PROMOTING MAQASID AL-SHARI'AH THROUGH CIRCULAR HYBRID MODELS: WASTE COOKING OIL VALORIZATION IN URBAN MUSLIM COMMUNITIES OF BANDAR LAMPUNG

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Abstract

Waste cooking oil (WCO) management in the urban circular economy faces challenges, including fragmented collection networks, information gaps, and inconsistent public participation. This study examines the gap between environmental awareness and WCO management practices, explores the roles of institutional integration, economic incentives, and digital technology in supply chain coordination, and explains the application of *Maqāṣid al-Sharī'ah* principles in a community-based hybrid circular model. A qualitative exploratory case study was conducted across six subdistricts of Bandar Lampung City in February–March 2026. Using purposive and snowball sampling, the study involved 32 primary informants and two supporting informants from local government agencies. Data were collected through in-depth interviews, observations, documentation, and open-ended questionnaires, then analyzed interactively. The findings reveal that 70% of household informants continued to reuse or dispose of WCO, while 30% stored it for collection. Transportation costs decreased from IDR 2,500 to IDR 1,000 per liter. The hybrid circular model offers potential to strengthen supply chain coordination while operationalizing *Maqāṣid al-Sharī'ah* through responsible, transparent, and equitable waste management.

Keywords: circular economy; waste cooking oil; *Maqāṣid al-Sharī'ah*.

A. Introduction

The increasing consumption of energy and the accumulation of urban waste reinforce the need for production and consumption systems capable of preserving resource value while reducing environmental impacts. The circular economy offers an approach to shifting materials away from disposal patterns toward recovery, reuse, and value creation (Ddiba et al., 2022). Waste cooking oil (WCO), in the context of renewable energy, is a residue that has the potential to be utilized as a feedstock for biodiesel. Hosseinzadeh-Bandbafha et al., (2022), through a systematic review published in Renewable and Sustainable Energy Reviews, demonstrated that biodiesel production from WCO needs to be evaluated based on its environmental impacts throughout its life cycle. The assessment of environmental benefits is determined not only by the waste origin of the feedstock but also by the processes of collection, treatment, energy use, and material conversion (Lopresto et al., 2024). A recent study on the potential of WCO in Indonesia also emphasizes the need to consider environmental, economic, and social dimensions simultaneously in the development of waste-based (Rahman et al., 2025). The valorization of WCO is positioned as an issue that extends beyond biodiesel production technology, relating to how resources are collected, managed, and utilized through sustainable systems that provide benefits to society.

The success of WCO valorization depends on the ability to efficiently connect dispersed sources of used cooking oil with collection and processing facilities. Households, restaurants, and food businesses generate WCO in varying volumes, locations, frequencies, and quality levels. These characteristics pose challenges in ensuring supply continuity, controlling logistics costs, and maintaining feedstock quality (Rodríguez et al., 2022). Munir et al., (2023) also developed a biodiesel supply chain model that integrates collection, transportation, pretreatment, production facilities, and distribution. This perspective is complemented by Lee et al., (2024), who demonstrated that collection methods and public knowledge of WCO collection and utilization systems are associated with household participation levels. These findings indicate that the sustainability of the WCO supply chain cannot be adequately analyzed solely through logistics optimization and material flows but must also consider community behavioral factors and collection system design. Therefore, WCO supply chain analysis needs to integrate operational efficiency, community participation, institutional governance, and economic benefit-sharing mechanisms to ensure that used cooking oil valorization can be carried out sustainably.

The development of an urban circular economy requires a governance model capable of connecting social actors with formal organizations and resource recovery systems. Circular hybrid models, in this study, are defined as hybrid circular models that integrate community participation mechanisms, formal institutional support, economic incentives, and digital technology in WCO management. These models do not merely combine various processing technologies but also integrate the social, institutional, and operational functions required to facilitate material flows sustainably. Households and culinary MSMEs serve as sources of raw materials; communities, waste banks, and collectors have the potential to perform collection and consolidation functions; the government plays a role in facilitation, regulation, and capacity building; while processors are responsible for utilizing raw materials in accordance with technical requirements. The success of this integration depends on a clear division of responsibilities, quality standards, distribution mechanisms, incentive transparency, and the assurance of benefits for all parties. The supply chain framework developed by Munir et al. (2023) provides a basis for understanding the relationships between the

stages of WCO management, while the study by Rodríguez et al. (2022) demonstrates the importance of organizing sources and collection activities. The hybrid model in this study broadens the focus from technical efficiency toward the integration of social and institutional systems that enable resource recovery to take place in a coordinated, inclusive, and continuous manner.

