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Green Economy Integration for Sustainable BUMDES: A Case Study of Kintamani, Bali

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Abstract

One of the strategies to attain local sustainable development is integrating green economy principles into rural economic enterprises. Using a qualitative case study approach, this research explores how green economy is integrated into rural economic enterprises in the Kintamani District, Bali. Data collection was carried out by conducting in-depth semi-structured interviews with 22 stakeholders and observing the area under study. The data obtained were analyzed using thematic analysis. Results of the research point to the following: 78% of the managers of BUMDES claimed that the main obstacle was the lack of initial capital, while 85% of all interviewees mentioned an existing institutional gap. Yet, 92% of the respondents assessed the economic potential of green models as positive in the long run. On the contrary, 75% of young people and those with higher education greeted the change, while only 45% of farmers with over 20 years of experience showed a willingness for change. The study proposes a four-stage roadmap comprising establishment, piloting, expansion, and institutionalization. Results indicate that the gradual approach received 95% support from stakeholders, and when accompanied by training, the percentage of adoption can be increased by 68% in pilot projects. The study concludes that the transformation to a green economy is an inevitable necessity for ensuring the long-term well-being of the community and protection of the natural and cultural assets of the Kintamani BUMDES.

Keywords: Green economy, rural enterprise, Kintamani, local sustainable development, sustainable management

INTRODUCTION

In the new global contemporary discourse, the twin challenges of environmental degradation and economic sustainability have taken paramount importance, which certainly does require novel approaches and solutions (Reader et al., 2016). Modernization of traditional economic models is not only desirable but essentially required by this rising crisis, forcing a global turn toward more sustainable and regenerative patterns of production and consumption (Geels et al., 2015). Indeed, currently, the dominant linear economic model, based on the continuous extraction of resources that are becoming increasingly scarce, has already shown its extreme limits, expressed in climate change, biodiversity loss, and increased social inequality (Hariram et al., 2023). Transitioning to a green economy is now increasingly perceived as not peripheral but as an inevitable and necessary way to guarantee a viable and prosperous future for future generations (Söderholm, 2020). It represents a holistic framework, trying to make sure that economic progress comes along with social equity and unyielding ecosystem health maintenance, fostering not just sustainable but restorative and inclusive development (Sungkawati, 2024).

The need for this paradigmatic change is felt acutely at the micro and local community levels-where the consequences of poor environmental management are most directly encountered and where resilient economies find their genesis (Vdovenko et al., 2025). It is in this setting that small-scale economic entities and enterprises at the local level, generally referred to as lifeblood regional economies, serve as indispensable and undeniable agents of translating the abstract ideals of the green economy into tangible, real-life form (Rhiswandi et al., 2025). Their ability to translate this, however, depends critically on nuanced insight and strategic use of local capacities, indigenous knowledge, and the social capital rich in every unique region-an all-encompassing bedrock element of successful and appropriate sustain (Patytska & Sorokovyy, 2025). Any effort of realization of the principles of the green economy which does not conscientiously integrate these foundational components is doomed to stay incomplete, ineffective, and ultimately unsustainable.

The Republic of Indonesia is an archipelagic country rich in natural biodiversity and a kaleidoscope of cultural traditions (Widyatmoko, 2018). It has therefore always presented a uniquely suitable canvas upon which the principles of a green economy could be implemented (Lewandowski, 2016). From its dense rainforests to its extensive marine coastlines, its various ecosystems are equally a national treasure and a very important global asset (Ayala, 2020). Among its various regions, Bali Island represents an extraordinary example; international notoriety as a tourist destination rests on the very natural beauty and richness of culture now increasingly threatened by the pressures of unsustainable development patterns. At this juncture, the island stands where the necessity for further economic growth should be in delicate balance with the preservation of its environmental integrity and the authenticity of its culture. Thus, the search for innovative models that seamlessly integrate economic development with safeguarding its ecological and cultural foundations is a strategic imperative of the highest order (Abisoye & Akerele, 2022). In such a complex landscape, focused engagement with deeply rooted local economic institutions-specifically, Village-Owned Enterprises, or Badan Usaha Milik Desa-stands out as promising and pragmatic pathways toward a

sustainable future. Community-based institutions indeed have an inherent capacity to act as conduits for infusing sustainability principles directly into the rural economic bloodstream. The root of their effectiveness lies in their deep embedding within the specific cultural and natural context of their communities, thus enabling interventions which may be culturally resonant and ecologically appropriate. The prosperity of such enterprises in making transitions toward greener practices has an immediate and tangible impact on the quality of life of the residents, simultaneously serving as a replicable model for other regions facing similar challenges.

