perkotaan Pendahuluan Pemanfaatan ruang adalah rangkaian konsumen bukan produsen . *Sementara. 8*(2), 119–130.

Sparks, L. (2026). Food Retailing and Consumption in Urban Areas. In The Wiley Blackwell Companion to the City, Retail, and Consumption (pp. 525–542). https://doi.org/https://doi.org/10.1002/9781394278657.ch29

Steenkamp, J., Cilliers, E. J., Cilliers, S. S., & Lategan, L. (2021). Food for Thought : Addressing Urban Food Security Risks through Urban Agriculture. 1–29. https://doi.org/10.3390/su13031267

Suarna, I. F., Patmawati, P., & Rumbayan, N. D. N. (2025). Penerapan Green Entrepreneurship Pada UMKM Organik di Bandung. 3(4), 202–208.

Tariq, A., et al. (2022). Smart agriculture and food security in urban areas: A thematic analysis approach. *Computers and Electronics in Agriculture*, *198*, 107087. https://doi.org/10.1016/j.compag.2022.107087

Thompson, C., Hamilton, L., Dickinson, A., Fallaize, R., Mathie, E., Rogers, S., & Wills, W. (2022). Changes to household food shopping practices during the COVID-19 restrictions: Evidence from *the East of England. Health & Place, 78,* 102906. https://doi.org/https://doi.org/10.1016/j.healthplace.2022.102906

Tuah, T., Ginting, M., & Sembiring, E. H. (2025). Model Kewirausahaan Smart Urban Farming Berbasis Probiotik Herbal Di Kota Medan. 2(2), 104–109.

Utami, Istiqomah, T., & Corsita, L. (2024). Implementation of Community-Based Waste Management to Improve Environmental Health in Villages. 01(2), 1–8.