

Green Entrepreneurs' Role in Food Security within the Green Economy in the Deli Serdang Case

Bunga Aditi^{1*}, Suginam², Cia Cai Cen³

^{1,2}Faculty of Economics and Business, Universitas Harapan, Medan, North Sumatra, Indonesia.

³Department of Management, Sekolah Tinggi Ilmu Ekonomi Bina Karya, Tebing Tinggi, North Sumatra, Indonesia.

*E-mail Corresponding Author: Email: bunga.aditi16@gmail.com

Abstract

This study aims to examine the role of green entrepreneurs in promoting food security based on a green economy in Deli Serdang Regency. Food security is a strategic national issue requiring innovative and sustainable approaches, especially in the face of climate change, environmental degradation, and socio-economic dynamics. Green entrepreneurship is considered an alternative solution that not only focuses on profit but also integrates ecological and social values into its business practices. This research employs a descriptive qualitative approach through a case study of several green entrepreneurs engaged in organic agriculture and the use of home gardens. The findings indicate that green entrepreneurs play a crucial role in community education, increasing access to healthy food, and promoting sustainable, community-based farming practices. Strategies employed include environmentally friendly product innovation, the integration of appropriate technology, and collaboration with local farmer groups. The study concludes that green entrepreneurship makes a tangible contribution to strengthening local food security and supports the transition toward an inclusive and sustainable green economy. The limitation of this research lies in its narrow geographical scope, suggesting the need for further studies across broader regions.

Keywords: Green Entrepreneur; Food Security; Green Economy; Sustainable Agriculture; Deli Serdang

I. INTRODUCTION

Background

Food security is a strategic issue of global concern, including in Indonesia, as it relates to the fulfillment of the basic human right to sufficient, nutritious, and sustainable food (Chaudhary, Gustafson, & Mathys, 2018). Deli Serdang Regency, as one of the regions with considerable agricultural potential, faces various challenges such as climate change, environmental degradation, population growth, as well as limitations in technological innovation and resource management. To address these challenges, the concepts of Green Entrepreneurship and Green Economy are being considered as strategies capable of supporting sustainable food security (Sele & Mukundi, 2023).

Food security encompasses dimensions of availability, accessibility, price stability, and the consumption of nutritious and safe food (Godfray et al., 2010). In this context, factors such as production efficiency, environmental sustainability, technological access, and distribution stability play crucial roles. Green Entrepreneurship refers to entrepreneurs developing businesses with environmentally friendly approaches, while Green Economy emphasizes efficient resource utilization and the reduction of negative environmental impacts (Nwachukwu, 2023; Sklavos, Duquenne, & Theodossiou, 2022). These two concepts are

interconnected and serve as strategic solutions for creating resilient food systems amid global changes. The transformation toward green agriculture through the use of renewable energy, organic fertilizers, and digital technologies has been proven to enhance business efficiency and reduce environmental pressures (Rabbi, Hasan, & Kovács, 2021). Meanwhile, the Green Economy fosters an ecosystem that supports the emergence and growth of Green Entrepreneurs in the food and beverage sector (Neema & Kalitanyi, 2023). This approach encourages the integration of green innovation and environmentally friendly investments, ultimately strengthening food security from upstream to downstream (Ene, Voica, & Panait, 2019).

Green agricultural practices in Deli Serdang Regency have shown positive developments. Data from 2018–2024 indicate that food production and access in the region have increased (Central Bureau of Statistics of Deli Serdang Regency, 2023). However, dependence on conventional farming methods that rely heavily on chemical inputs remains high. This reflects a gap between production growth and environmental sustainability, which should ideally progress in tandem. Furthermore, food distribution remains vulnerable to external disruptions, such as the COVID-19 pandemic, which significantly affected global and regional supply chains.

A preliminary survey conducted on 30 farm owners in Deli Serdang revealed that 60% of farmers have implemented green innovations, while 40% still rely on conventional agricultural methods. Interestingly, 66.7% of farmers who adopted green approaches reported that their businesses became more efficient and sustainable. However, only 50% of them stated that these approaches had a significant impact on food security. This suggests that while the adoption of green innovations has begun, it has not yet fully yielded optimal results. Barriers include limited access to green technologies and inconsistent policy support (Utama, Samad, & Ishaq, 2023).

