Enhancing Micro-enterprise Capacity through Circular Economy and Integrated Farming: Strategies for the Green Transition

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Abstract

The transition to a green economy presents both significant opportunities and profound hurdles for micro-enterprises, which typically operate with highly constrained capital and limited technical business expertise. This study addresses the core problem of how agricultural micro-enterprises can financially and strategically sustain the adoption of Circular Economy (CE) and Integrated Farming (IF) practices in a highly competitive market. The primary purpose of this research is to formulate a comprehensive capacity-building strategy by integrating multidisciplinary perspectives from strategic marketing, financial management, taxation, and environmental accounting. An explanatory sequential mixed-methods design was employed, focusing exclusively on a purposive sample of exactly 40 agricultural micro-enterprises located in Magelang Regency, Central Java, Indonesia. Quantitative data regarding financial performance, Environmental Management Accounting (EMA) implementation, tax literacy, and market positioning were collected via structured questionnaires. This was followed by qualitative Focus Group Discussions (FGD) to deeply interpret the numerical findings and behavioral barriers. The results indicate that while the implementation of CE and IF successfully reduces operational costs by an average of 14.5% through effective waste valorization, the formal adoption of EMA remains at a moderate to low level. Furthermore, while strategic green marketing allowed digitally literate enterprises to capture a price premium, there is a critical vulnerability in taxation strategy, with the lowest overall awareness score recorded for green tax incentives. The study concludes that technical agricultural training alone is wholly insufficient. Micro-enterprises require an integrated capacity-building approach emphasizing sustainable cost accounting, proactive tax planning, and green value-proposition marketing to ensure long-term organizational resilience and inclusive economic growth.

Keywords: Circular Economy, Environmental Accounting, Green Marketing, Integrated Farming, Mixed Methods

INTRODUCTION

The global macroeconomic shift towards a green economy is fundamentally reshaping how agricultural and manufacturing sectors operate. This ecological transition places micro, small, and medium enterprises (MSMEs) at the absolute forefront of the movement, particularly in developing nations where they constitute the backbone of local economies. In major agricultural hubs such as Magelang Regency, Central Java, micro-enterprises are increasingly pressured to adopt sustainable practices to mitigate environmental degradation while maintaining profitability. Two of the most prominent frameworks being adopted are the Circular Economy (CE) and Integrated Farming (IF) systems. While CE focuses on closing the loop of product lifecycles through aggressive waste minimization and resource reuse, IF

serves as its practical agricultural manifestation. Integrated Farming combines different agricultural sub-sectors, such as crop cultivation, poultry, and aquaculture to create a closed-loop, self-sustaining ecosystem where the waste of one process becomes the raw input for another. However, transitioning to these sustainable models requires initial capital expenditure, significant shifts in operational paradigms, and a restructuring of cost management, placing immense pressure on the often-fragile financial structures of rural micro-businesses.

Recent academic literature has extensively documented the environmental and agronomic benefits of CE and IF. Foundational studies highlight how circular business models drastically reduce supply chain vulnerabilities and limit environmental degradation (Bocken and Geradts, 2020; Centobelli et al., 2021). From an accounting and financial perspective, Environmental Management Accounting (EMA) has emerged as a crucial theoretical tool to help businesses quantify waste and energy costs. EMA is designed to translate ecological efforts into tangible financial metrics, proving that sustainability can be profitable (Gunarathne and Lee, 2021). Furthermore, within the realm of strategic management and marketing, consumer demand for ethically sourced and environmentally friendly products has grown exponentially. This shift provides a potential competitive advantage for sustainable businesses that can effectively communicate their green value proposition to the market (Papadas et al., 2019).

Despite these theoretical advancements, the current state of the art remains highly compartmentalized and siloed. Agronomic studies focusing on integrated farming rarely intersect with discussions on tax literacy or fiscal policy. Similarly, advanced green marketing is frequently treated in the literature as a strategy exclusive to large, multinational corporations with substantial promotional budgets. This leaves rural micro-enterprises vastly underrepresented in multidisciplinary business literature. There is a distinct, critical gap in current research regarding how micro-enterprises practically manage the crossover between financial management, taxation compliance, environmental accounting, and strategic marketing when executing green transitions at the grassroots level.

