Journal of Economics Research and Policy Studies, 6(2), 2026, 389-409
Available at: https://journal.nurscienceinstitute.id/index.php/jerps
E-ISSN: 2797-8141

Circular economy approach: A sustainable business model in transforming farmers' livelihoods

Fajar Purwanto[1], Soesanto[2], Sari Rahayu[1], Zenita Afifah Fitriyani[1]*, Dimas Ganda Permana Putra[2]

[1]Department of Economic, University of Mayjend Sungkono Mojokerto, Indonesian

[2]Department of Agriculture, University of Mayjend Sungkono Mojokerto, Indonesian

*) Korespondensi (e-mail: zenitaafifah@gmail.com)

Abstract

The transition toward a circular economy in agriculture is essential for improving resource efficiency, reducing waste, and strengthening farmers' livelihoods. This study aims to formulate a sustainable business model based on a circular economy approach to support the transformation of farmers' livelihoods. A qualitative descriptive case study was conducted using interviews, focus group discussions, field observations, and secondary data. The data were analyzed using SWOT, IFAS–EFAS, and TOWS matrices to identify internal and external strategic factors. The IFAS results show that strengths exceed weaknesses, with a difference of 0.415, while the EFAS results indicate that opportunities exceed threats, with a difference of 0.414. These findings place the farmers' business position in the aggressive or SO quadrant. The key strategic insight is that farmers should prioritize market expansion for organic products, technology adoption, product differentiation, stronger partnerships, and research collaboration while gradually improving post-harvest processing, packaging, human resource regeneration, and access to financing. A circular economy-based sustainable business model is feasible for transforming farmers' livelihoods by improving cost efficiency, product quality, supply stability, market access, and business resilience.

Keywords: Circular Economy, Sustainable Business Models, Transforming Farmers' Livelihoods

Abstrak

Transisi menuju ekonomi sirkular di bidang pertanian sangat penting untuk meningkatkan efisiensi sumber daya, mengurangi limbah, dan memperkuat mata pencaharian petani. Studi ini bertujuan untuk merumuskan model bisnis berkelanjutan berdasarkan pendekatan ekonomi sirkular untuk mendukung transformasi mata pencaharian petani. Studi kasus deskriptif kualitatif dilakukan dengan menggunakan wawancara, diskusi kelompok fokus, observasi lapangan, dan data sekunder. Data dianalisis menggunakan matriks SWOT, IFAS–EFAS, dan TOWS untuk mengidentifikasi faktor strategis internal dan eksternal. Hasil IFAS menunjukkan bahwa kekuatan melebihi kelemahan, dengan selisih 0,415, sedangkan hasil EFAS menunjukkan bahwa peluang melebihi ancaman, dengan selisih 0,414. Temuan ini menempatkan posisi bisnis petani di kuadran agresif atau SO. Wawasan strategis utama adalah bahwa petani harus memprioritaskan perluasan pasar untuk produk organik, adopsi teknologi, diferensiasi produk, kemitraan yang lebih kuat, dan kolaborasi penelitian sambil secara bertahap meningkatkan pengolahan pasca panen, pengemasan, regenerasi sumber daya manusia, dan akses ke pembiayaan. Model bisnis berkelanjutan berbasis ekonomi sirkular layak untuk mentransformasi mata pencaharian petani dengan meningkatkan efisiensi biaya, kualitas produk, stabilitas pasokan, akses pasar, dan ketahanan bisnis.

Kata kunci: Ekonomi Sirkuler, Model Bisnis Berkelanjutan, Transformasi Kehidupan Petani

How to cite: Purwanto, F., Soesanto, S., Rahayu, S., Fitriyani, Z. A., & Putra, D. G. P. (2026). Circular economy approach: A sustainable business model in transforming farmers' livelihoods. *Journal of Economics Research and Policy Studies*, *6*(2), 389–409. https://doi.org/10.53088/jerps.v6i2.2971

1. Introduction

The transformation towards a circular economy in food and agricultural systems emerged in response to the climate crisis, resource degradation, and increasing supply chain volatility. This approach emphasizes design that eliminates waste, circulates materials/energy, and regenerates natural resources, such as soil, air, and water, so that food production is not only efficient but also restores ecosystems (Alnajdawi et al., 2025). Global institutions such as the FAO and the Ellen MacArthur Foundation (EMF) emphasize that shifting to a circular economy for food can strengthen resilience to shocks, reduce emissions, and improve the well-being of farmers through practices that are regenerative and reduce dependence on external inputs (Zhang et al., 2022).

At the business model level, policy organizations such as the OECD highlight the need for innovation models that revolve around materials, such as “product-as-a-service” models, product shelf-life extensions, and industrial symbiosis, which in agriculture can translate into performance-based input services (e.g., compost/biostimulant services), upstream-downstream partnerships for upcycling sampling results, and regeneration-based value-added schemes. Recent research also introduces a “circular & nature-inclusive agricultural business model” framework that places the way farmers work and earn income while caring for the soil, minimizing emissions, and maintaining ecosystem services at the heart of business model design (Hoogstra et al., 2024).

For Indonesia, the push toward more sustainable agrifood systems is increasingly relevant in line with poverty alleviation targets, nutritional security, and net-zero commitments. Recent reports and policy analyses emphasize the need for new strategies, including regenerative agricultural practices and crop and livestock integration that balance productivity and desirability. The 2024 review of integrated crop-livestock systems (ICLS) underscores their relevance for Indonesia's agricultural ecosystem in closing organic matter loops, reducing input costs, and strengthening farm business resilience. At the same time, the OECD's monitoring of Indonesian agricultural policy places resource efficiency and poverty at the forefront of its modernization agenda (Sekaran et al., 2021).

Environmental issues are currently important to pay attention to, because the existence of Law of the Republic of Indonesia No. 3 of 2014 is an encouragement for the utilization of resources with effectiveness and efficiency to be based on environmental concepts, for example by reducing pollution, contamination and CO2 gas emissions so that product production activities can be environmentally friendly (Waluyo et al., 2022). The implementation of environmentally friendly activities in the agricultural sector can be done by planting organic vegetables, using environmentally friendly fertilizers to reduce excessive chemicals that have the potential to pollute the environment, and maintaining air temperature to avoid air contamination (Fitriyani et al., 2024).

Changing farmers' livelihoods is key, as implementing a circular economy often requires changes in production and consumption behavior at the household and

farming community levels, from managing organic residues into compost, diversifying products beyond growing and managing a single crop, to direct marketing patterns that minimize waste and strengthen local added value. Exchange studies show that such interventions can encourage a shift in preferences and habits toward circular practices, while simultaneously opening up new sources of income that are more resilient to market and climate shocks (Velasco-Muñoz et al., 2022).

