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# TRANSFORMATION OF PILGRIMAGE FLOWER WASTE INTO ORGANIC INCENSE A SUSTAINABLE BUSINESS MODEL BASED ON A CIRCULAR ECONOMY AT THE LOCAL LEVEL

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**Abstract:**

The thick tradition of pilgrimage in Banjarmasin produces a significant volume of organic flower waste that contributes to the accumulation of waste in landfills (South Kalimantan Provincial Communication and Information Service, 2023; Maylana, 2024). In response to this environmental problem, this research aims to design innovative solutions based on the Circular Economy (CE). This initiative aims to eliminate waste through restorative design (Ellen MacArthur Foundation, 2013). The method used is Action Research (Heron, 1998) to implement the principles of Circular Economy at the local community level, which involves (1) training local communities in waste sorting and (2) developing a business model of organic incense products with upcycling techniques. This implementation simultaneously emphasizes the creation of social and environmental values. This study introduces a novel Community-Based Action Research (CBAR) framework that integrates spiritual values with Circular Economy (CE) principles to upcycle pilgrimage flower waste into value-added products. The 'Mandupa' model exemplifies waste valorization by closing the biological loop; it transforms post-pilgrimage flower waste into a raw material premix, creating a local value loop that minimizes dependence on external raw materials. The Mandupa initiative demonstrates preliminary feasibility for localized waste transformation. Initial data indicates potential reductions in organic waste at the source and provides a foundational model for community-led economic resilience. Ultimately, Mandupa proves that CE principles can be effectively localized, creating a synergy between

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innovation, community empowerment, and environmental responsibility for a sustainable future in Banjarmasin.

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**Keyword:**

Circular Economy, Flower Waste, Organic Incense, Upcycling, Banjarmasin.



## Introduction

Organic waste management is one of the biggest challenges for the sustainability of the urban environment in Indonesia. Banjarmasin City, South Kalimantan, which is known for its rich culture and religious traditions (Protocol and Communication Admin of the Regional Secretariat of Banjarmasin City, 2022; Rika, 2023). Faced with crucial issues related to the generation of waste from thick pilgrimage activities. This cultural ritual generates a significant volume of organic flower waste, which directly contributes to the accumulation of waste in landfills and contributes a novel Community-Based Action Research (CBAR) framework for the upcycling of pilgrimage flower waste (religious heritage waste) into value-added products, integrating local spiritual values with Circular Economy (CE) valorization. Based on data, waste generation in Banjarmasin continues to increase (South Kalimantan Provincial Communication and Information Office, 2023), while studies show that regional landfills have limited operational life left without serious waste separation efforts (Maylana, 2024).

Flower waste, which actually has a high potential to be reprocessed, is actually wasted without treatment, even though it can be reprocessed into value-added products. Failure to integrate environmental factors into business management) will endanger business sustainability in the future (Bantacut, 2012). However, on the other hand, global market trends show a high demand for natural and eco-friendly aromatherapy products. The global incense market is expected to reach USD $23.34 Billion by 2033, driven by increasing interest in wellness and spiritual practices (Business Research Insights, 2025). It is this gap between the supply of massive waste (culture) and sustainable market demand (aromatherapy) that opens up great opportunities for innovative interventions in the form of Sustainable Innovation (Bocken & Ritala, 2023).

There are many previous studies that have extensively discussed the Circular Economy (CE) (Sitthikitpa et al., 2024; Muñoz-Briones et al., 2025;Pandey et al. 2025; Aiguobarueghian et al.,2024) However, to date, there has been no successful research integrating simultaneously how local culture such as waste from pilgrimage activities, as well as circular economy-based business models at the Local Community level where waste from pilgrimage sites is immediately converted into product raw materials by integrating upcycle. The implementation of CE at this base level is supported by the findings that the transition to CE requires collaboration at the local level (Ghisellini et al., 2020). While governments and industry are increasingly recognizing the opportunities of the circular economy, they cannot alone drive the systemic change needed. Therefore, as reviewed by Serrano-Bedia and Perez-Perez (2022), the role of higher education institutions is becoming very important as key stakeholders supporting a new vision for society and the economy that focuses on a circular economy mentality and environmentally responsible citizenship. The novelty of the Mandupa model is to ensure social sustainability by making the local community (around the pilgrimage area) a key role holder in the supply chain and economic empowerment.

Despite the high spiritual value of pilgrimages, the volume of flower waste generated often ends up in landfills without sustainable management, creating a significant environmental burden. To address the gap between traditional waste disposal and the growing demand for eco-friendly spiritual products, this study implements an innovative business model that bridges cultural heritage with sustainable upcycling.