Therefore, the novelty and urgency of this research lie in its localized, highly integrated multidisciplinary evaluation. By focusing exclusively on exactly 40 micro-enterprises specifically situated in Magelang Regency, this study moves beyond abstract agronomy. It utilizes a robust mixed-methods approach to synthesize cost-accounting models, tax incentive awareness, financial feasibility, and marketing positioning into a single analytical framework. This research provides a realistic, human-centric blueprint for building organizational resilience, demonstrating that true inclusive growth in a changing world requires more than just planting seeds; it requires strategic business acumen.

RESEARCH METHODOLOGY

This research strategically employs an Explanatory Sequential Mixed-Methods design. This is a rigorous two-phase approach where quantitative data is collected and analyzed in the first phase, followed by targeted qualitative data collection to elaborate on, contextualize, and explain the numerical findings (Creswell and Creswell, 2023). The study was conducted exclusively in Magelang Regency, Central Java. The population for this study consisted of rural agricultural businesses, from which a purposive sample of exactly 40 micro-enterprises was carefully selected. The inclusion criteria required that the enterprises must have operated for at least two years and have either initiated or fully implemented both Circular Economy principles and Integrated Farming practices within their daily operations.

In the first phase of the research, quantitative data was gathered through structured, researcher-administered questionnaires distributed directly to the 40 enterprise owners. The survey instrument was designed to measure four core variables representing multidisciplinary business capacity using a standardized 5-point Likert scale (ranging from 1 = strongly disagree/very low capacity, to 5 = strongly agree/very high capacity). The variables included: Environmental Management Accounting (EMA) application, strategic green marketing adoption, tax incentive awareness, and general financial management capability. Additionally, empirical numerical data regarding the percentage of operational cost reduction post-integration was collected. The quantitative data was rigorously analyzed using descriptive statistical techniques via IBM SPSS Statistics Version 26 to determine the mean, minimum, maximum, and standard deviation for each specific variable (Ghozali, 2021).

In the second phase, in-depth qualitative data was collected through a structured Focus Group Discussion (FGD). The FGD involved 8 specifically selected respondents drawn from the initial sample of 40. These specific individuals were chosen based on their contrasting survey scores for instance, selecting owners who scored exceptionally high in marketing but critically low in tax awareness to provide a rich, diverse, and explanatory narrative. The FGD lasted for approximately 120 minutes, was audio-recorded with consent, transcribed verbatim, and subsequently analyzed using reflexive thematic analysis. This qualitative approach was crucial for interpreting the behavioral, generational, and institutional barriers operating behind the descriptive statistics (Yin, 2018).

RESULTS AND DISCUSSION

The quantitative survey provided a clear, objective baseline of the multidisciplinary business capacities among the 40 micro-enterprises in Magelang Regency. Subsequently, the qualitative FGDs uncovered the practical realities, daily struggles, and institutional challenges driving these statistical numbers. The integrated findings are presented in Table 1 and discussed thoroughly across the specific disciplinary focuses of the study.

Table 1. Statistical Results

Variables	Minimum	Maximum	Mean	Std. Deviation
Financial Management Capability (1-5)	2.00	5.00	3.85	0.72
Green Marketing Adoption (1-5)	1.00	5.00	3.40	0.88
EMA Implementation (1-5)	1.00	4.00	2.65	0.91

Tax Incentive Awareness (1-5)	1.00	3.00	1.80	0.65
Operational Cost Reduction (%)	5.00	25.00	14.50	4.20

Source: Primary Data Processing, 2026.

Accounting and Financial Management Perspectives The descriptive statistics displayed in Table 1 indicate that while the general Financial Management Capability among the respondents is relatively strong and commendable (Mean = 3.85), the specific, technical implementation of Environmental Management Accounting (EMA) remains at a weak to moderate level (Mean = 2.65). Despite this low level of accounting formality, the quantitative empirical data revealed that the physical transition to CE and IF still yielded a highly tangible average operational cost reduction of 14.5% among the 40 respondents.

During the qualitative FGD, the enterprise owners elaborated extensively on this discrepancy, highlighting a widespread practice of what can be termed "informal circularity." One key participant eloquently noted, *"We inherently know that feeding our catfish with the agricultural waste from our vegetable plots saves us significant money every month. We manage our daily cash flow carefully so we don't go bankrupt, but we do not record the specific financial value of that reused waste on our formal ledgers."* This primary finding strongly confirms the theoretical assertions by Lutfi et al. (2022) and Kristoffersen et al. (2021), which state that MSMEs frequently practice environmental sustainability without the formal Material Flow Cost Accounting (MFCA) structures necessary to accurately measure true profit margins, optimize resource efficiency, and present bankable data to potential investors.