The problematic phenomenon that occurred in Kebontunggul Village, Gondang District, Mojokerto Regency is the conversion of agricultural land due to the increasing number of housing estates, as well as the construction of factories that are indicated to open up agricultural business space, as well as air conditions around the factory that affect agricultural land that threaten the continuity of production and local food security. The Head of Kebuntunggul Village, Mr. Siandi, S.H., M.M. also explained that there was a decline in the productivity of the main commodity of Rice, although for Corn products there was an increase, instability occurred due to a decrease in product quality due to undemanding air conditions. Economically, Kebontunggul relies on agriculture, livestock, and the processing of local products for its livelihoods. The village covers an area of 2.63 km², or 7.06% of Gondang District, with a relatively small formal economic base, as evidenced by the 114 taxpayers. At the sub-district level, agriculture is a crucial sector, contributing to Mojokerto Regency's GRDP and employing the largest workforce (Gondang.mojokertokab, 2024). This potential is reinforced by the presence of 69 farmer groups in Gondang District, the poultry and livestock sub-sector, and the development of herbal commodities in Kebontunggul, such as ginger, turmeric, lemongrass, Javanese ginger, and galangal. Furthermore, the utilization of approximately 1 hectare of village land for family medicinal plants, the development of processed herbal products, and the example of the profitability of teak leaf tea bags demonstrate that the downstreaming of agricultural products offers significant economic potential (Purwanto et al., 2025). Thus, the economic conditions of Kebontunggul not only illustrate local potential, but also demonstrate the relevance of applying the SWOT–IFAS–EFAS–TOWS framework to form a sustainable business model based on a circular economy, especially through strengthening product added value, partnerships, technology, and market access.

Although the circular economy has been widely discussed in the agrifood sector, previous studies have mostly emphasized waste reduction, resource efficiency, circular supply chains, and technological practices at a conceptual or sectoral level. Systematic reviews show that circular economy studies in food and agriculture continue to grow, but many still focus on general frameworks, isolated practices, or supply-chain-level discussions rather than explaining how circular principles can be translated into practical business strategies for rural farmers. Zhang et al. (2022) highlight that circular economy research in the food sector is increasingly important for reducing waste and improving sustainability, while recent reviews on agri-food circularity note that many studies remain theoretical or fragmented across contexts.

Furthermore, studies on circular agriculture have begun to examine transformative initiatives and sustainable agricultural transitions, yet there remains limited empirical

evidence on how circular economy principles can be integrated with farmers' livelihood transformation, local resource conditions, and strategic business model formulation at the village level. Hoogstra, Silvius, Olde, et al., (2024) show that many circular agriculture initiatives still represent incremental and mainly technological changes, while more transformative initiatives require the integration of technological and social change. This indicates a research gap in connecting circular agriculture with practical livelihood-oriented strategies that are suitable for small-scale rural farmers.

In addition, circular business models in agribusiness are still relatively underexplored compared with circular economy studies in other sectors. Existing literature notes that circular business models can help agribusiness actors adopt circular practices, but their application in agriculture remains limited, especially in relation to farmers' income diversification, post-harvest value creation, market access, and local institutional support. Therefore, a more contextual study is needed to formulate a circular economy-based sustainable business model that not only reduces agricultural waste but also strengthens farmers' livelihoods, improves product value, supports market expansion, and encourages behavioral change among farming communities (Cahyadi et al., 2024).

The use of the SWOT analysis approach and TOWS strategy is relevant in solving the problems of the circular economy approach: sustainable business models and the transformation of farmers' lifestyles, because it is able to map internal strengths, internal weaknesses, external opportunities, and external threats. As stated by (Fitriyani et al., 2021) SWOT analysis is a strategy for organizations, communities, and agencies in identifying external conditions from critical threats and opportunities for environmental competition, while in internal conditions, it must focus on the strengths and weaknesses of the business.

The novelty of this study lies in its integration of the circular economy approach, sustainable business model formulation, and farmers' livelihood transformation through a SWOT–IFAS–EFAS–TOWS framework. Unlike previous studies that mainly discuss circular agriculture from the perspective of resource efficiency, waste management, or supply chain sustainability, this study positions the circular economy as a strategic business model for rural farmers (Hilmi, 2024). It maps internal strengths and weaknesses as well as external opportunities and threats to determine the strategic position of farmers and to formulate practical strategies for improving cost efficiency, product quality, post-harvest processing, packaging, market access, partnerships, and business resilience (Fitriyani et al., 2022).

This study aims to (1) identify the strengths, weaknesses, opportunities, and threats faced by farmers in implementing a circular economy-based sustainable business model. (2) analyze the strategic position of farmers in Kebontunggul Village using the IFAS–EFAS matrix and (3) formulate sustainable business strategies through the TOWS matrix to support farmers' livelihood transformation, market expansion, product value improvement, and business resilience

Based on these developments, our research entitled The Circular Economy Approach: Sustainable Business Models in Farmers' Lifestyle Transformation is urgently needed to describe how circular principles are translated into concrete and profitable farming business models, as well as identifying the driving/inhibiting factors of farmers' lifestyle changes in adopting circular practices using a SWOT analysis approach and TOWS strategy.

2. Literature Review

Circular Economy

A circular economy is an economic system that aims to minimize waste and the use of new resources by keeping materials, products and components in the economic cycle for as long as possible (Chauhan et al., 2022). The circular economy system is also designed to reduce waste and pollution by maintaining and circulating resources, products, and materials at the highest value through loops such as reuse, repair, remanufacturing, recycling, so that the circular economy has a strong link in sustainable development (Kirchherr et al., 2023).

Indicators used to assess the circular economy in the region include carbon emissions, energy consumption and economic costs (Kopp et al., 2024). The systematic review shows that the convergence of economic assessments is also present in resource flows, life cycle impacts, and social dimensions in an integrated manner (Munonye, 2025).

Sustainable Business

Sustainable business is a business approach that integrates economic objectives with environmental and social impacts often summarized as the triple bottom line (TBL: profit, people, planet) into an organization's business model, governance, and performance measurement systems (de Oliveira et al., 2024). Business sustainability prioritizes the effective and efficient use of resources to align development and environmental functions that can provide benefits to society and focuses on improving economic aspects so that national development activities continue to pay attention to environmental sustainability (Fitriyani, 2025).

Indicators that can be measured in business sustainability include profits, revenue growth, operational costs, green innovation, and supply chain resilience (Damtoft et al., 2025). In a social context, sustainable business can also be assessed from occupational safety and health, HR training and development, welfare, community, and supply chain (Dauerer, 2025).

Farmers' Livelihoods

Farmer livelihoods is a way of life focused on agriculture, where a producer who is a farmer accesses assets, forms livelihood strategies (on farm, off farm, non farm), and achieves welfare outcomes (income, food security, subjective well-being) under the influence of the socio-ecological context and policies. The updated Sustainable Livelihoods Framework (SLF) framework emphasizes that there are five capitals or assets (human, social, natural, physical, financial), dynamic vulnerabilities, and

institutions that shape farmers' choices and life outcomes (Natarajan et al., 2022). Farmers' lifestyles are fundamentally based on public awareness and understanding. Therefore, a shared perspective and support from stakeholders is expected to support the successful implementation of a circular economy, thereby minimizing negative environmental impacts and improving the economic and social well-being of the community (Malihah & Magfiroh, 2024).

Indicators that can be measured in farmers' lifestyles include human capital (education, farming experience, health, and digital literacy), social capital (membership of farmer groups, networks, and trust), natural capital (agricultural land area, irrigation channels, and commodity diversity), physical capital (tools and machines, infrastructure such as roads and warehouses to agricultural land, and digital dams), and financial capital (savings, credit access, and household savings) (Niu et al., 2023). Farmers' lifestyles can also be seen from product strategies and behaviors such as agricultural product diversification, technology adoption, and market participation (Habib et al., 2023).

Gap Analysis

From previous research, a research gap was obtained as shown in the following Table 1.