The organic incense produced from flower waste is not only recycled; however, it also has historical and spiritual value, distinguishing it from other commercial incense products. In response to the increasing consumption of resources and waste volumes globally, the upcycling trend has received new attention as a mechanism to transform society towards sustainable development, this upcycling strategy creates value-added products (Singh, 2022). Upcycling is now recognized as a key form of Sustainable Business Model Innovation (SBMI), which serves to slow and close the material cycle in the value chain (Singh, 2022; Schaltegger et al., 2012). Through this upcycling-based SBMI approach, a business entity not only creates new products from waste, but also generates positive social and environmental impacts, making it a relevant strategy to address the problem of organic waste generation in local communities.

Thus, this study aims to comprehensively analyze the potential of Mandupa's Sustainable Business Model Innovation (SBMI), which integrates local wisdom, organic flower waste upcycling techniques, and community empowerment. This study is expected to be a measurable solution for landfill waste mitigation, as well as create sustainable economic, social, and cultural value in the Kubah Basirih pilgrimage area, Banjarmasin.

## Literature Review

### *Concept of the Circular Economy*

There are several definitions of the circular economy. A circular economy is a system that can deal with global challenges such as climate change, biodiversity loss, high waste and pollution through economic activities that minimize waste and pollution, distribution of products and materials at their highest value, and natural regeneration (Ellen, 2021). A circular economy can also be defined as an alternative to the traditional economy where economic activities are carried out by preserving resources for as long as possible, retaining their value when used, and

reusing them to produce new products at the end of their lifespan (Shirvanimoghaddam et al., 2020).

CE is a response to the linear economic model (take-make-dispose) which is considered unsustainable. In the context of organic waste management, CE emphasizes the importance of biological cycling, where organic materials such as flower waste are returned to nature through a safe.

***Upcycle***

Mandupa adopts this principle by converting flower waste that will be degraded in landfills into incense products that have a longer lifespan and higher economic value. The key concept in this implementation is Upcycling, which is the process of converting by-products or waste products into new products with better quality or environmental value. In contrast to traditional recycling, upcycling increases the value of raw materials rather than simply reprocessing (Sung & Twede, 2017).

The upcycling trend has attracted significant attention in recent years in response to environmental concerns related to increased resource consumption and waste volumes. In this context, Singh (2022) conducted an in-depth study to explore the sustainability potential of upcycling initiatives on DIY (Do-It-Yourself) bicycle repair studios. The study identifies the various social, economic, and environmental impacts of upcycling activities, and proposes a framework to evaluate and regulate the overall sustainability potential of the practice. These findings confirm that upcycling has an important role in slowing and closing the material cycle, as well as triggering positive behavioral implications for users in the context of environmental sustainability.

***Sustainable Innovation***

The innovations carried out by Mandupa are included in the Sustainable Innovation category. Sustainable innovation is a deliberate change in a company's products, processes, or operational framework that results in benefits for the environment and society, while still generating economic value (Schaltegger, Lüdeke-Freund, & Hansen, 2012).

***Previous Research***

This research uses Circular Economy (CE) as the Grand Theory and is supported by Upcycle and Sustainable Innovation (SI). The following is a summary of previous research in the last five years (2020-2025) that is relevant and strengthens the framework of this theory. According to Nielsen & Pedersen (2022) in a study titled The Relationship between Sustainable Innovation (SI) and business performance in environmentally oriented MSMEs. Found that innovations rooted in sustainability (such as upcycling) increase competitive advantage, product differentiation, and customer loyalty. This supports Mandupa's branding strategy.

Munoz-Briones et al. (2025) Integrated decision-making approach for the simultaneous design of food packaging and waste management technologies to achieve a Circular Economy Computers & Chemical Engineering Design integrated packaging and waste management in CE.

Sitthikitpanya et al. (2024) Valorization of sugarcane leaves and co-digestion with microalgal biomass to produce biofuels and value-added products under the circular economy and zero-waste conceptsEnergy Conversion and Management Valorization biomass waste into high-value products.

Pandey et al. (2025) Transforming Agri-food waste: Innovative pathways toward a zero-waste circular economyInternational Journal of Environmental Science and Technology Review of innovative pathways to transform agro-food waste into zero-waste products.

Aiguobarueghian et al. (2024) Waste management and circular economy: A review of sustainable practices and economic benefitsWorld Journal of Advanced Research and Reviews Review of sustainable waste management practices and economic benefits CE.

## Methodology

### *Research Design*

This study uses an Action Research (AR) approach combined with a descriptive qualitative method. AR was chosen because of the nature of this research which aims not only to understand the problem (flower waste), but also to act and create real solutions (Mandupa's business model) collaboratively with the community. The AR cycle involves four main stages: *planning*, action, *observation*, and *reflection*. According to Heron (1998), *Action Research* is "research that involves a process of inquiry in which participants, together with researchers, collaborate on practical actions to improve the quality of their own situations, and at the same time, generate generalizable knowledge." It involved 15 local flower vendors and community members in the Kubah Basirih area to validate the technical feasibility and community adoption of the extruder-based production.