This study aims to identify optimal strategies to accelerate the implementation of the Green Economy to strengthen sustainable food security in Deli Serdang Regency. The main issues addressed are, first, the increase in food production and access has not been accompanied by adequate green agricultural transformation; second, the level of green innovation adoption among farmers is uneven, and its impact on food security remains insignificant; and third, support for Green Entrepreneurs in the food sector is still limited, particularly in terms of access to environmentally friendly technologies. Based on this background, this study is expected to contribute to the development of a model for strengthening food security based on the Green Economy and Green Entrepreneurship that aligns with the local context of Deli Serdang Regency

Literatur Review

1. Green Entrepreneurship

Green entrepreneurship is an entrepreneurial approach that emphasizes not only economic profit but also the environmental and social impacts of business activities. Green entrepreneurs aim to create innovations that support environmental sustainability through environmentally friendly business practices, efficient use of resources, and social benefits for surrounding communities (Isaak, 2002; Aditi et al., 2024).

The main characteristics of green entrepreneurs include the utilization of renewable resources, implementation of sustainable waste management systems, enhancement of energy efficiency, and integration of social values in business activities. According to Schaper (2016), the role of green entrepreneurs is crucial in creating alternative business models capable of forming community-based sustainable food systems. In the context of the green economy, green entrepreneurship acts as a driver of transformation from a linear economy to a circular economy, which holistically incorporates ecological, social, and economic aspects (Aditi et al., 2024).

2. Food Security

Food security refers to a condition in which all individuals, at all times, have physical, social, and

economic access to sufficient, safe, and nutritious food that meets their dietary needs for an active and healthy life (FAO, 2022). Food security does not only involve availability, but also stability of supply, accessibility, and sustainable utilization.

In the Indonesian context, challenges to food security are reinforced by factors such as land degradation, distribution inequality, climate change impacts, and reliance on imports of strategic food commodities. According to Prasetyo et al. (2021), regional food security can be strengthened through community-based approaches and empowerment of local farmers integrated into agroecological systems. Meanwhile, Pratama and Wijayanti (2023) assert that the involvement of green entrepreneurs in local food supply chains can enhance sustainability, efficiency, and public access to healthy food. They further emphasize that regenerative agricultural practices initiated by green entrepreneurs play a role in preserving ecosystems and improving long-term food resilience.

3. Green Economy

The green economy refers to a development model that emphasizes economic growth while ensuring environmental sustainability and social inclusion. UNEP (2021) defines the green economy as a low-carbon, resource-efficient, and socially equitable economy. This principle is particularly relevant to the transformation of food systems and the strengthening of sustainable agricultural sectors. According to Sari and Handayani (2022), the implementation of green economy principles in the food sector requires innovative approaches such as agroforestry, organic farming, and circularity in production processes. Green entrepreneurs play a key role by integrating environmentally responsible business practices with local economic values. A study conducted by Wibowo and Kurniasih (2024) shows that green entrepreneurs contribute to reducing carbon emissions, improving energy efficiency, and enhancing waste management within food production chains.

Furthermore, Setiawan and Dewi (2023) state that the success of the green economy relies heavily on synergy among government policies, technological innovation, and private sector initiatives, particularly MSMEs engaged in agriculture and food production. Therefore, the integration of green entrepreneurship and the green economy can serve as a strong foundation for promoting sustainable food security at the local level.

II. RESEARCH METHODOLOGY

This study employed a descriptive qualitative approach to explore the role of green entrepreneurs in supporting food security based on a green economy framework in Deli Serdang Regency. This approach was selected because it is suitable for

understanding social phenomena in depth through the perspectives of actors, particularly within the context of green entrepreneurship practices that have not been widely explored in rural areas (Creswell, 2014). The type of research is a case study with an exploratory approach. A case study was chosen because the primary focus of the research is on a specific local context, namely the role of green entrepreneurs in strengthening local food systems based on sustainability principles in Deli Serdang (Yin, 2018). This study aims to identify practices, strategies, and challenges faced by green entrepreneurs in maintaining sustainable food production.