Table 1. Gap Analysis

Authors and Year	Article title	Similarities	Differences
(Velasco-Munoz et al., 2021)	Circular economy implementation in the agricultural sector: Definition, strategies and indicators	Both discuss the implementation of a circular economy in the agricultural sector, specifically strategies, indicators, and principles for poverty reduction. This article explains that the circular economy is a crucial strategy for supporting sustainable, restorative, and regenerative agriculture.	This research is conceptual/literature review in nature and has not empirically tested circular economy strategies in specific rural farming communities. This research fills this gap with a case study of Kebontunggul and uses SWOT–IFAS–EFAS–TOWS to design a sustainable business strategy based on the internal and external conditions of farmers.
(Zhang et al., 2022)	Circular economy and the food sector: A systematic literature review	Both discussed economic circulation in the food/agriculture sector and its relevance to waste reduction, resource efficiency, and drought.	Zhang et al.'s research focuses on the broader food sector, not on formulating strategies for rural farmers. This study focuses on local agribusiness and connects the circular economy with farmers' livelihood strategies through SWOT, IFAS–EFAS, and TOWS analyses.
(Dagevos & Lauwere, 2021)	Circular Business Models and Circular Agriculture: Perceptions and Practices of Dutch Farmers	Both discuss the relationship between circular business models, circular agriculture, and farmer practices. This article also highlights how farmers understand the circular economy in their agricultural practices.	The study focused on farmer perceptions and practices in the Netherlands, a developed country. This research fills the gap in the developing world context by examining rural farmers in Indonesia, who face limitations in technology, capital, packaging, market access, and farmer regeneration.

Conceptual Framework

In this research framework, the concept of circular economy (reduce, reuse, recycle, recovery) is integrated with SWOT-TOWS. Thus, the research produces an applicable strategy that is oriented towards economic, social, and environmental extinction (Sopyandi et al., 2024). The research framework image can be seen in Figure 1.

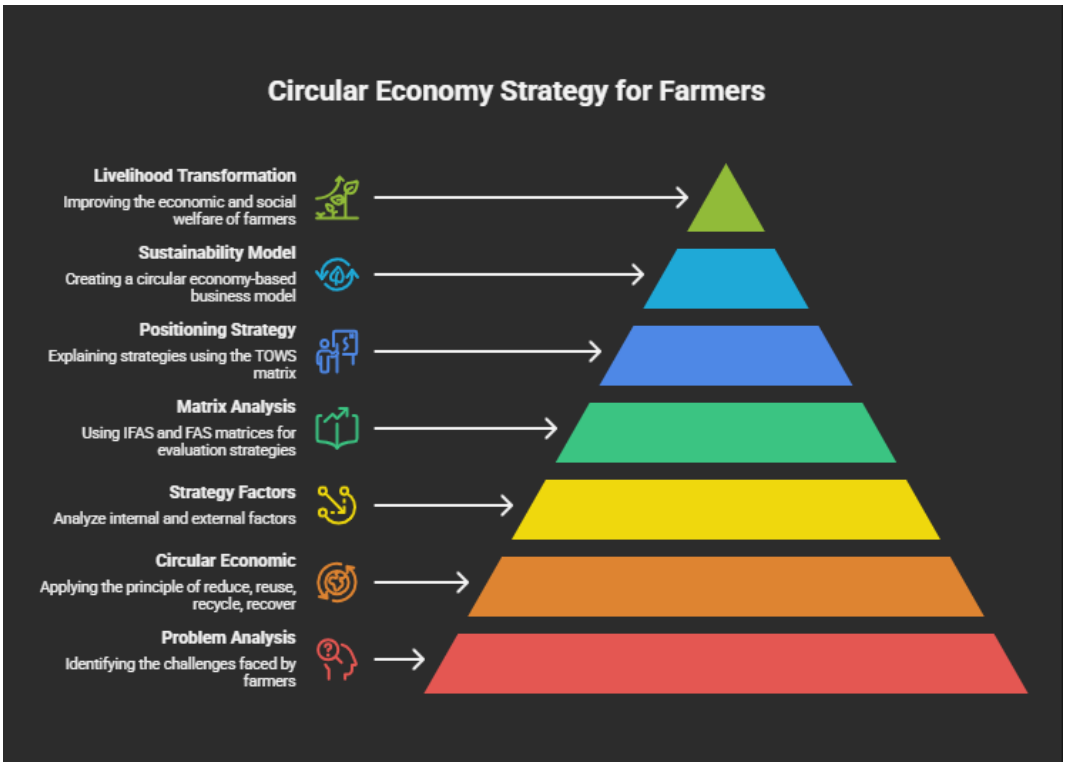

Figure 1. Research Framework
Source: Processed Data (2026)

3. Methods

This research uses a qualitative descriptive approach with a case study method as proposed by (Fitriyani et al., 2021) The qualitative approach was chosen because the research objective was to deeply understand the potential, weaknesses, opportunities, and threats faced by farmers in adopting a sustainable business model based on a circular economy. Furthermore, the TOWS strategy was used to design alternative strategies that farmers could implement to transform their lifestyles to be more adaptive to changing demand (Putri et al., 2023).

The research was conducted in Kebontunggul Village, Gondang District, Mojokerto Regency, and was conducted in regional agricultural centers with potential for implementing a circular economy and sustainable business. These areas, for example, produce rice, horticulture, and plantations, which generate valuable waste that encourages lifestyle transformation. The research subjects were farmers, farmer groups, agricultural extension workers, village officials, and private sector partners.

The respondents in this study consisted of 15 key stakeholders who were directly involved in and knowledgeable about organic farming initiatives in Kebontunggul Village. They included organic farmers (n = 8), local government officials (n = 3),

agricultural extension workers (n = 2), and cooperative managers (n = 2). The respondents were selected using a purposive sampling technique, considering their practical experience, institutional roles, and direct participation in agricultural activities, circular economy practices, and sustainable agribusiness development. This selection was intended to ensure that the data obtained reflected diverse perspectives from production actors, policy supporters, technical facilitators, and market or institutional managers relevant to the formulation of a circular economy-based sustainable business model.

In data collection techniques, the data used in this study consists of primary data, which includes (1) in-depth interviews with farmers, extension workers, and related stakeholders to explore perceptions, practices, and challenges in implementing a circular economy, business desires, and lifestyle transformation. (2) Focus Group Discussion (FGD) with farmer groups and village officials to validate initial findings and obtain input regarding transformation strategies. (3) Field observations regarding agricultural waste utilization practices, technology use, and the socio-economic conditions of farmers. The second data is secondary data which includes government policy documents related to sustainability and the green economy, journals, research reports, and publications related to the implementation of a circular economy and business desires, as well as statistical data (productivity, land area, income, and exports and imports of agricultural products).

In data analysis techniques, data is analyzed through several stages, including (Aunalal et al., 2025) :

1. Data Reduction: Compiling and sorting data from interviews, observations, and secondary documents according to SWOT indicators.
2. SWOT Analysis: (1) Strengths (Strengths): identification of internal potential of farmers, such as natural resources, local wisdom, and community support. (2) Weaknesses (Weaknesses): limited identification capital, digital literacy, and market access. (3) Opportunities (Opportunities): External opportunities such as government regulations, green market trends, and technological advances. (4) Threats (Threats): External factors that inhibit, for example climate change, price fluctuations, and cultural resistance.
3. Strategy Formulation with TOWS Matrix: (1) SO (Strength–Opportunities) Strategy: Optimizing strengths to seize opportunities. (2) WO (Weakness–Opportunities) Strategy: Minimizing weaknesses by taking advantage of opportunities. (3) ST (Strength–Threats) Strategy: Utilizing strengths to anticipate threats. (4) WT (Weakness–Threats) Strategy: Minimizing weaknesses while avoiding threats.