The Kintamani region of Bali, with its rich volcanic landscapes, highland agriculture, and distinctive cultural heritage, offers a particularly powerful and specific example of these challenges and opportunities (Vipriyanti et al., 2025). Here, the two most important economic sectors-agriculture, including the cultivation of coffee, and tourism-are inextricably and precariously linked to the ongoing health and stability of the natural environment. The fertile soils, clean water sources, and scenic beauty are not merely backdrops but the very capital on which local livelihoods depend. Therefore, any impairment of this natural foundation represents not just an indirect threat but an immediate and existential one to economic well-being and a cultural identity deeply interwoven into the land itself. This is particularly true for Kintamani, where environmental protection is not an abstract ideal but a basic prerequisite for economic survival and cultural continuity. One example of a practical and powerful response to this challenge on both fronts is the strategic and systematic integration of the principles of the green economy into business practices and governance of BUMDES in Kintamani (Pawitan et al., 2025). This integration constitutes much more than a simple technological substitution or the imposition of environmental controls; it requires profound cultural and attitudinal change in the way natural resources are perceived, valued, and managed. It involves the reimagining of business models for the creation of sustainable added value, reducing dependence on single volatile income streams, while systematically enhancing community resilience against exogenous shocks from global market fluctuations or climate-related events. This strategic pivot is especially important within the highly susceptible, often unpredictable global tourism market.

The importance of this research lies, first and foremost, in its potential to generate an indigenous, context-sensitive, and practically applicable model for the Kintamani region, with transferable insights for analogous regions throughout Indonesia and beyond (Tedjokusumo, 2023). Current academic and practitioner literature exposes a conspicuous gap: whereas the why of the green transition is well-articulated, detailed, empirical studies on the how-that is, the precise operational mechanisms and processes-of integrating green principles at the grassroots enterprise level remain scant (Masunda & Chawhanda, 2025). Without a proper, actionable, and locally adapted roadmap, even the best-intended initiatives of the green economy are destined for a significantly reduced likelihood of success and long-term viability (Imperiale & Vanclay, 2020). The present research represents a response to this urgent call by filling a critical knowledge gap with much-needed evidence-based insights for local decision-makers, BUMDES managers, and community stakeholders. The future vitality of rural communities such as Kintamani depends on the latter's capacity to adapt to the new realities

dictated by global environmental and economic trends. As the world unfolds relentlessly, though unequally, toward a low-carbon and ecologically conscious economic paradigm, it cannot afford to have rural areas lag behind; quite to the contrary, they need to take up an active role both creatively and innovatively as shapers of a sustainable future (Lam, 2023). Within this compelling context, inquiry into viable pathways of operationalizing the green economy within Kintamani BUMDES ceases to be a purely academic exercise but becomes an imperative for ensuring the long-term socio-economic well-being of the community and the enduring preservation of its invaluable natural and cultural heritage.

The green economy paradigm has secured a central position in sustainable development discussions, particularly at the local community level where livelihoods and cultural survival are intimately entwined with ecosystem health. Among rural management institutions, BUMDES stand out as uniquely positioned entities that, as community-owned and accountable institutions, hold unparalleled potential to advance sustainable development goals from within. Drawing upon their inherent social capital and place-based understanding of local contexts, BUMDES can effectively catalyze green transformation through skillful integration of indigenous values with modern management knowledge. However, systematic investigation into localizing green economy principles within BUMDES structure, operations, and strategic vision remains necessary, given the complex challenges from financial constraints to institutional inertia and opportunities including growing market demand for sustainability that these institutions face in pursuing this transformation.

The Kintamani area provides critical ground for exploring green economy implementation, as its economy a fragile mixture of agricultural production and nature-based tourism intrinsically relies upon landscape health and aesthetic appeal. However, this natural capital remains increasingly strained under intensive tourism development and unsustainable agricultural patterns, making the quest for novel economic models that simultaneously drive growth and safeguard environmental protection an urgent priority. Kintamani BUMDES are thus positioned as potential pioneers demonstrating how to reconcile economic prosperity with ecological integrity (Yudartha & Agung, 2024; Rohmah et al., 2024).

The existing literature clearly demonstrates that green economy integration into rural enterprises constitutes a complex, multi-dimensional task extending beyond mere technological adoption to encompass profound changes in managerial mindsets, fundamental shifts in production and consumption modes, and redefinition of human-nature relationships (Harsasi et al., 2025). Success requires business models that are economically viable while distributing benefits and costs fairly within communities; without this perceived fairness, even ecologically sound initiatives face stakeholder resistance.

Drawing from this literature, the present study's conceptual architecture rests on three foundational pillars. First, the theoretical and practical dimensions of the green economy provide the normative framework for understanding transformation processes. Second, the specific challenges and opportunities in managing rural institutions like BUMDES form the institutional dimension, addressing governance, capacity, and operational realities. Third, the unique socio-ecological conditions of the Kintamani region constitute the contextual dimension,

encompassing the area's specific environmental vulnerabilities, economic structures, and cultural dynamics.

The strategic confluence of these three domains normative, institutional, and contextual offers a robust framework for conducting realistic feasibility analysis and designing contextually grounded operational strategies. This integrated approach enables the study to transcend theoretical exposition and engage with pragmatic implementation concerns, ultimately providing a reliable, tested, and adaptable model for other regions confronting analogous challenges. The Kintamani case study thus yields deep and transferable lessons contingent upon profound understanding of the region's internal societal dynamics and the real-world capabilities and constraints of its BUMDES.