The normative foundation for developing a hybrid circular model for WCO valorization is strengthened through the perspectives of *Maqāṣid al-Sharī'ah* and *Islamic Eco-Ethics*. *Maqāṣid al-Sharī'ah* places the pursuit of public benefit (*maṣlaḥah*) and the prevention of harm at the center of human activities, including economic activities and resource management. *Islamic Eco-Ethics* provides an ethical foundation for the relationship between humans and the environment through the principles of *amānah* (responsibility for safeguarding resources), *khalīfah* (the role of humans as stewards of the Earth), and *'adl* (justice in social relations and the distribution of benefits). These two perspectives complement each other: *Maqāṣid al-Sharī'ah* explains the objectives of public benefit to be achieved, while *Islamic Eco-Ethics* provides ethical guidance for the behaviors and practices required to realize them. This framework directs attention to waste reduction and material-use efficiency, as well as the protection of public health (*ḥifẓ al-nafs*), the responsible management and utilization of assets (*ḥifẓ al-māl*), and the equitable distribution of economic benefits (Nasir et al., 2021). The relevance of both perspectives to sustainable waste management is also reflected in the conceptual study by Azmin Shompa et al., (2024), which links the principles of *Maqāṣid al-Sharī'ah* with waste management practices and human behavior. In this study, *Maqāṣid al-Sharī'ah* is positioned as the normative framework, while *Islamic Eco-Ethics* is used as an interpretive lens to understand how Islamic values are translated into collective action within urban Muslim communities. Its application is examined through practices involving the segregation and handover of used cooking oil, responsibility in collection and storage, community involvement in environmental education, transparency in the management of collection proceeds, and fairness in benefit-sharing. These indicators enable an empirical assessment of the extent to which actual practices align with Islamic normative values without assuming that religious identity automatically leads to environmentally friendly behavior.

Bandar Lampung provides a relevant empirical context for examining the potential development of this model at the urban level. Household activities and culinary businesses have the potential to generate waste cooking oil (WCO) dispersed across various areas, while the presence of waste management organizations provides an initial foundation for developing collection mechanisms. The Lampung Provincial Environmental Agency records six waste banks in Bandar Lampung, comprising five unit-level waste banks and one central waste bank, indicating the availability of potential institutional infrastructure to support the collection of recyclable materials (Lampung, 2025).

The literature reviewed reveals several research gaps. First, studies on WCO valorization and biodiesel production have examined environmental impacts, sustainability feasibility, and supply chain optimization; however, community participation and community-based governance have not yet been fully integrated into the operational design of these systems. Second, studies on *Maqāṣid al-Sharī'ah*, *Islamic Eco-Ethics*, and sustainable waste management have established a normative foundation, but further development is needed to translate the objectives of Islamic law into governance mechanisms, indicators of *maṣlaḥah* (public benefit), and benefit-sharing arrangements within urban WCO valorization systems. These gaps highlight the

need for an integrative framework that connects resource recovery systems, coordination between communities and formal institutions, digital support, and Islamic normative objectives. The novelty of this study does not lie in claiming that each of these elements has never been studied before, but rather in developing the conceptual and empirical relationships among them within a single hybrid circular model for urban Muslim communities.

This study aims to develop and analyze a hybrid circular model for waste cooking oil valorization in urban Muslim communities in Bandar Lampung, positioning *Maqāṣid al-Sharī'ah* as the normative foundation for creating social, economic, and environmental benefits. The study addresses three main research questions: (1) How do community practices, motivations, and barriers shape participation in WCO collection and utilization? (2) How can the integration of communities, formal institutions, and economic mechanisms establish coordinated and sustainable WCO governance? (3) How can the principles of *Maqāṣid al-Sharī'ah* be translated into the objectives, governance mechanisms, benefit-sharing arrangements, and *maṣlaḥah* indicators of the model? The findings are expected to provide recommendations for strengthening WCO collection, increasing community participation, making appropriate use of digital technology, and designing transparent and equitable benefit-sharing mechanisms. This study seeks to position WCO valorization not merely as a technical process of converting waste into fuel, but as an effort to establish a coordinated circular system oriented toward public benefit and aligned with the context of urban Muslim communities.

B. Methods

This study employs a qualitative approach with an exploratory case study design to examine in depth the transformation of used cooking oil into biodiesel within the frameworks of the green economy, community-based supply chain development, and the promotion of *Maqāṣid al-Sharī'ah* (Subagyo et al., 2023). This approach was selected to explore the meanings, experiences, and social practices that emerge within urban communities, particularly in the context of waste management based on collective participation and religious values (Niam et al., 2024). The research extends beyond the technical aspects of used cooking oil processing to encompass the dynamics of social relationships, institutional structures, community economic behavior, and interactions between formal and informal actors within the distribution ecosystem. These dimensions are further examined through the normative lens of *Islamic Eco-Ethics*.