The data qualification in this study is explained as needing to be transformed into SWOT factors through systematic stages, namely data reduction, thematic coding, factor classification, validation, weighting, assessment, and prioritization. First, data from interviews, FGDs, observations, and secondary documents were read repeatedly, then coded into main themes such as agricultural product potential, waste utilization, production technology, post-harvest processes, packaging, capital, farmer

regeneration, organic market opportunities, policy support, partnerships, climate change, pests, distribution costs, and consumer literacy. This process is in line with the principles of thematic analysis, namely transforming qualitative data into meaningful codes, patterns, and themes (Roberts et al., 2019).

Themes originating from farmers' resources, capacities, and internal operational conditions were classified as strengths or weaknesses, while themes originating from the external environment such as markets, policies, technology, climate, and consumer behavior were classified as opportunities or threats. SWOT factors were only included in the matrix if they met three criteria: they appeared repeatedly in the data or were confirmed by more than one source, were directly relevant to a sustainable business model based on a circular economy, and had a strategic impact on income, cost efficiency, product quality, market access, business resilience, or the transformation of farmers' livelihoods.

Each factor was then assigned a weight of 0.00–1.00 based on its importance, with the total weights of internal factors in the IFAS and external factors in the EFAS each adding up to 1.00. Ratings were assigned on a scale of 1–5 to indicate the strength of the factor's influence, with higher values indicating a stronger factor, greater opportunities, or more serious weaknesses/threats. Priority scores were calculated by multiplying the weights and ratings, and the factor with the highest weighted score was considered the key strategic factor in the TOWS. This approach aligns with the IFAS–EFAS principles of summarizing internal and external environmental information through weights, ratings, and weighted scores, and the TOWS used to address strengths, weaknesses, opportunities, and threats into a more operational strategy (Fitriyani et al., 2021). The results of the SWOT analysis and TOWS strategy are then compiled in the form of recommendations for sustainable business models that can be adopted by farmers.

4. Result and Discussion

Village Profile and Comprehensive Resource Assessment

Kebontunggul Village is located in Gondang District, Mojokerto Regency, East Java, which is listed as one of the villages in the Gondang region with the postal code 61372 and has coordinates of ±7.62583 South Latitude; 112.48861 East Longitude. According to (Widyastuti et al., 2019) that Kebuntunggul village has great opportunities in the agricultural product business, the post-harvest products produced are rice and secondary crops, horticulture (chili, tomato, leafy vegetables, and eggplant), medicinal plants and spices (ginger, turmeric, lemongrass, galangal, and Javanese ginger), and livestock (chicken and catfish).

In addition to business opportunities in post-harvest products, the Kebontunggul village community also makes circular-based products, which are products made to reduce pollution, as seen in Table 2.

Table 2. Circular-Based Products

Raw Materials	Process	Product	Business Advantages
Straw, Rice Husk, Litter	Manual and buried	Simple compost	there is a lot of demand for compost
Cow's Milk	Food processing	Yogurt	Health drink products
Bananas, Cassava	Food processing	Chips / local snacks	Collaboration with MSME

Source: Processed Data (2025)

Methodologically, the study explains how qualitative data from interviews, focus group discussions, observations, and secondary documents were reduced, coded, and categorized into internal and external strategic factors through thematic analysis; this procedure is consistent with Braun and Clarke's approach, which emphasizes identifying patterns and themes from qualitative data in a systematic way. These themes were then classified into strengths, weaknesses, opportunities, and threats, followed by IFAS–EFAS weighting and rating to determine factor priority and strategic position. The analytical discussion was also deepened by interpreting not only the numerical results of the IFAS–EFAS matrices, but also their implications for farmers' business resilience, product value creation, technology adoption, partnership development, and livelihood transformation.

The theoretical integration was made more explicit by positioning the circular economy as the main conceptual foundation for resource efficiency, waste reduction, reuse of agricultural residues, and value-added processing, while the sustainable business model perspective explains how these circular practices can be converted into economic, social, and environmental value for farmers. This is consistent with recent literature emphasizing that circular economy implementation in agriculture should be connected to regional characteristics and sustainability outcomes, rather than treated only as a technical waste-management practice. In addition, the sustainable agriculture business model framework supports the argument that sustainable practices in farm value chains require the integration of managerial practices, key drivers, and stakeholder involvement. Thus, the revised section provides a clearer methodological path, stronger analytical reasoning, and a more coherent connection between empirical findings, SWOT–TOWS strategy formulation, circular economy theory, and sustainable livelihood transformation (Alonso-martínez et al., 2024).

SWOT Analysis (IFAS and EFAS Matrix)

The next step is to conduct a SWOT analysis. According to (Fitriyani et al., 2021) A SWOT analysis is conducted to map the internal and external conditions of an organization. A SWOT analysis can utilize the IFAS and EFAS matrices, which aim to explore SWOT aspects by combining internal strengths and weaknesses, as well as external opportunities and threats. The results of the study show a SWOT analysis of agricultural products in Kebontunggul village, which can be seen in Table 3.

Table 3 shows a SWOT analysis of agricultural products in Kebontunggul village, which includes five indicators of strengths, five indicators of weaknesses, five indicators of opportunities, and five indicators of threats. The SWOT analysis was

conducted to explore the internal and external conditions of farmers, who are also producers of agricultural products in Kebontunggul village. According to (Pramuji et al., 2021) that it is necessary to maximize strengths and opportunities and minimize weaknesses and threats, so that the IFAS (Internal Factor Analysis) and EFAS (External Factor Analysis) matrices are used systematically and in an integrated manner.

Table 3. SWOT Analysis

No	Strength	Weakness	Opportunity	Threat
1	Diverse and renewable agricultural products	Inadequate land conditions and technology	Wide market opportunities for organic agricultural products	Climate and weather factors
2	Nutritious organic agricultural products	Production processing is still manual	Government policy in the go organic program	Threats of plant pests and diseases
3	Competitive price	Unattractive packaging	Cooperation with third parties	The high price of organic products
4	Adequate farmer skills	There is no HR regeneration	Adoption of increasingly sophisticated agricultural technology	Increase in prices for delivery services
5	Has Regional Government support	Business capital is still insufficient	The development of research and technology	Low public knowledge about organic products

Source: Processed Data (2025)

The IFAS and EFAS strategies are used to analyze the company's internal and external factors to be identified and given weights and ratings, so that each factor is visible in the total score listed in the IFAS and EFAS matrices (Sefi et al., 2022). Meanwhile, the IFAS matrix can be seen in Table 4 and the EFAS matrix can be seen in Table 5.