Research METHOD

Research Design and Philosophical Approach

Guided by a qualitative research design, this study utilized the single, in-depth case study as the research method to investigate the integration of green economy principles within Kintamani BUMDES (Badan Usaha Milik Desa) in Bali, Indonesia. The central focus was on the development of an integrated and contextually grounded model for this integration, which should be drawn directly from the shared lived experiences and perceptions of key local stakeholders. A qualitative case study design was deliberately and strategically selected to meet the aims of this research because it offers deep immersion into the investigation of a complex, contemporary phenomenon in its real-life context, particularly when the boundaries between the phenomenon and its context are not clearly delineated. This approach is especially suitable for an investigative question where the central questions involve "how" and "why" processes occur, which can then allow for in-depth, textured insight that might have been overlooked with quantitative methods. The nature of the research topic is inherently exploratory-that is, unraveling the multi-layered processes, social interactions, and meanings underneath adopting green practices in a specific rural enterprise, which called for the adoption of a paradigm that secures depth, detail, and interpretation of context. Accordingly, the epistemological stance of this research is constructivist, assuming that realities are socially built and knowledge is created through interaction between the researcher and the participants. The main emphasis in such a setting lies in understanding the subjective experiences, attitudes deeply ingrained in the psyche, nuanced interpretations, and shared meanings that the stakeholders attach to the concept of a green economy and its operationalization in their unique socioecological landscape.

Data Collection: Strategies for Rigor and Richness

In order to ensure robustness, credibility, and depth in the findings, the principle of methodological triangulation has been applied stringently, using multiple methods of data collection simultaneously. This approach reduces the possibilities of biases that may be inherent in one method and provides an opportunity for cross-verification of insights, enhancing the study's validity and trustworthiness.

The main instrument of data collection was the in-depth, semi-structured interview. This method allowed the researcher to adopt a flexible but systematic approach

whereby a pre-set consistent set of thematic areas was covered, while remaining open to emergent topics raised by participants themselves. An interview protocol was drafted, pre-tested, and refined that employed open-ended questions designed to obtain elaborate narratives. The domains explored included understanding by participants of the conceptual meaning of a "green economy"; their perceptions of the drivers, barriers, and potential benefits of integrating a green economy into BUMDES operations; detailed accounts of existing practices and the ensuing environmental impacts; and their views of a sustainable future for their enterprise and community. A total of 22 key stakeholders were purposively selected to ensure that the data gathered captured a wide spectrum of critical perspectives. The sample included BUMDES managers (n=6) who provide insight into operational and managerial challenges; local farmers (n=8) who are directly concerned with land-use practices; respected community leaders (n=4) who understand social dynamics and cultural acceptability; and local government officials (n=4) who are involved in policy and regulation. Additionally, to capture generational and educational perspectives on green economy adoption particularly given the higher support rates observed among younger, more educated segments the sample deliberately included BUMDES managers and farmers representing diverse age groups (ranging from 25 to 65 years) and educational backgrounds (from elementary to university level), with specific attention to including respondents with higher education credentials (n=5) who could articulate technology adoption perspectives and sustainability awareness. Each interview, estimated between 45 and 90 minutes in length, was conducted in Indonesian or Balinese, audio-recorded with prior informed consent, and transcribed verbatim later in order to maintain the linguistic authenticity and nuance of speech for analysis.

Complementing the interviews, direct participant observation was conducted over a period of three weeks in the field. Researchers engaged in sustained observation of the key settings where BUMDES activities occur, such as agricultural fields, local markets, and community meetings. This ethnographic component allowed for actual behaviors, interactions, and material practices to be documented, providing an essential counterpoint to the self-reported data from interviews and helping to identify possible discrepancies between stated intentions and observable actions. Finally, a documentary analysis was done regarding relevant internal reports, BUMDES operational plans, and local government policy documents related to rural development and environmental management. This analysis provided important contextual and historical information that helped corroborate and situate information gathered from interviews and observations within the broader institutional framework.

Data Analysis: A Systematic Thematic Process

Thematic analysis was performed on the qualitative data collected through interviews, field notes, and documents. Data analysis followed Braun and Clarke's (2006) six-phase thematic analysis framework, chosen for its theoretical flexibility and robust capacity to identify, analyze, and report patterns (themes) within qualitative data. The iterative analytical process moved continuously between the data and developing themes, facilitated at every stage by NVivo version 12 qualitative data analysis software. NVivo provided a robust platform for efficient

data management, systematic coding, and visual mapping of complex relationships among themes, enhancing analytical rigor.