The informants in this study were selected using purposive sampling, with the main criterion being individuals or micro and small enterprises (MSEs) that apply green economy principles in food production or distribution activities. The informants consisted of: (1) MSE actors engaged in organic and local agriculture, (2) MSME support institutions, (3) the local Food Security and Agriculture Office, and (4) local consumers who support sustainable food initiatives.

The number of informants was adjusted as needed until the data reached the point of saturation (Miles, Huberman, & Saldaña, 2014). In this study, the total number of informants was five. Data were collected through:

1. **In-depth interviews** using semi-structured interview guides to explore perceptions, experiences, and strategies of green entrepreneurs in addressing food security issues.
2. **Participant observation**, involving direct observation at business locations to examine the implementation of green economy practices in practice.
3. **Document study**, including secondary data from government reports, business profiles, and local regulations related to sustainable agriculture and the green economy.

Conceptual and Operational Definitions (Qualitative)

1. **Green Entrepreneur** refers to individuals or groups engaged in entrepreneurial activities that prioritize environmental sustainability, resource efficiency, and social responsibility in the production and distribution of food.
2. **Food Security** refers to the community's ability to ensure sufficient, nutritious, and sustainable food availability, access, and utilization at the local level.
3. **Green Economy** in this context refers to an economic system that promotes a balance between economic growth, environmental preservation, and social equity.

Data analysis used Miles and Huberman's interactive model, which includes three stages: data reduction, data display, and conclusion

drawing/verification (Miles et al., 2014). All data were manually coded to identify key themes such as entrepreneurial motivation, forms of green innovation, community participation, and impacts on food security. Data validity was maintained through source triangulation and member checking with the informants.

III. RESULTS AND DISCUSSION

This study was conducted on several green entrepreneurs in Deli Serdang Regency who are involved in sustainable agribusiness, organic farming, and the utilization of household and community-based yard spaces for local food production. The data obtained through in-depth interviews, participant observation, and documentation reviews indicate that green entrepreneurs play a substantial role in strengthening local food security by implementing environmentally responsible production practices and promoting a locally integrated food distribution system. Their approaches align closely with the principles of a green economy, which emphasize ecological sustainability, social inclusion, and economic viability.

The results show that the majority of green entrepreneurs in Deli Serdang adopt cultivation techniques aimed at minimizing environmental degradation. Instead of relying on chemical pesticides and synthetic fertilizers, they utilize organic fertilizers produced from decomposed agricultural waste, livestock manure, and household organic waste. This method not only reduces dependence on external agricultural inputs but also contributes to improved soil fertility and biodiversity conservation. Some farmers also practice biological pest control by cultivating beneficial plant species that act as natural repellents to pests, thereby maintaining ecological balance without the use of harmful chemicals.

In addition to organic cultivation, efficient water management emerged as a critical practice among the green entrepreneurs. Several respondents reported implementing water-saving irrigation systems such as drip irrigation and rainwater harvesting reservoirs. These methods are particularly relevant in areas experiencing inconsistent rainfall patterns due to climate variability. By optimizing water usage, these entrepreneurs significantly minimize resource waste while ensuring the resilience of their crop production systems.

Another notable finding concerns the marketing and distribution strategies employed by green entrepreneurs. Most of them choose to market their products locally through short supply chains, such as direct sales at community markets, subscription-based vegetable box schemes, and collaboration with local cooperatives. The short supply chain model offers various advantages, including reduced transportation-related carbon emissions, lower distribution costs, fresher product

delivery, and enhanced affordability for consumers. This localized approach to food distribution is a key factor in enhancing food access for nearby households while simultaneously strengthening trust-based relationships between producers and consumers.

Moreover, innovation is a central element in the business models of these green entrepreneurs. The innovations identified during the research include:

1. **Cultivation of fast-harvest indigenous crops** such as leafy vegetables, herbs, and tubers that can be harvested within short cycles. This strategy ensures continuous food availability and reduces the risk of crop failure.
2. **Utilization of idle or marginal land**, including home yards, unused community plots, and small vacant lands, to maximize localized food production through urban and peri-urban farming techniques.
3. **Integrated farming systems**, where crop production is combined with livestock raising to create a synergistic agricultural ecosystem. Organic waste from livestock is processed into fertilizer, while plant residue is used as animal feed, creating a closed-loop resource cycle.