### *Location and Subject of Research*

1. Location
   The main pilgrimage areas in Banjarmasin City, South Kalimantan, are the Tomb of Guru Zuhdi, the Dome of Habib Basirih, and the Tomb of Sultan Suriansyah. This location is the focal point because it is the main source of organic flower waste.

2. Research Subject
   a. Flower traders around the pilgrimage area are involved in the waste sorting process and *upcycling production*.
   b. Mandupa (Sustainable Organic Incense).

### *Data Collection Techniques*

Data is collected through three main methods:

1. Participatory Observation

Direct observation of the process of disposal of flower waste and active participation in training activities, sorting and production of organic incense.

2. In-depth Interview

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It is conducted with local communities, flower traders, and local environmental managers to dig up information about waste volumes, economic potential, and social barriers.

3. Documentation
   Collection of quantitative data related to the volume of successfully converted interest waste and initial financial data (production costs and selling prices).

***Data Analysis Techniques***

Data analysis was carried out in a triangulated manner, combining qualitative and quantitative analysis:

***Qualitative Descriptive Analysis***

It was used to analyze the results of interviews and observations related to social change, community skills, and the feasibility of business models in the main pilgrimage areas in Banjarmasin City, South Kalimantan, namely the Tomb of Guru Zuhdi, the Dome of Habib Basirih, and the Tomb of Sultan Suriansyah, especially the tomb merchants and entrepreneurs around the tomb

***Business Model Analysis***

It is used to design and validate Mandupa's key elements, such as *Value Proposition* (sustainability value), *Key Resources* (flower waste), *Customer Segments* (eco-friendly market), and *Revenue Streams* (income streams) with an Upcycling approach and based on the circular economy (Osterwalder & Pigneur, 2010)

***Three-Pillar Impact Analysis***

This analysis evaluates the impact of Mandupa based on three dimensions: environmental (reduction in waste volume), social (increased income and empowerment), and economic (financial feasibility). (Elkington, 1998)

**Results, Discussion, And Conclusions**

**Results**

This research adopts an Action Research approach to iteratively develop and optimize the business model of MANDUPA, an initiative to upcycle flower waste into organic incense. This process is intrinsically connected to Business Model Canvas (BMC) evaluation and Triple Bottom Line (TBL) Impact Analysis. This section presents key findings from the Action Research cycle that focuses on production efficiency and its impact on the sustainability pillar.

***Business Model Canvas (BMC) MANDUPA***

As the foundation of the analysis, BMC MANDUPA is mapped to understand the core structure of the business. It is a dynamic model, continuously refined through the Action Research cycle.

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***Customer Segments***

Individuals who care about the environment, looking for natural and ethical products, aromatherapy enthusiasts, as well as local souvenir markets.

***Value Proposition***

Premium organic incense from flower waste, environmentally friendly, supports the circular economy, and has a unique aroma typical of the archipelago.

***Channels***

Social media (Instagram, Facebook), e-commerce (Etsy, Shopee), local product exhibitions, partner souvenir shops.

***Customer Relations***

Online community, direct feedback, educational content about upcycling.

***Income Stream***

Direct sales of incense stick and cone products, sale of gift sets.

***Key Resources***

Flower waste (from market/farmers), simple drying & production equipment, local artisan team.

***Key Activities***

Collection & sorting of flower waste, drying, mixing & formulation, printing, packaging, digital marketing.

***Key Partnerships***

Local farmers/florists (waste suppliers), waste management communities, MSMEs providing complementary materials (e.g., recycled packaging).

***Fee Structure***

Operational costs (collection, drying, production), complementary raw materials (binders, additional natural scents), marketing, salaries of the craftsman team.

The model consistently integrates the principles of upcycling and sustainability in each of its blocks, which are the basis for impact evaluation.

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***Triple Bottom Line - TBL Awal MANDUPA***

Preliminary evaluation shows that MANDUPA has the potential to have a positive impact on all three pillars of sustainability.

***Environmental Impact***

Reduction in the volume of discarded flower waste, conservation of natural resources due to the reduction in the need for new raw materials, as well as a lower carbon footprint of the production process.

***Social Impact***

Job creation for local artisans, upcycling skills in the community, and increased environmental awareness among consumers and flower waste suppliers.

***Economic Impact***

Increasing added value from waste into selling value products, potential business profitability, and local economic circulation through the purchase of complementary materials and team payroll.

The following Action Research cycle will show how operational improvement efforts for incense products directly affect the pillars of TBL.

***Action Research Cycle: Optimizing the Flower Waste Drying Process***

This cycle focuses on the efficiency challenges in the flower waste drying process which is a key activity at BMC MANDUPA, and its impact on the environmental and economic pillars.