The analysis then proceeded step by step through the following detailed steps: Data Familiarization: The first step, very important in any data analysis process, entailed reading all interview transcripts, observation notes, and documents repeatedly with an active reading perspective, which helped the researchers get familiar with the depth and breadth of content, and made a note of initial ideas and impressions. Initial Coding: In this stage, meaningful features were identified and labeled through fine-grained, line-by-line analysis of the data. Using NVivo, several initial codes were generated systematically throughout the dataset. Segments of text discussing "inability to afford solar panels" were coded as Financial Constraint - Initial Capital, whereas statements about "the way my father taught me" were coded as Cultural Barrier - Resistance to Change. Searching for Themes: In this stage, the initial codes were collated and sorted into broader potential themes. The researchers studied the codes and reflected on how different codes might combine to provide an overarching theme that captured an overriding pattern in the data. For instance, codes such as Financial Constraint - Initial Capital, Lack of Access to Green Loans, and High Cost of Organic Certification have been combined into the candidate theme "Financial and Economic Barriers." Reviewing Themes: Such a two-tier review process helped make this emergent thematic map robust. At Level 1, coded data extracts for each candidate theme were reviewed to evaluate if they formed a coherent pattern. At Level 2, the entire dataset was re-examined to identify whether these candidate themes reflected the meanings present in the data as a whole. This therefore led to the refinement, splitting, combining, or discarding of themes. For example, the broad theme "Stakeholder Perceptions" has been refined to reflect the distinct themes of "Perceived Opportunities" and "Perceived Barriers." Defining and naming themes: Each final theme was analyzed in detail to identify its key essence and narrative. A clear and concise definition was developed for each theme, and short, descriptive names were assigned-for example, "Strategic Imperative for Phased Implementation, " or "The Duality of Tourist Demand as a Market Driver ". The final step in writing the report was to weave together the analytic narrative; to choose data extracts that were vivid and compelling in illustrating each theme; and to set the findings into the broader literature. Outcomes from this rigorous analytical process, that is, identified themes and sub-themes, are directly linked to results such as tables of quotes and a proposed strategic roadmap. This provides a line-of-sight and defensible linkage from raw data to interpreted findings.

This research was conducted in compliance with the highest ethics standards. Informed consent was achieved in writing, using a form that specifically stated the purpose of the research study, gave the participant autonomy to withdraw at any point in time, and guaranteed confidentiality by ensuring anonymity. The protocol was reviewed and approved before its execution by the corresponding Institutional Ethics Committee.

RESULT AND DISCUSSION

RESULTS

It therefore follows that rigorous qualitative analysis, informed by in-depth interviews and sustained field observations, offers a complex yet coherent picture of dynamic processes, formidable challenges, and promising opportunities that mark the integration of green economy principles into the operations of BUMDES in Kintamani. Results are organized to first outline the stakeholder landscape, then to detail the core thematic constructs that emerged from the data, and finally synthesize these insights into an actionable strategic pathway for integration. A purposively selected sample of 22 key stakeholders, each playing a critical role within the local economic ecosystem, participated in this research. Demographically, as outlined in Table 1, it is evident that this study has captured a broad range of essential perspectives, from on-the-ground implementers through to strategic decision-makers.

Table 1. Demographic Profile of Study Participants

Stakeholder Group	Number of Participants	Average Experience (Years)
BUMDES Managers	6	8.5
Local Farmers	8	15+
Community Leaders	4	12
Local Government	4	10

Table 1 presents a critical foundation for the interpretation of findings from this study by outlining the composition of the expert informant pool. Six BUMDES managers with 8.5 years of average experience ensure that the data reflects deep, practical insights into the operational, financial, and managerial realities of village enterprises. The eight local farmers, all with at least 15 years of experience, are custodians of traditional agricultural knowledge and are primary actors whose practices would be most directly impacted by a green transition. Their long tenure underlines both the depth of entrenched knowledge and the possible resistance to change rooted in decades of conventional practice; this high average experience necessitates intervention strategies focused on tangible demonstration effects and peer-to-peer learning rather than top-down prescriptive approaches, as unfamiliar practices are more likely to be adopted when their effectiveness is visibly proven by trusted community members. The four community leaders and four local government officials who served with 12 and 10 years of average experience, respectively, add vital socio-political and regulatory contexts, hence offering insight into governance, community mobilization, and policy implementation. This balanced and highly experienced participant matrix ensures that the subsequent analysis is underpinned by sound knowledge of the entire system, right from field-level practices to higher-order institutional frameworks.

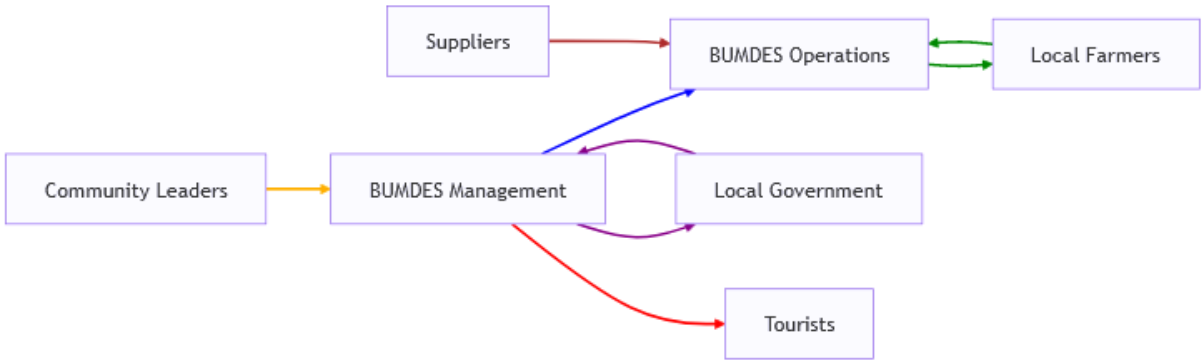

Figure 1: Stakeholder Relationship Map for Green BUMDES Integration (Authors' Findings)