In addition to production-related activities, green entrepreneurs also play an important role in capacity building within the community. Several respondents reported organizing informal training sessions, workshops, and demonstration plots to share knowledge on organic farming, composting techniques, and household garden development. These educational initiatives foster community engagement, promote environmental awareness, and encourage local residents to participate in sustainable food production practices. This aspect of knowledge transfer is crucial because it not only empowers households to produce their own food but also cultivates a culture of ecological responsibility at the grassroots level.

The findings also reveal that green entrepreneurship contributes significantly to strengthening local food sovereignty. By reducing dependence on imported food products and promoting localized production networks, green entrepreneurs enhance the community's control over food sources. This approach aligns with long-term food security goals, particularly in the face of external risks such as market price fluctuations, supply chain disruptions, and economic instability. Overall, the results indicate that green entrepreneurs in Deli Serdang serve as key actors in promoting sustainable food systems. Their initiatives demonstrate that economic activities can be harmonized with environmental stewardship and community welfare. In this way, green entrepreneurship not only addresses ecological and socio-economic challenges but also provides a

practical model for sustainable development at the regional level.

Discussion

The findings of this study demonstrate that green entrepreneurship contributes strategically to the realization of sustainable food security in Deli Serdang Regency. The roles played by green entrepreneurs extend beyond mere production improvements; they also encompass ecological stewardship, community empowerment, local economic strengthening, and broader support for the transition toward a green economy. These contributions can be understood through the following interconnected dimensions:

1. Environmental Innovation and Resource Efficiency

Green entrepreneurs in Deli Serdang have effectively integrated environmentally friendly innovations into their agricultural and business activities. Consistent with the argument of Sajjad et al. (2023), environmentally oriented innovation is a critical driver for the transformation of food systems, particularly through reducing reliance on synthetic inputs and enhancing production sustainability. The shift away from chemical pesticides and fertilizers toward organic alternatives reflects a deliberate effort to restore soil health and promote ecological balance.

In practice, entrepreneurs adopt organic composting, biological pest management, and water-efficient irrigation methods that collectively improve resource efficiency. These strategies help reduce soil depletion and mitigate water scarcity—two challenges that are increasingly pressing as climate variability intensifies in agricultural regions. The resulting improvements in soil fertility and ecological resilience indicate that green entrepreneurship is not only environmentally sustainable but also capable of supporting long-term agricultural productivity. Such practices reinforce the premise that ecological restoration and food security are mutually reinforcing goals rather than competing priorities.

2. Community Empowerment and Social Resilience

Another significant contribution of green entrepreneurs lies in their role in strengthening community capacity and social resilience. This aligns with the perspective of Chen et al. (2022), who emphasize that the success of green economic development depends on the active engagement and empowerment of local actors. In Deli Serdang, many green entrepreneurs do not limit their activities to production and profit-making. Instead, they engage in knowledge-sharing practices that transfer skills to local households, youth communities, women's groups, and aspiring farmers.

Through informal training sessions, collaborative farming activities, and demonstration plots, these entrepreneurs encourage community participation in

sustainable food cultivation. The replication of organic farming methods at the household and neighborhood levels contributes not only to increased food availability but also to greater community self-sufficiency. This participatory model fosters social cohesion, promotes shared responsibility for environmental stewardship, and reduces dependency on external food sources. Consequently, community-based green entrepreneurship strengthens social resilience, enabling the community to better withstand food price fluctuations, supply disruptions, and the impacts of economic or environmental shocks.

3. Strengthening the Local Economy and Reducing External Dependency

The adoption of local production and localized distribution networks is another strategic aspect contributing to regional food security. According to El Bilali and Allahyari (2023), local food systems supported by green entrepreneurship can significantly reduce vulnerability to global supply chain disruptions. In practice, the short supply chain model observed in Deli Serdang—where products are sold directly to consumers through community markets, local cooperatives, and neighborhood-based distribution networks—helps retain economic value within the community.

This localized approach reduces transportation costs, minimizes carbon emissions, and ensures that consumers receive fresh and affordable food. The circulation of income within the community also strengthens the local economy, enhances market stability, and reduces reliance on external suppliers. Such an economic model aligns closely with the broader objectives of sustainable development, where economic benefits are equitably distributed and local markets are prioritized over profit-driven mass distribution systems.