Strategic Green Marketing Execution The variable of Green Marketing Adoption showed a moderate overall mean score of 3.40. The initial survey indicated that businesses actively labeling and promoting their products as "organic," "pesticide-free," or "zero-waste" managed to successfully secure a price premium, particularly when selling to urban markets located near Magelang. However, the FGD revealed a very distinct and profound strategic divide based primarily on generational lines and digital literacy.

Younger micro-enterprise owners demonstrated a high propensity to utilize digital social media platforms and e-commerce to directly communicate their green value proposition to eco-conscious, middle-class consumers. By doing so, they effectively bypassed traditional supply chains and differentiated their brand. Conversely, older farmers in the sample still rely heavily on traditional middlemen and standard commodity pricing, entirely missing out on the added financial value generated by their hard-fought sustainable practices. This perfectly aligns with the contemporary marketing literature, reinforcing the assertion that adopting Marketing 5.0 strategies—merging human-centric values with digital execution—is absolutely vital for translating environmental efforts into economic competitive advantage (Kotler et al., 2021).

Taxation Strategy and Institutional Resilience Undoubtedly, the most critical vulnerability identified in this entire study is the realm of taxation strategy, which scored the lowest

across all measured metrics (Mean = 1.80). Shockingly, the maximum score recorded in the entire quantitative survey for this variable was only 3 out of 5, indicating a severe, systemic, and widespread lack of tax literacy. Consequently, micro-enterprises in Magelang Regency are absorbing the full, heavy financial burden of the green transition without leveraging any of the existing governmental fiscal support structures designed to aid them.

The FGD provided profound, sometimes frustrating insights into this massive institutional barrier. Participants universally expressed a mixture of confusion, apathy, and intimidation regarding national and regional tax laws. *"We are farmers and small traders, not trained accountants,"* stated an exasperated respondent during the FGD session. *"We heard rumors that there are tax deductions or holidays for buying eco-friendly equipment or reducing carbon, but the paperwork at the local tax office is far too complicated and intimidating. So, we just pay the standard final SME tax rate to avoid any trouble or audits."* This qualitative evidence strongly supports recent fiscal literature (Machmud and Dirgantari, 2021; Tarmidi et al., 2021), emphasizing that the sheer administrative complexity and bureaucratic opacity of tax compliance acts as a massive deterrent, preventing MSMEs from utilizing green tax incentives to improve their operating cash flow and overall financial resilience.

CONCLUSION

The physical integration of Circular Economy principles and Integrated Farming systems provides a highly robust agronomic foundation for micro-enterprises operating in Magelang Regency. However, evaluating this green transition through a rigorous, multidisciplinary business lens reveals that their overall organizational resilience remains deeply unbalanced. The explanatory sequential mixed-methods approach utilized in this study demonstrated that while these exactly 40 agricultural enterprises successfully manage basic daily cash flows and physically reduce operational costs by an average of 14.5%, they are severely hindered by a critical lack of advanced business acumen. Environmental Management Accounting is rarely formalized, which severely limits accurate cost-benefit tracking of their sustainable practices. Furthermore, while strategic green marketing is beginning to help some digitally literate businesses capture well-deserved premium pricing, the overwhelming, systemic lack of tax awareness remains a critical institutional barrier. The sheer inability to navigate bureaucracy and claim green tax incentives means these micro-enterprises are financing the crucial green transition entirely out of pocket, a practice that directly threatens their long-term financial viability. Ultimately, technical agricultural mastery is not enough; true resilience requires a holistic business strategy.

RECOMMENDATION

Based directly on the empirical findings of this research, it is highly recommended that local government bodies, specifically the Magelang Regency administration, alongside regional academic institutions, fundamentally redesign their MSME empowerment programs. Training curriculums must immediately shift from focusing purely on agricultural production techniques to integrated business capacity building. Specifically, regional tax authorities must actively simplify the bureaucratic procedures for claiming green MSME tax incentives and provide localized, hands-on tax literacy workshops. Additionally, the introduction of simplified, mobile-friendly digital Environmental Management Accounting applications would greatly assist micro-enterprises in formally tracking and capitalizing on their waste-reduction savings.

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