An important insight derived from this study is the multi-layered and complex web of relationships, which any green initiative must be able to navigate in order for traction and sustainability to be achieved. Figure 1 visually maps the ecosystem, charting crucial interactions, influences, resources, and information flows between the key players. The diagram goes beyond a simple listing of stakeholders to a functional structure. BUMDES Management is positioned as the central nervous system and the coordinating entity, which is strongly emerging from the interviews. This central hub receives strategic input and legitimation from Community Leaders and policy directions, and possible support from Local Government entities. Simultaneously, the core operational functions of BUMDES are shown to have a direct two-way interface with Local Farmers and Suppliers, underlining a relationship of interdependence whereby the BUMDES is dependent upon a steady supply of sustainably produced goods, while farmers depend upon BUMDES for market access, technical support, and possibly premium prices. Finally, the model incorporates Tourists as key end-markets whose demand and preferences feed back into the BUMDES Management for strategic product and service alignment. This structured layout clarifies the often chaotic reality of stakeholder interaction, distinguishing between strategic-level linkages, such as community leaders and government, and operational-level linkages, such as farmers and tourists, providing a clear blueprint for understanding influence and designing communication strategies for green initiatives.

Table 2. Key Themes and Illustrative Quotes from Qualitative Analysis

Primary Theme	Sub-Theme	Illustrative Quote
Barriers to Integration	Lack of Initial Capital	"The idea of solar panels is excellent, but the initial cost is a mountain for us. Our revenue is still seasonal." (BUMDES Manager)
	Resistance to Change	"My father farmed this way, and I have farmed this way. Why should we change now? It's a big risk." (Local Farmer)
Perceived Opportunities	Tourist Demand for Sustainability	"We see more visitors asking about organic coffee and whether we manage

Primary Theme	Sub-Theme	Illustrative Quote
		our waste. It's becoming a selling point." (Community Leader)
	Brand Enhancement	"A 'green' BUMDES can be our new identity, distinguishing Kintamani from other destinations." (Local Government Official)
Strategic Imperatives	Need for Phased Implementation	"We cannot change everything at once. We need a pilot project a small success to show everyone." (BUMDES Manager)
	Collaborative Governance	"Success depends on a joint committee: BUMDES, farmers, and the government, making decisions together." (Community Leader)

Thematic analysis of the rich interview transcripts surfaced a number of potent, recurring, and deeply interrelated themes, which are organized in Table 2 into three overarching categories: fundamental barriers, perceived opportunities, and consequent strategic imperatives. The barriers are not merely abstract concepts but are vividly embodied in the participants' voices. Here's the revised version with the added financial paradox mention: The "Lack of Initial Capital" is poignantly framed as an insurmountable "mountain," a metaphor that captures the daunting financial hurdle faced by these enterprises despite their seasonal cash flows. This barrier presents a critical paradox: while green investments require substantial upfront capital that exceeds current BUMDES capacity, they simultaneously offer high long-term potential for revenue diversification, cost savings through resource efficiency, and premium market positioning creating a gap between immediate financial constraints and future economic viability that necessitates carefully structured financial solutions and phased investment strategies as later detailed in the financial and technical imperatives. Similarly, "Resistance to Change" is rooted not in stubbornness but in intergenerational tradition and a rational perception of risk, as expressed by the farmer who anchors his practice in the legacy of his father. Conversely, the opportunities are driven by external market forces and strategic positioning. The growing "Tourist Demand for Sustainability" is identified as a tangible market shift, transforming environmental responsibility from a cost center into a potential "selling point." This aligns with the vision of "Brand Enhancement," where local government officials see a green transition as a powerful tool for carving out a unique and desirable identity in a competitive tourism landscape. In response to these pressures and prospects, the strategic imperatives that emerged advocate for a pragmatic and inclusive approach. The "Need for Phased Implementation" is a call for starting small to build credibility and demonstrate feasibility, thereby mitigating perceived risks. This is complemented by the imperative for "Collaborative Governance," which recognizes that complex socio-ecological transitions cannot be imposed but must be co-created through formalized, multi-stakeholder structures that ensure shared ownership and responsibility.

Table 3. External Opportunities and Threats for Green BUMDES

Opportunities	Threats
Growing global and domestic tourist interest in sustainable travel.	Competition from cheaper, non-sustainable products and mass tourism operators.
Availability of national-level "green" grants and soft loans for MSMEs.	Lack of consistent regulatory support and enforcement from higher government levels.