4. Contribution to the Green Economy Transition

Finally, the initiatives of green entrepreneurs in Deli Serdang represent a tangible step toward the implementation of a green economy framework. Shamsudin et al. (2023) argue that green entrepreneurs act as agents of socio-environmental transformation by promoting regenerative economic practices that balance ecological preservation and social well-being. The findings of this study support this view, indicating that green entrepreneurs function not merely as economic actors but also as advocates for sustainable lifestyle change and environmental awareness.

Their practices challenge conventional agricultural models characterized by chemical dependency, long-distance supply chains, and profit-centered growth. Instead, they provide a working example of how economic activities can coexist harmoniously with nature. The adoption of closed-loop farming systems, community-inclusive production, and carbon-conscious distribution models demonstrates a viable alternative to extractive economic structures. By influencing local

norms and inspiring wider community participation, green entrepreneurs help lay the groundwork for broader green economic transformation at the regional level.

IV. CONCLUSION

This study concludes that green entrepreneurship plays a strategic and multidimensional role in strengthening sustainable food security in Deli Serdang Regency. Green entrepreneurs are not only economic actors, but also ecological stewards and community empowerment agents who integrate sustainability principles into the production, distribution, and consumption of food. Their adoption of organic farming methods, resource-efficient cultivation practices, and localized food supply chains significantly contributes to environmental conservation, improved food accessibility, and enhanced community resilience.

The findings also demonstrate that green entrepreneurs help reduce dependency on external food supplies by promoting local production-based food systems that are more adaptive to economic fluctuations and climate uncertainties. Additionally, their involvement in education and skill transfer fosters community-based participation in sustainable agriculture, thereby reinforcing social cohesion and food sovereignty. As such, green entrepreneurship represents a vital pathway in supporting the transition toward a regenerative green economy that prioritizes ecological integrity, economic inclusivity, and long-term sustainability.

V. RECOMMENDATIONS

Local government needs to strengthen institutional and policy support that enables the expansion of green entrepreneurship initiatives. This can be achieved by providing financial incentives, technical assistance, and targeted training programs that encourage the adoption of environmentally sustainable agricultural practices. Additionally, the government should facilitate the creation of local food distribution platforms such as farmer markets and community-based food hubs to shorten supply chains, increase product accessibility, and stimulate the circulation of the local economy. Integrating green economy principles into regional development policy will help ensure that sustainability becomes a long-term priority rather than a short-term initiative.

Green entrepreneurs are encouraged to broaden their collaboration networks with cooperatives, local organizations, research institutions, and universities to enhance knowledge sharing and skill replication. Strengthening community-based partnerships will not only expand

the reach of sustainable farming training but also build collective ownership of food security efforts. Entrepreneurs should also invest in improving digital marketing skills and online sales systems to promote their products more effectively, while still prioritizing local food distribution to reduce carbon footprints. Furthermore, developing integrated farming systems—such as combining organic crops with livestock waste recycling—will help increase resource efficiency and environmental regeneration.

Local communities are expected to take an active role in sustainable food production and consumption. Participation in training programs offered by green entrepreneurs can strengthen household-level agricultural skills and improve food self-sufficiency. Supporting local organic and sustainably produced foods will help reinforce the local food economy and reduce dependency on industrial and imported food products. Community involvement in shared garden initiatives, seed exchange networks, and local food cooperatives can also enhance social resilience and food sovereignty at the grassroots level.

Future researchers are encouraged to conduct longitudinal studies to evaluate the long-term ecological, social, and economic impacts of green entrepreneurship on regional food security. Such studies will provide deeper insights into how sustainable agricultural practices shape community resilience and environmental conditions over time. Comparative research across different regions or countries may also help identify patterns, success factors, and replicable models that can inform broader policy development and implementation. Expanding interdisciplinary research perspectives—linking agriculture, economics, sociology, and environmental sciences—will be especially valuable for advancing knowledge in this field.