Table 4. IFAS Matrix - Internal Factors

No	Internal Factors	Weight	Rating	Value Score
	Strength			
1	Diverse and renewable agricultural products	0.119	5	0.595
2	Nutritious organic agricultural products	0.108	4	0.432
3	Competitive price	0.114	3	0.342
4	Adequate farmer skills	0.095	3	0.285
5	Has Regional Government support	0.105	4	0.420
	Total S	0.541		2.074
	Weakness			
1	Inadequate land conditions and technology	0.098	4	0.392
2	Production processing is still manual	0.096	3	0.288
3	Unattractive packaging	0.083	4	0.332
4	There is no HR regeneration	0.101	4	0.404
5	Business capital is still insufficient	0.081	3	0.243
	Total W	0.459		1.659
	Total	1		3.733
	Difference ΣS – ΣW			0.415

Source: Processed Data (2025)

Table 5. EFAS Matrix - External Factors

No	External Factors	Weight	Rating	Value Score
	Opportunity			
1	Wide market opportunities for organic agricultural products	0.125	5	0.625
2	Government policy in the go organic program	0.110	3	0.330
3	Cooperation with third parties	0.109	3	0.327
4	Adoption of increasingly sophisticated agricultural technology	0.112	4	0.448
5	The development of research and technology	0.101	4	0.404
	Total O	0.557		2.134
	Threat			
1	Climate and weather factors	0.102	5	0.510
2	Threats of plant pests and diseases	0.081	3	0.243
3	The high price of organic products	0.110	4	0.440
4	Increase in prices for delivery services	0.073	3	0.219
5	Low public knowledge about organic products	0.077	4	0.308
	Total T	0.443		1.720
	Total	1		3.854
	Difference ΣO – ΣT			0.414

Source: Processed Data (2025)

From the data matrix presented in Table 4 and Table 5, it can be seen that the IFAS matrix describes the internal units of a business or farmer group by assessing its positional strengths (S) and weaknesses (W) in a weighted manner. In the strengths section, the total weighting reaches 0.541 with an aggregate score of 2.074. The largest contributor is diverse and renewable agricultural products (score 0.595), followed by nutritious organic products (0.432) and local government support (0.420). Two other factors, such as competitive prices (0.342) and farmer skills (0.285), also emphasize the internal capacity to generate value and compete in the market. According to (Sefi et al., 2022) that the strength of this structure indicates a strong foundation for green strategy differentiation (green differentiation), product portfolio development, and orchestration of partnerships/promotions through government facilitation.

On the weaknesses side, the total weighting was 0.459 with an aggregate score of 1.659. The three most prominent gaps were the lack of human resource regeneration (0.404), inadequate land/technology conditions (0.392), and unattractive packaging (0.332). Two other factors, namely the still-manual production process (0.288) and limited business capital (0.243), indicated the need for minimal investment in equipment, improved SOPs, and enhanced design and marketing capabilities. Pramuji et al. (2021) that this pattern directs intervention priorities towards strengthening human capacity (youth cadre development), modernizing core processes (basic equipment and quality standards), and updating packaging to improve perceived quality and selling price.

Overall, the internal score reached 3.733, the difference ΣS − ΣW = 0.415 places the organization in a strong internal position, where strengths are more dominant than weaknesses. This means that a growth-based strategy (grow/build) is feasible to

achieve, focusing on "riding" three main levers (product diversity, organic claims, local government support) while closing three priority bottlenecks (human resource regeneration, technological processes, and packaging). Thus, IFAS not only captures the current condition, but also provides tactical direction for formulating an aggressive and measurable TOWS strategy.

On the opportunity side, the largest driver is the expansive market for organic products (score 0.625), followed by the adoption of agricultural technology (0.448) and research and technology development (0.404). Two other opportunities, namely the go-organic policy (0.330) and partnerships with third parties (0.327), can strengthen institutional foundations and network access. This means that the best growth engines lie in organic demand, technology, and research or partnerships.

On the threat side, the most pressing were climate and weather (0.510), high organic product prices (0.440), low consumer literacy (0.308), proposed threats from plant pests and diseases (0.243), and rising shipping costs (0.219). This emphasizes the need for climate adaptation and cost efficiency, as well as the value of communication to ensure consumers understand the rationale for premium prices.

The EFAS matrix captures external environmental forces/pressures through weighted and rated opportunities (O) and threats (T). Your results show a total opportunity weight of 0.557 with a score of 2.134, higher than the threat weight of 0.443 with a score of 1.720. The difference ΣO − ΣT = 0.414 indicates that the external environment supports real opportunities that outweigh the risks. Overall, the EFAS score = 3.854, indicating strong room for growth if managed with the right strategy.

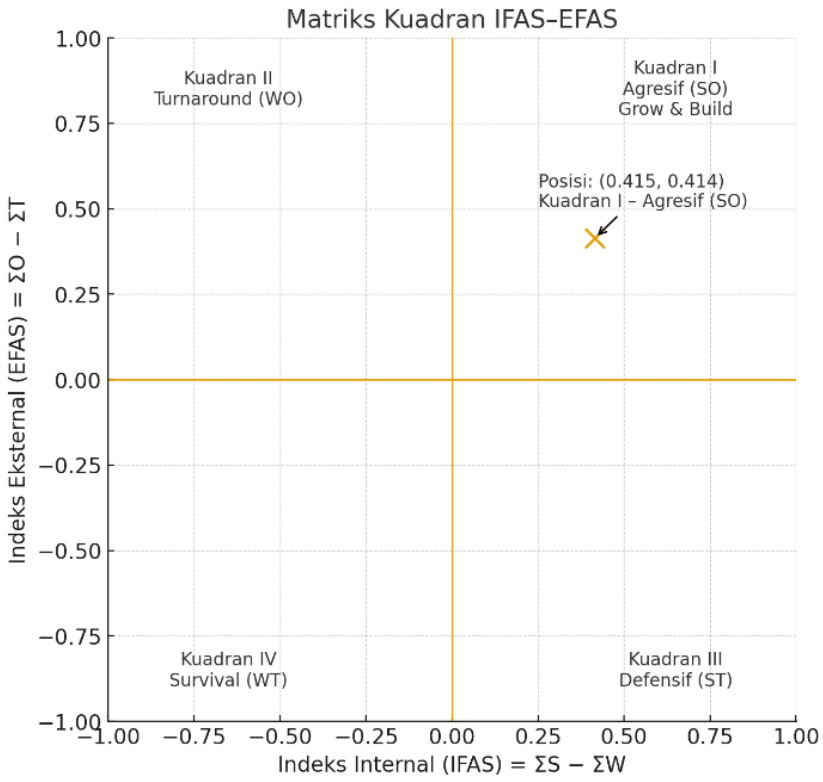

Figure 2. Quadrant Matrix
Source: Processed Data (2025)

The IFAS and EFAS matrices provide a clear picture of how to face opportunities and threats based on the strengths and weaknesses that exist (Rachmawati et al., 2022). After obtaining the IFAS and EFAS matrices, a quadrant matrix is created to map strategic positions based on two measurement axes. In the context of SWOT-based planning, the X-axis represents internal performance and the Y-axis represents external support. The intersection of the two axes forms four quadrants, each with its own strategic direction (Chopra et al., 2025). The agricultural product quadrant matrix for Kebontunggul Village can be seen in Figure 2.

Figure 2 displays a quadrant plot that maps the organization's strategic position based on the X-axis, which is the internal index, and the Y-axis, which is the external index. The vertical and horizontal lines at the value 0 divide the field into four quadrants: Quadrant I (Aggressive/SO), Quadrant II (Turnaround/WO), Quadrant III (Defensive/ST), and Quadrant IV (Survival/WT). The orange dot with a cross mark the position (0.415; 0.414) with the annotation Quadrant I – Aggressive (SO). This means that internal strengths are greater than weaknesses, indicating a positive IFAS matrix. External opportunities that are more dominant than threats also indicate a positive EFAS matrix. Managerially, this position indicates readiness for a growth strategy or growth and development where sales of agricultural products from Kebontunggul village can expand the market, increase product differentiation and quality, strengthen partnerships or access policies, and invest in capabilities such as tools, SOPs, and necessary human resources). Internal strengths (product diversification, organic quality, government support) and external opportunities (organic markets, technology, research/partnerships) are equally powerful.