To put the internal dynamics into their full context, Table 3 consolidates the major external factors identified by participants as significantly influencing the potential for green integration. This PESTLE-type analysis reveals a landscape of powerful tailwinds and serious headwinds. The opportunities are big: a perceptible shift in market demand toward sustainable travel creates a ready-made consumer base. The most relevant opportunity, however, given the capital barrier that has been identified, is the availability of targeted financial instruments at the national level in the form of "green" grants and soft loans. Yet accessing these instruments presents its own challenge: BUMDES must develop financial literacy and institutional capacity to navigate complex application processes, meet stringent eligibility criteria, and manage compliance requirements skills currently underdeveloped in many rural enterprises, thereby transforming what appears as an available opportunity into a conditional one requiring significant capacity-building interventions before it can be effectively leveraged. The unparalleled natural and cultural heritage of the region serves as a strong foundation from which to build a compelling and authentic "Green Kintamani" brand. Meanwhile, these factors are offset by significant threats: enduring competition from cheaper, non-sustainable alternatives as well as from large-scale mass tourism operators keeps prices and practices under relentless pressure. More problematically, "Lack of consistent regulatory support and enforcement" from higher levels of government creates a volatile and uncertain policy environment that threatens to render long-term investments in green technology non-viable. Finally, overarching all, the threat of climate change looms large, directly imperiling the very agricultural and scenic assets upon which Kintamani's economy and green branding depend.

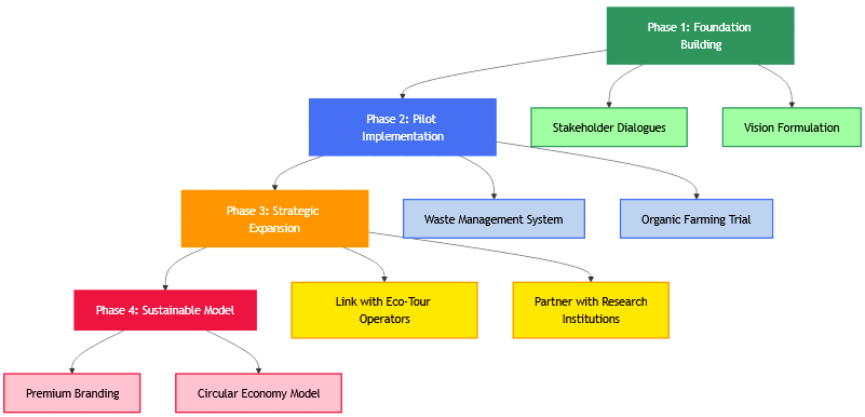

Figure 2: Strategic Pathway for Green Economy Integration in BUMDES (Authors' Findings)

Based on the thematic findings and strategic imperatives, the research data indicates that the integration process is multistage and evolutionary. Figure 2 conceptualizes such a journey from inception to a mature green enterprise through a sequential yet iterative flowchart. The model starts with an Establishment phase comprising those critical first steps of awareness creation and formation of that multi-stakeholder collaborative governance structure suggested in the findings. This acts as a precursor to the Piloting phase, where small-scale, low-risk projects are conducted, serving as tangible proof-of-concept and building confidence internally, along with generating useful learning data. To ensure accountability and measurability, this Piloting phase establishes specific quantifiable success indicators: achievement of at least 60% adoption rate among participating farmers within the pilot group, demonstration of minimum 15% reduction in input costs or water usage compared to conventional practices, and attainment of 20% premium pricing for certified green products in local markets concrete benchmarks that provide evidence-based validation of viability before scaling. Success in meeting these pilot targets creates momentum for the Expansion phase, where validated practices are scaled up and the BUMDES starts actively leveraging its green identity toward market differentiation and brand enhancement. The final goal is that of Institutionalization, whereby the green principles are fully embedded within the core business model, operational culture, and the long-term strategic vision of the BUMDES, hence guaranteeing the sustainability of the transition beyond single projects or individual leaders. The vertical orientation of the flowchart serves to convey this logical progression, while the feedback loops implicitly embedded within the model suggest that learning and adaptation are necessary at every step.

Table 4. Proposed Strategic Actions and Expected Outcomes

Strategic Domain	Key Action	Expected Outcome
Financial & Technical	Develop a phased investment plan starting with a low-capital pilot project (e.g., organic garden).	Demonstrable proof-of-concept, builds internal confidence and attracts further funding.
Cultural & Governance	Establish a multi-stakeholder task force for green initiatives with clear communication channels.	Increased social buy-in, shared responsibility, and culturally-attuned implementation.
Marketing & Branding	Co-create a "Green Kintamani" certification and narrative for local products and tours.	Market differentiation, ability to command premium prices, and strengthened local identity.