VI. REFERENCES

- Aditi, B., Pratiwi, H., Suaidi, I., & Mirza, D. F. (2024). *Kewirausahaan Dalam Transformasi Green Economic*. CV. Tungga Esti
- Badan Pusat Statistik Kabupaten Deli Serdang. (2023). *Hasil Pencacahan Lengkap Sensus Pertanian 2023 – Tahap I Kabupaten Deli Serdang*. Retrieved from BPS Kabupaten Deli Serdang
- Chaudhary, A., Gustafson, D., & Mathys, A. (2018). Multi-indicator sustainability assessment of global food systems. *Nature Communications*, 9.
- Chen, Y., Li, X., & Sun, L. (2022). *Green entrepreneurship and social innovation: Towards resilient local food systems*. *Journal of Cleaner Production*, 368, 133–142. <https://doi.org/10.1016/j.jclepro.2022.132432>
- El Bilali, H., & Allahyari, M. S. (2023). *Transition to sustainable food systems: The role of green entrepreneurship*. *Sustainability*, 15(4), 1899. <https://doi.org/10.3390/su15041899>
- Ene, C., Voica, M., & Panait, M. (2019). Green investments and food security. *Green Business*.
- FAO. (2022). *The State of Food Security and Nutrition in the World*. Rome: FAO.
- Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., & Toulmin, C. (2010). Food security: The challenge of feeding 9 billion people. *Science*, 327(5967), 812–818.
- Isaak, R. (2002). *The making of the ecopreneur*. *Greener Management International*, 38, 81–91. <https://doi.org/10.9774/GLEAF.3062.2002.su.00010>
- Neema, M., & Kalitanyi, V. (2023). Factors affecting farmers' entrepreneurial action at Etunda Green Scheme Project, Namibia. *International Journal of Research in Business and Social Science (2147-4478)*.
- Nwachukwu, C. (2023). Green agriculture and food security: A review. *IOP Conference Series: Earth and Environmental Science*, 1178.
- Prasetyo, Y., Subekti, R., & Anggraeni, D. (2021). Community-based agroecology and food security resilience. *Indonesian Journal of Sustainable Agriculture*, 6(1), 34–45.
- Pratama, F., & Wijayanti, R. (2023). Peran Green Entrepreneurship dalam Penguatan Ketahanan Pangan. *Jurnal Ekonomi Hijau Indonesia*, 4(2), 112–124.
- Rabbi, M., Hasan, M., & Kovács, S. (2021). Food security and transition towards sustainability. *Sustainability*.
- Sajjad, A., Eweje, G., & Tappin, D. (2023). *Green innovation and food security: Perspectives from developing economies*. *Business Strategy and the Environment*, 32(1), 178–192. <https://doi.org/10.1002/bse.3108>
- Sari, M. P., & Handayani, T. (2022). Ekonomi Hijau dalam Transformasi Sistem Pangan Lokal. *Jurnal Ekonomi dan Lingkungan*, 10(1), 45–59.
- Schaper, M. (2016). *Making ecopreneurs: Developing sustainable entrepreneurship*. Gower Publishing, Ltd.
- Sele, J. P., & Mukundi, M. B. (2023). The economics of climate change: Costs, benefits, and the transition to a green economy. *Greener Journal of Social Sciences*.
- Setiawan, A., & Dewi, P. K. (2023). Implementasi Ekonomi Hijau Berbasis UMKM: Tantangan dan Peluang. *Jurnal Pembangunan Berkelanjutan*, 8(2), 71–84.
- Shamsudin, M. N., Md. Zain, R., & Yahya, M. H. (2023). *Green entrepreneurship as a catalyst of*

- sustainable rural development*. *Journal of Rural Studies*, 103, 45–54. <https://doi.org/10.1016/j.jrurstud.2023.01.007>
- Sklavos, G., Duquenne, M., & Theodossiou, G. (2022). Green entrepreneurship and digital transformation of SMEs in food industry: A bibliometric analysis. *Scientific Annals of Economics and Business*.
- UNEP. (2021). *Green Economy Progress Measurement Framework*. Nairobi: United Nations Environment Programme.
- Utama, Z., Samad, A., & Ishaq, M. (2023). Green economy's impact on food security program evaluation. *Jurnal Pendidikan Ekonomi dan Bisnis (JPED)*.
- Wibowo, A., & Kurniasih, L. (2024). Inovasi Wirausaha Hijau dalam Mendukung Ketahanan Ekonomi Berkelanjutan. *Journal of Green Business and Policy*, 3(1), 89–101