In this context, approaching lifestyle change for farmers is not simply a choice, but a strategic imperative to seize growth opportunities, thus requiring a shift to an environmentally-based lifestyle. According to (Putra et al., 2025) that human resources have an important role in processing agricultural products that are free from pollution, so that there is a change in the lifestyle of producers, in this case farmers, to understand how to process agricultural products based on the environment, including avoiding pollution. According to (Pradani, 2025) He added that farmers must be able to participate in the transformation of sustainable business. This can be achieved by adopting participatory lifestyles that increase social solidarity and environmental awareness.

TOWS Strategy Analysis

After calculating the IFAS and EFAS matrices, the results can serve as the basis for developing a structured TOWS strategy. From the TOWS matrix framework presented in Table 5, it can be seen that there are four strategies, including:

1. SO Strategy

In the SO strategy there are strategies to add new variants for different segmentation (S1, O1), create nutritional labeling on agricultural products to support going organic (S2, O2), adopt agricultural technology to maintain competitive advantage (S3, O4), build partnerships in improving farmer skills (S4, O3), and research collaboration with

universities in supporting environmentally friendly cultivation (S5, O5) which are in line with the latest literature. Agricultural product producers in Kebontunggul village can adopt technologies such as irrigation technology with humidity sensors which are proven to increase air efficiency and reduce input costs, in addition the role of IoT in irrigation management can be more accurate and resource efficient (Zhao et al., 2023). Sustainability labeling is also essential for strengthening trust and purchasing intentions, particularly in the organic market. Clear labeling can also increase understanding and purchase intention of organic products (Cook et al., 2023). Building partnership networks is also believed to increase technical efficiency and producer income, while maintaining a stable supply for agricultural product sales. Furthermore, research collaboration with universities or research centers aligns with triple-helix practices for the diffusion of superior varieties and environmentally friendly cultivation techniques (Maity et al., 2023).

Table 6. TOWS Matrix

	Opportunity (O)	Threat (T)
Strength (S)	**SO Strategy :** 1. Add new variants for different segmentation (S1,O1) 2. Create nutritional labeling on agricultural products to support going organic (S2,O2) 3. Adopt agricultural technology to maintain competitive advantage (S3,O4) 4. Building partnerships to improve farmers' skills (S4,O3) 5. Research collaboration with universities to support environmentally friendly cultivation (S5,O5)	**ST Strategy :** 1. Utilize local government support for climate and weather-resistant seed subsidies (S5,T1,T2) 2. Negotiate rates and product delivery routes to form a distribution network (S3,T4) 3. Create sales packages for agricultural products to make prices more affordable (S1,T3) 4. Regular training for farmers regarding biopesticides and land sanitation (S4,T2) 5. Create a cooking demonstration event for organic-based products (S2,T5)
Weakness (W)	**WO Strategy :** 1. Investment in irrigation technology, greenhouses, and planting tools in an appropriate technology scheme (W1,O4) 2. Improving post-harvest techniques through research grant collaboration (W2,O5,O3) 3. Design environmentally friendly packaging by including nutritional information (W3,O1,O2) 4. Create internship programs and collaborations with vocational schools or universities for human resource regeneration (W4,O5,O3) 5. Submitting financing access to the government or partnerships to increase working capital (W5,O2,O3)	**WT Strategy :** 1. Implement Climate-Smart Agriculture (CSA) so that agricultural product cultivation is resistant to climate and weather changes (W1,T1) 2. Build local processing centers near agricultural land to minimize shipping costs (W2,T4) 3. Create educational packaging by displaying product storage guidelines or product consumption guidelines (W3,T5) 4. Provide training for young cadres regarding plant pests and diseases and climate in agricultural activities (W4,T1,T2) 5. Create a Climate-Smart Agriculture (CSA) membership model to improve cash flow (W5,T3)

Source : Processed Data (2025)

2. ST Strategy

In the ST strategy, producers utilize local government support for climate and weather-resistant seed subsidies (S5, T1, T2), negotiate tariffs and product delivery to form a distribution network (S3, T4), create agricultural product sales packages to make prices more affordable (S1, T3), regular training for routes related to biopesticide farmers and land sanitation (S4, T2), and create cooking demonstration events based on organic products (S2, T5), conceptually, Climate-Smart Agriculture (CSA) provides a framework for adaptation of agricultural product materials and climate mitigation, CSA activities can increase food system resilience, efficiency, and poverty (Zhao et al., 2023). Optimizing distribution networks, including routes, cross-docking, and cargo consolidation, has been proven to reduce costs while simultaneously reducing the quality of fresh milk products. Furthermore, maintaining product affordability can be achieved through product packaging, given the perceived high price of organic products. Research on organic packaging also shows that design elements contribute to sustainability performance, which can, if implemented correctly, reduce purchase intention (Liang et al., 2023).

3. WO Strategy

In the WO strategy, producers can invest in irrigation technology, greenhouses, and planting tools within an appropriate technology scheme (W1, O4), improve post-harvest techniques through collaborative research grants (W2, O5, O3), design environmentally friendly packaging that includes nutritional information (W3, O1, O2), create programs and collaborate with vocational schools or universities to regenerate human resources (W4, O5, O3), and apply for government financing or partnerships to increase working capital (W5, O2, O3). Producers can leverage technology, partnerships, markets, and policies, for example, by utilizing appropriate technology for grading or sorting to consistently reduce rejects (Gouda & Duarte-Sierra, 2024). Eco-friendly packaging design and nutrition labels need to be implemented to add brand value while addressing consumer preferences for eco-friendly packaging. Green packaging has a positive influence on purchase intention (Siuda & Grebosz Krawczyk, 2025). Agricultural producers also need to regenerate their human resources through internship schemes and collaborations with universities and vocational schools. Financially, access to government program financing or partnerships, along with innovative supply chain finance, can help address working capital constraints (Keefe et al., 2024).

4. WT Strategy

In the WT strategy, producers implement Climate-Smart Agriculture (CSA) to make agricultural product cultivation resilient to climate and weather changes (W1, T1), build local processing centers near agricultural land to minimize shipping costs (W2, T4), create educational packaging by displaying product storage guidelines or product consumption guidelines (W3, T5), provide training for young cadres regarding plant diseases and climate in agricultural activities (W4, T1, T2), and create a model of the need for Climate-Smart Agriculture (CSA) to improve cash flow (W5, T3). Therefore, CSA can help reduce the impact of weather and climate on agricultural land and

products, thereby minimizing producer risks, because planting activities are adaptive to weather and climate (Zhao et al., 2023). Local processing centers can operate close to the farm, for example through drying, pre-packaging, and pre-cooling, which aim to reduce the weight or volume transported and lower shipping costs. These activities are consistent with findings in food cold chain literature on the importance of facilities for reducing total costs and losses. Furthermore, educational packaging is also important, for example by displaying storage and consumption guidelines, to support increased public understanding of the importance of environmentally friendly products (Martini & Menozzi, 2021). The CSA recording system is expected to improve cash flow, encourage demand, and encourage the perception of expensive product selling prices through value bundling to make them cheaper (Wang & Gao, 2024).

5. Conclusions

This study concludes that the circular economy approach provides a relevant and feasible foundation for developing a sustainable business model to transform farmers' livelihoods in Kebontunggul Village. The IFAS–EFAS results indicate that internal strengths and external opportunities are more dominant than weaknesses and threats, placing the farmers' agribusiness position in the aggressive or SO quadrant. Analytically, this finding shows that the transformation of farmers' livelihoods should not only focus on waste reduction, but also on strengthening product value, improving post-harvest efficiency, expanding organic market access, adopting appropriate agricultural technology, and building collaborative partnerships. The main contribution of this study lies in integrating circular economy principles with the SWOT–IFAS–EFAS–TOWS framework to produce a practical and context-specific strategy for rural agribusiness development. Therefore, the proposed model can support cost efficiency, product quality improvement, business resilience, and sustainable livelihood transformation among farmers.