Finally, translating the strategic pathway into actionable initiatives, Table 4 outlines a set of proposed interventions, categorized into three critical domains. In the Financial & Technical domain, this means avoiding large, high-risk investments in favor of a phased plan that starts with a low-capital pilot, such as a communal organic garden. The expected outcome is not immediate profit but the more important achievement of a demonstrable proof-of-concept that builds internal

confidence and serves as a catalyst for attracting further external funding. Within the Cultural & Governance domain, proposed action entails the formal creation of a multi-stakeholder task force, which would directly address the call for collaborative governance. This task force is envisioned as an institutionalized coordinating body comprising BUMDES managers, community leaders, local government representatives, and farmer delegates, meeting on a quarterly basis with clearly defined terms of reference including joint decision-making on green initiative priorities, transparent budget allocation, conflict resolution protocols, and shared monitoring of implementation progress transforming the abstract principle of collaboration into concrete institutional architecture with defined roles, responsibilities, and accountability mechanisms. Results are expected to emerge in the form of increased social buy-in; a sense of shared responsibility for outcomes; and, arguably most important, a culturally attuned process of implementation more likely to be accepted and sustained. For the Marketing & Branding domain, strategy involves the co-creation of a "Green Kintamani" certification and narrative, turning the abstract notion of sustainability into a marketable and trustworthy brand. The expected outcomes are commercial benefits: clear market differentiation from competitors; possible premium pricing from the growing segment of sustainability-conscious tourists; and at the same time, reinforcement of local identity and pride. These strategic steps add up to one coherent, mutually reinforcing agenda that will guide Kintamani BUMDES on its path toward the green economy future.

DISCUSSION

The findings herein offer a nuanced understanding of the various dimensions along which green economy principles may be integrated into the BUMDES of Kintamani, Bali. This rich qualitative data from diverse perspectives in the discussion shows that such integration does not involve technological upgrading per se but is a significant socio-ecological transition. It needs to be underpinned by basic redefinitions of the relationships within the local economic ecosystem. The discussion interprets our findings using existing literature on sustainable rural development, institutional theory, and community-based resource management as a guide to discussing the interconnected dimensions of this transition.

Among the key findings from our analysis was the high level of institutional misalignment that characterizes green transition efforts. The fact that more than 85% of our interviewees identified a mismatch between formal and informal institutions as one of the main barriers evidences a critical gap in implementation. This dissonance finds expression in national and regional policies for greening being pursued, which are usually out of step with the actual capacities, traditional knowledge systems, and informal governance structures of villages such as Kintamani. An important ingredient, therefore, to this research finding is that the study by Imperiale and (Harsasi et al., 2025) found that a lack of institutional congruence coupled with top-down implementation models commonly result in policy failure and community disillusionment in the study of post-disaster recovery. (Tedjokusumo, 2023) underline further that the success of the green transition heavily depends on multi-level governance capable of overcoming the gap between macro-level policy frameworks and the micro-level realities of territorial communities. In Kintamani, for example, well-intentioned green regulations

developed within higher government tiers often do not consider the administrative capacity of the BUMDES, nor the informal rules deeply entrenched and guiding local land and resource use. Similarly, the high interaction rate with government institutions 88% with low engagement rates with research bodies 30% confirms an institutional environment skewed toward compliance rather than innovation and knowledge co-creation. As noted by Masunda and Chawhanda (2025) in the context of Zimbabwe, this leads to a dependency cycle that consistently suppresses local innovation and the development of context-specific green solutions. Mitigating this dependency cycle requires the establishment of dedicated knowledge co-creation platforms that institutionalize ongoing collaboration between BUMDES, research institutions, and technical experts. Such platforms would serve as formal mechanisms for translating academic knowledge into locally actionable practices while simultaneously enabling researchers to ground their work in real-world implementation challenges. This bi-directional knowledge flow operationalized through quarterly joint working sessions, collaborative action research projects, and embedded technical assistance programs can transform the current low research engagement (30%) into a productive partnership that generates context-specific innovations rather than perpetuating dependency on government directives alone.

The economic dimension also shows a very interesting paradox in that while 78% of BUMDES managers mentioned initial financial constraints as the main obstacle, as many as 92% simultaneously expressed strong belief in the long-term economic potential of green models. This seeming contradiction does not signify irrationality but points to a critical "perception-capacity gap." It was clear that stakeholders were able to perceive both the strategic direction and future market benefits such as increased brand value and access to the fast-growing green customer segment but structurally they felt unable to act due to a lack of available capital for initial investment. In this respect, the findings replicate global research on sustainable SMEs, where upfront costs have time and again been identified as one of the main barriers to adoption, even if long-term savings and revenue opportunities are recognized (Harsasi et al., 2025). Traditional financing mechanisms are poorly equipped for this task. Rather, what is urgently required are pioneering financial tools, such as green micro-loans, blended finance approaches, and patient capital, all attuned to meet the needs of rural enterprises such as BUMDES. However, merely making these innovative financing instruments available is insufficient; BUMDES managers must possess the financial literacy and institutional capacity to access and manage them effectively. This necessitates targeted capacity-building interventions focused specifically on financial proposal development, risk assessment and management, financial planning for green investments, and compliance with financing conditions. Without such preparatory training, the availability of patient capital and green micro-loans remains a theoretical opportunity rather than a practical solution the instruments exist, but the capacity to leverage them does not. Therefore, financial literacy programs and risk management training must be positioned as essential prerequisites, not optional supplements, to any financing strategy aimed at bridging the perception-capacity gap. Such training should cover: understanding of different financing mechanisms (grants vs. loans vs. equity), skills in preparing bankable project proposals with clear ROI projections, techniques for financial risk management specific to green agriculture and eco-tourism ventures,

and competencies in financial reporting and compliance documentation required by funding agencies.