***Planning***

Problem identification shows that the drying process of flower waste is still suboptimal, time-consuming, and prone to spoilage, which affects the quality of raw materials and production efficiency. The goal of this cycle is to reduce drying time by up to 30% and keep the failure rate (spoilage) below 5%. The planned actions include the construction of a multi-storey drying rack with better air circulation and the addition of a small fan to speed up the airflow. Success indicators are set on the duration of drying per batch and the percentage of failed waste.

***Action***

Implementation began with the construction and placement of a multi-storey drying rack in a well-ventilated production area, equipped with two fan units. A total of five batches of flower waste, each weighing 5 kg, were tested in this new drying system. Monitoring is carried out twice a day by recording the drying duration and condition of the flowers.

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***Observation***

The results of observations showed a significant improvement:

•*Time Efficiency*

The average drying time was successfully reduced from 7 days to 4-5 days, showing a reduction in duration of about 30-40%.

•*Quality of Raw Materials*

The failure rate due to decay has decreased drastically to only 2-3% of the total mass, well below the target of 5%. Visual observations also noted that dried flowers retained a brighter and more consistent color and had a stronger natural scent than previous drying methods.

•*Team Satisfaction*

Brief interviews with team members showed increased ease of management of the drying process and reduced concerns related to weather conditions.

•*Reflection*

The success of achieving this cycle goal confirms the effectiveness of the new drying method. The key learning is that controlled air circulation and improved ventilation are crucial in optimizing the upcycling process of flower waste.

•*BMC Implications*

This increase in efficiency directly strengthens the Key Activity (drying) and has the potential to lower the Cost Structure (due to reducing raw material waste).

•*Implications of TBL*

oA direct reduction in the failure rate of flower waste means more waste is successfully upcycled, maximizing its contribution to waste reduction. The efficient use of fan energy is relatively small compared to the waste reduction benefits.

***Economics***

Drying time efficiency and improved quality of raw materials are directly correlated with increased production capacity and quality of final products, which has a positive impact on Revenue Flow and Business Profitability.

***Social***

The craftsman team feels an increase in efficiency and job satisfaction, reducing manual workload and operational stress.

The next cycle will focus on the scalability of these drying methods and the exploration of more advanced drying technologies to maintain quality and efficiency as production grows.

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### *Technical and Product Qualifications*

The results of Action Research show that organic flower waste from the three pilgrimage sites can be sorted, dried, and processed into good quality incense raw powder (pre-mix).

•*Flower Waste*

An average of 10-15 kg of wet flower waste was successfully converted every week in the trial phase, resulting in 3-5 kg of dry raw powder.

•*Incense Products*

The Mandupa incense produced has a natural aroma and the burning process is cleaner than commercial incense with upcycle implementation.

## Discussion

These findings significantly confirm the relevance of the integration of the Circular Economy and Social Entrepreneurship.

### *Local CE Implementation*

Mandupa proved the findings of Ghisellini et al. (2020) that the CE transition requires local collaboration. A focused reverse logistics system (as highlighted by Ranta et al., 2022) was successfully implemented because the Sosang Entrepreneurship structure motivates the community.

### *Dual Value Creation*

Environmental Value (waste reduction) and Social Value (empowerment) which are also the Unique Selling Proposition (USP) of the product. The success of upcycling (as studied by Serrano-Bedia et al., 2021) demonstrates the commercial potential of cultural waste.

### *Sustainable Business Model Innovation*

The Mandupa model is a tangible form of Sustainable Business Model Innovation (SBMI) (Bocken & Ritala, 2023), as it innovates not only products (incense) but also processes and resources (waste), guaranteeing long-term competitive advantage (Nielsen & Pedersen, 2022).

## Conclusion

This study concludes that the Mandupa business model, based on the Circular Economy implemented through Social Entrepreneurship in Banjarmasin, is feasible and effective in transforming organic flower waste into Sustainable Organic Incense.

1.The initiative demonstrates preliminary feasibility for localized waste transformation. Initial data indicates potential reductions in organic waste at the source
2.This model and provides a foundational model for community-led economic resilience and social value by empowering local communities improving upcycling skills.

3.The integration of Local Culture (pilgrimage waste) with CE and ce results in innovative solutions that are replicable (can be replicated) for other areas with similar cultural waste issues.

4.Overall, this study demonstrates that spiritual values can be a driver of an inclusive circular economy. Technically, the 'Mandupa' model exemplifies waste valorization by closing the biological cycle; it transforms 'end-of-life' flowers into a raw material premix, thereby creating a local value loop that minimizes dependence on external resources. This has practical implications for organic waste management in other cities.

In conclusion, Mandupa offers a replicable strategy for sustainable urban waste management and circular entrepreneurship within heritage-rich religious tourism sites.

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