Acknowledgement

We would like to thank the Head of Kebontunggul Village for providing permission and data to support this research. We also extend our deepest gratitude to Mayjen Sungkono University, Mojokerto, for providing the motivation for this research.

References

Alnajdawi, R., Gaber, T., & Clark, A. (2025). A Digital Circular Food System: A systematic review and conceptual framework Keywords: Circular Economy, AI, IoT, food waste, blockchain, carbon. *SSRN Electronic Journal*, 1–42. https://doi.org/10.2139/ssrn.5241116

Alonso-martínez, D., Jim, B., & Cabeza-garcía, L. (2024). Environmental and Sustainability Indicators Theoretical framework to foster and assess sustainable agriculture practices : Drivers and key performance indicators. *Elsevier : Environmental and Sustainability Indicators*, *23*(June). https://doi.org/10.1016/j.indic.2024.100434

Aunalal, Z. A., Tangnga, M. H., Luturmas, J. R., Hahury, J. J., Titioka, S. R., & Joice Siahaya. (2025). From Tradition To Tourism : Sustainable Management Strategy

For Rutong Digital Heritage Village. *Jurnal Maneksi (Management Ekonomi Dan Akuntansi) September 2025*, *14*(3), 1267–1280. https://doi.org/10.31959/jm.v14i3.3288

Cahyadi, E. R., Hidayati, N., Zahra, N., & Arif, C. (2024). Integrating Circular Economy Principles into Agri-Food Supply Chain Management : A Systematic Literature Review. *MDPI : Sustainability*, *16*(7165). https://doi.org/10.3390/su16167165

Chauhan, C., Parida, V., & Dhir, A. (2022). Linking circular economy and digitalisation technologies: A systematic literature review of past achievements and future promises. *Technological Forecasting and Social Change*, *177*(May 2021), 121508. https://doi.org/10.1016/j.techfore.2022.121508

Chopra, A., Shastry, S., Mohan, G., Deepika, C., & Rajendran, V. (2025). A Comprehensive SWOT and TOWS analysis of transfusion medicine: Indian Perspective. *Transfusion and Apheresis Science*, *64*(1), 104061. https://doi.org/10.1016/j.transci.2024.104061

Cook, B., Costa Leite, J., Rayner, M., Stoffel, S., van Rijn, E., & Wollgast, J. (2023). Consumer Interaction with Sustainability Labelling on Food Products: A Narrative Literature Review. *Nutrients*, *15*(17). https://doi.org/10.3390/nu15173837

Dagevos, H., & Lauwere, C. (2021). Circular Business Models and Circular Agriculture : Perceptions and Practices of Dutch Farmers. *MDPI : Sustainability*, *13*(3), 1282. https://doi.org/10.3390/su13031282

Damtoft, N. F., van Liempd, D., & Lueg, R. (2025). Sustainability performance measurement – a framework for context-specific applications. *Journal of Global Responsibility*, *16*(1), 162–201. https://doi.org/10.1108/JGR-05-2023-0082

Dauerer, A. (2025). A systematic literature review of performance measurement systems and the integration of ESG factors. *Environmental and Sustainability Indicators*, *27*(June), 100746. https://doi.org/10.1016/j.indic.2025.100746

de Oliveira, U. R., Menezes, R. P., & Fernandes, V. A. (2024). A systematic literature review on corporate sustainability: contributions, barriers, innovations and future possibilities. In *Environment, Development and Sustainability* (Vol. 26, Issue 2). Springer Netherlands. https://doi.org/10.1007/s10668-023-02933-7

Fitriyani, Z. A. (2025). Paper Cup And Paper Bowl Design To Support Economic Resilience Through the Green Economy Concept. *Journal of Economics Research and Policy Studies*, *5*(1), 93–108. https://doi.org/10.53088/jerps.v5i1.1639

Fitriyani, Z. A., Putra, D. G. P., Ardiyanto, F. R., Dewi, Y. R., & Khusumawati, T. (2024). Analysis Of Willingness To Pay In Improving The Quality Of Biopesticide Products Based On Green Economy. *Journal of Economics Research and Policy Studies*, *4*(3), 573–590. https://doi.org/10.53088/jerps.v4i3.1349

Fitriyani, Z. A., Ridha, M., & Yuli Waluyo, S. E. (2021). Formulasi Strategi Bersaing Di Kafe Dan Angkringan Nu Laharjo Mojokerto. *Jurnal Riset Entrepreneurship*, *4*(2), 9–18. https://doi.org/10.30587/jre.v4i2.2629

Fitriyani, Z. A., Santy, Y. J. N., Laili, E. I. N., & Permatasari, O. (2022). Is a Food Security Program a Solution In Family Economic Resiliance? *Mega Aktiva : Jurnal Ekonomi Dan Manajemen*, *1*(1), 19–27. https://doi.org/10.32833/majem.v11i1.218

Gondang.mojokertokab. (2024). *Profil Kecamatan Gondang*.

https://gondang.mojokertokab.go.id/download/view/profil-kecamatan-gondang-2024-20241211_091643.pdf

Gouda, M. H. B., & Duarte-Sierra, A. (2024). An Overview of Low-Cost Approaches for the Postharvest Storage of Fruits and Vegetables for Smallholders, Retailers, and Consumers. *Horticulturae*, *10*(8). https://doi.org/10.3390/horticulturae10080803

Habib, N., Ariyawardana, A., & Aziz, A. A. (2023). The influence and impact of livelihood capitals on livelihood diversification strategies in developing countries: a systematic literature review. *Environmental Science and Pollution Research*, *30*(27), 69882–69898. https://doi.org/10.1007/s11356-023-27638-2

Hilmi, Y. S. (2024). Farmers ' resilience to climate change through the circular economy and sustainable agriculture : a review from developed and developing countries. *Renewable Agriculture and Food Systems*, *39*(15), 1–11. https://doi.org/10.1017/S174217052400009

Hoogstra, A. G., Silvius, J., Olde, E. M. De, Candel, J. J. L., Termeer, C. J. A. M., & Boer, I. J. M. De. (2024). The transformative potential of circular agriculture initiatives in the North of the Netherlands. *Agricultural Systems*, *214*(July 2023), 103833. https://doi.org/10.1016/j.agsy.2023.103833

Keefe, D. H. S., Jang, H., & Sur, J. (2024). The Asian Journal of Shipping and Logistics Digitalization for agricultural supply chains resilience : Perspectives from Indonesia as an ASEAN member. *The Asian Journal of Shipping and Logistics*, *40*(June), 180–186. https://doi.org/10.1016/j.ajsl.2024.09.001

Kirchherr, J., Yang, N. H. N., Schulze-Spüntrup, F., Heerink, M. J., & Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. *Resources, Conservation and Recycling*, *194*, 107001. https://doi.org/10.1016/j.resconrec.2023.107001

Kopp, M., Petit-Boix, A., & Leipold, S. (2024). Municipal circular economy indicators: Do they measure the cities' environmental ambitions? *Sustainable Production and Consumption*, *50*(April), 431–444. https://doi.org/10.1016/j.spc.2024.08.009

Liang, S., Yuan, X., Han, X., Han, C., Liu, Z., & Liang, M. (2023). Is seeing always good? The influence of organic food packaging transparency on consumers' purchase intentions. *International Journal of Food Science and Technology*, *58*(12), 6517–6529. https://doi.org/10.1111/ijfs.16765

Maity, R., Sudhakar, K., Abdul Razak, A., Karthick, A., & Barbulescu, D. (2023). Agrivoltaic: A Strategic Assessment Using SWOT and TOWS Matrix. *Energies*, *16*(8), 1–18. https://doi.org/10.3390/en16083313

Malihah, L., & Magfiroh, S. (2024). Ekonomi Sirkular Sebagai Antitesis dari Ekonomi Linear: Sebuah Tinjauan. *Jurnal Ekonomi STIEP (JES)*, *9*(1), 75–84.