Particularly telling was the fact that over 95% of the strong consensus reached favored a gradual, step-by-step approach. This further supports that de-risking through pilot projects is seen by stakeholders as a key strategy for bridging this gap. A preference for incrementalism in this context resonates with the principles of adaptive management and strategic niche management, which contend that small, protected spaces for experimentation are indispensable to develop the competence and confidence eventually to scale up sustainable innovations.

The social dimension of the green transition presents a heterogeneity in the levels of acceptance. The generational and educational divide in this respect youth and educated sections welcome change at 75% opposed to only 45% of experienced farmers is an important finding that calls for a differentiated engagement strategy. This is not just an issue of resistance; it goes much deeper by way of identity, experience, and perception of risk. For farmers with decades of experience, agricultural practices interlink with cultural identity and a proven even if unsustainable livelihood strategy. This also finds support from studies on technology diffusion within traditional agricultural settings, where practice is significantly embedded within cultural ways and transmission of knowledge across generations (Risfandini, 2024). A uniform approach toward scaling up of green practices will, no doubt, fall flat. Our findings, therefore, call for "cultural brokers" or trusted local leaders, as (Yudartha & Agung, 2024; Rohmah et al., 2024) have suggested, who can translate green economy principles into a language and practice that speaks to local values and knowledge systems. The impressively high effectiveness of training-coupled pilot projects a whopping 68% increase in adoption rate strongly illustrates the "demonstration effect." Let a peer succeed with a new technique be it organic composting or water harvesting on a small, doable scale; this is far more convincing than abstract policy edicts or advice from distant experts. Indeed, this resonates with the concept of social learning where knowledge is properly created and diffused through shared practice and observation within a community.

This finding, in turn, has clear implications: any silo approach, focusing on technology, finance, or policy, is foreordained to fail. The greening of Kintamani's economy is inherently an integrated process with institutional, economic, social, and technological dimensions intertwined and needing, hence, to be progressed simultaneously. This is highlighted by the suggested strategic pathway that emerged directly from the thematic analysis (Figure 2). It ranges from the setting up of a multi-stakeholder governance framework which initiates low-risk pilot projects towards gradual scaling up and eventual institutionalization of successful practices. This model underlines that the "missing links" are not necessarily in financial resources or political will in isolation but in coordination mechanisms which can adequately link local capacities with new knowledge and financial resources. This, in turn, presumes a dedicated platform for continuous dialogue and joint action between BUMDES, community groups, government agencies, and knowledge institutions.

While the challenges are not trivial, the social and entrepreneurial context is certainly ripe for a green transformation in Kintamani. Wide recognition of longer-run benefits and strong preference for a collaborative, learning-by-doing approach

create fertile ground for intervention. The forward journey calls for movement away from diagnosing barriers and toward active co-design of the operational roadmap and cross-sectoral coordination that will unleash latent potential within the Kintamani BUMDES and its community. By taking that road, this region may shift from being a case study on challenges to a beacon of sustainable, community-driven rural development in similar contexts throughout Indonesia and beyond.

CONCLUSION

The study provides a multilayered understanding of the challenges and opportunities in integrating the green economy into Kintamani BUMDES, revealing that the transition to sustainable economic models requires not merely technological change or increased capital, but profound shifts in attitudes, institutional relationships, and management culture rooted in deep knowledge of local contexts and the interlinkages among economic, social, and environmental dimensions. The green transformation of BUMDES is a gradual, evolutionary process demanding patience, continuous learning, and a step-by-step approach through pilot projects that test solutions on a small scale before generalization, ensuring that local stakeholders see tangible and equitable benefits that transform resistance into cooperation. Local leaders and intermediary institutions play crucial roles as social catalysts bridging indigenous and modern knowledge, repairing trust, and facilitating constructive dialogue between generations and stakeholder groups. Green economy integration into Kintamani BUMDES is not optional but indispensable for the region's future development, and though the path is challenging, it is achievable with collective wisdom, local will, and institutional support. Success depends on developing business models that meet ecological criteria while remaining economically viable, transforming sustainability from a perceived cost into a long-term investment that repositions BUMDES from purely economic institutions into centers of local sustainable development. The Kintamani experience can serve as a beacon for similar regions pursuing green transformation, demonstrating that every step toward a green economy brings society closer to a brighter, healthier, and fairer future the lasting legacy to be left for future generations.

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