Martini, D., & Menozzi, D. (2021). Food Labeling: Analysis, Understanding, and Perception. *Nutrients*, *13*(1), 268. https://doi.org/10.3390/nu13010268

Munonye, W. C. (2025). Towards Circular Economy Metrics: a Systematic Review. *Circular Economy and Sustainability*. https://doi.org/10.1007/s43615-025-00604-5

Natarajan, N., Newsham, A., Rigg, J., & Suhardiman, D. (2022). A sustainable livelihoods framework for the 21st century. *World Development*, *155*, 105898. https://doi.org/10.1016/j.worlddev.2022.105898

Niu, L., Lu, C., & Sun, R. (2023). The Impact of Livelihood Capital on Subjective Well-Being of New Professional Farmers: Evidence from China. *Sustainability (Switzerland)*, *15*(14). https://doi.org/10.3390/su151411305

Pradani, R. F. E. (2025). Pertanian Berbasis Green Economy: Langkah Nyata Menuju Masa Depan Ramah Lingkungan. *International Conference on Islamic Economic (ICIE)*, *4*(1), 61–78. https://doi.org/10.58223/icie.v4i1.407

Pramuji, K., Siswadi, B., & Hindarti, S. (2021). Strategi Peningkatan Produktivitas Jeruk Keprok Batu 55 Di Kecamatan Karangploso Kabupaten Malang. *Seagri: Jurnal Sosial Ekonomi Pertanian Dan Agribisnis*, *1*(1), 1–9.

Purwanto, F., Rahayu, S., Ganda, D., Putra, P., & Fitriyani, Z. A. (2025). Evaluasi Spesifik Lokasi terhadap Kualitas Udara dan Tanah dalam Kecamatan Gondang , Kabupaten Mojokerto. *Jurnal Penelitian Pertanian Terapan*, *25*(4), 83–89. https://doi.org/10.25181/jppt.v25i4.4479

Putra, D. G. P., Fitriyani, Z. A., Ardiyanto, F. R., Dewi, Y. R., Khusumawati, T., Alfarisyi, F. K., Novita, M. D., & Soesanto. (2025). The Effect of Pesticide Residues on Environmental Quality in the Kromong II Watershed, Pacet District, Mojokerto Regency. *Journal of Applied Agricultural Science and Technology, May 2025*, *9*(2), 128–139. https://doi.org/10.55043/jaast.v9i2.348

Putri, D. E., Raharjo, S., & Aziz, R. (2023). Analisis SWOT Keberlanjutan Bank Sampah Kota Padang untuk Mendukung Penggunaan Alternative Fuel and Raw Material (AFR) pada PT. Semen Padang. *Jurnal Ilmu Lingkungan*, *21*(3), 675–683. https://doi.org/10.14710/jil.21.3.675-683

Rachmawati, R., Wisnujati, N. S., & Hermawati, D. T. (2022). Strategi Pengembangan Usaha Jamur Tiram Putih di Desa Wadungasih Kecamatan Buduran Kabupaten Sidoarjo. *Jurnal Ilmiah Sosio Agribis*, *22*(1), 9. https://doi.org/10.30742/jisa22120221996

Roberts, K., Dowell, A., & Nie, J. (2019). Attempting rigour and replicability in thematic analysis of qualitative research data ; a case study of codebook development. *Springer : BMC Medical Research Methodology*, *19*(66), 1–8. https://doi.org/10.1186/s12874-019-0707-y

Sefi, A. A., Kapioru, C., & Surayasa, M. T. (2022). Strategi Pengembangan Usaha Sayuran Berbasis Pertanian Organik. *Buletin Ilmiah IMPAS, Juni 2022*, *23*(2), 138–151.

Sekaran, U., Lai, L., Ussiri, D. A. N., Kumar, S., & Clay, S. (2021). Role of integrated crop-livestock systems in improving agriculture production and addressing food security – A review. *Journal of Agriculture and Food Research*, *5*, 100190. https://doi.org/10.1016/j.jafr.2021.100190

Siuda, D., & Grebosz Krawczyk, M. (2025). The Role of Pro-Ecological Packaging in Shaping Purchase Intentions and Brand Image in the Food Sector : An Experimental Study. *Sustainability, Februari 2025*, *17*(1744), 1–19. https://doi.org/10.3390/su17041744

Sopyandi, D., Perdana, T., & Kusumawati, R. (2024). Kajian Pengembangan Model Ekonomi Sirkular (Circular Economy) Cabai sebagai Upaya Pengembangan Model Rantai Pasok Pertanian Berkelanjutan di Kabupaten Bogor. *Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, *10*(2), 2292–2309.

https://doi.org/10.25157/ma.v10i2.14158

Velasco-Muñoz, J. F., Aznar-Sánchez, J. A., López-Felices, B., & Román-Sánchez, I. M. (2022). Circular economy in agriculture. An analysis of the state of research based on the life cycle. *Sustainable Production and Consumption*, *34*, 257–270. https://doi.org/10.1016/j.spc.2022.09.017

Velasco-Munoz, J. F., Mendoza, J. M. F., Aznar-Sanchez, J. A., & Gallego-Schm, A. (2021). Circular economy implementation in the agricultural sector : Definition , strategies and indicators. *Resources, Conservation & Recycling*, *170*(April). https://doi.org/10.1016/j.resconrec.2021.105618

Waluyo, S. E. Y., Fitriyani, Z. A., & Huda, K. (2022). Konsep Green Economy Terhadap Penjualan Sektor UMKM Melalui Pertumbuhan Ekonomi Kota Mojokerto. *PROSIDING SEMINAR NASIONAL UNIVERSITAS PGRI PALANGKA RAYA*, 310–326. https://doi.org/10.54683/puppr.v1i0.32

Wang, Y., & Gao, B. (2024). Dual-Channel Supply Chain of Agricultural Products under Centralised and Decentralised Decision-Making. *Applied Sciences*, *14*(8039), 1–20. https://doi.org/10.3390/app14178039

Widyastuti, A. A. S. A., Abriantoko, O., & Hidayati, R. (2019). Pemberdayaan Pemuda Karang Taruna Melalui Program Remaja Peduli Lingkungan Desa Wisata Kebontunggul. *Penamas Adi Buana*, *3*(1), 23–30.

Zhang, Q., Dhir, A., & Kaur, P. (2022). Circular economy and the food sector: A systematic literature review. *Sustainable Production and Consumption*, *32*, 655–668. https://doi.org/10.1016/j.spc.2022.05.010

Zhao, J., Liu, D., & Huang, R. (2023). A Review of Climate-Smart Agriculture: Recent Advancements, Challenges, and Future Directions. *Sustainability (Switzerland)*, *15*(4), 1–15. https://doi.org/10.3390/su15043404