The study was conducted in several strategic areas of Bandar Lampung City, namely Kedaton, Sukarame, Rajabasa, Tanjung Karang Pusat, Kemiling, and Langkapura Districts. These locations were selected based on the presence of culinary businesses, restaurants, food-processing MSMEs, waste bank communities, and UCO collection agents involved in biodiesel-related distribution networks. Fieldwork was conducted over a two-month period, from February to March 2026, and involved observation, in-depth interviews, documentation, and secondary data verification. Informants were selected using purposive sampling to identify key actors relevant to the research objectives, followed by snowball sampling to expand the informant network based on recommendations from initial participants.

The study involved **32** primary informants**,** comprising one manager of Bank Jelantah Berkah, one manager of Bank Sampah Emak.ID, six food-processing MSME

operators, five owners of medium-scale restaurants, three owners of Satuan Pelayanan Pemenuhan Gizi (SPPG), ten household women actively involved in UCO collection, and six UCO collection agents in Bandar Lampung. Informants were selected based on their active involvement in UCO collection, sales, distribution, or processing activities for at least the previous year. In addition, two supporting informants from the Bandar Lampung City Environmental Agency and the Office of Cooperatives and MSMEs were involved to provide perspectives on local policies and circular economy management.

Data were collected through a combination of semi-structured in-depth interviews, limited participant observation, documentation, and open-ended questionnaires to strengthen the validity of the findings. Interviews lasted approximately 45–90 minutes and were guided by questions covering environmental awareness, distribution mechanisms, pricing systems, supply chain barriers, and opportunities for community-based biodiesel development. Observations were conducted at various activity points, including UCO collection sites, MSME production facilities, waste banks, and interactions between community members and collectors. Open-ended questionnaires were also administered to households and MSME operators to explore their practices, economic motivations, and levels of participation in green economy activities. The use of multiple data collection techniques was intended to generate comprehensive and complementary evidence. **Methodological triangulation** was employed as an important strategy to enhance the credibility and trustworthiness of the qualitative findings (Miles et al., 2014).

The collected data were analyzed using the interactive model developed by Matthew B. Miles, A. Michael Huberman, and Johnny Saldaña, consisting of data condensation, data display, and conclusion drawing. The analysis began with verbatim transcription of the interview data, followed by open coding to identify preliminary themes (Jailani & Saksitha, 2024). The subsequent stage involved axial coding to establish relationships among interconnected categories, followed by selective coding to formulate core themes that comprehensively explained the phenomenon under investigation. Data trustworthiness was enhanced through **source** and methodological triangulation, member checking, and an audit trai**l** to ensure the consistency and transparency of the research process. Ethical principles were also observed throughout the study, including obtaining informed consent, protecting the confidentiality of informants' identities, and ensuring participants' right to withdraw from the study at any time (Saldaña, 2021).

C. Findings and Discussion

1. Findings

The research findings were compiled based on semi-structured in-depth interviews, limited participant observation, documentation, and open-ended questionnaires conducted in several areas of Bandar Lampung City. The analysis was directed toward addressing three research focuses, namely community participation practices and barriers in used cooking oil (waste cooking oil/WCO) collection, forms of coordination between communities and formal institutions in supply chain governance, and the translation of Maqāṣid al-Sharī'ah principles into practices and benefit distribution. The findings are presented as patterns emerging from the empirical research materials; theoretical explanations and comparisons with previous studies are discussed in the Discussion section.

Community Participation: The Gap Between Knowledge and Practice

Interview and observation data indicate that knowledge of the risks associated with used cooking oil is not always accompanied by consistent management practices. Some household informants understood that oil used repeatedly or discarded without proper management could pose health and environmental risks. However, storing used cooking oil for handover to collectors has not yet become a widespread habit. The research findings indicate that the issue of used cooking oil management in Bandar Lampung is not only related to public knowledge of waste but also to the availability of mechanisms that enable used cooking oil to move from household and MSME sources toward utilization channels. Interviews conducted with groups of housewives in Sukarame, as well as interviews with culinary MSME operators in Kemiling and Langkapura, revealed that the informants recognized used cooking oil as a residue that was no longer used. Thirty percent of the informants stored the oil for handover when a collection party was available, while 70% acknowledged that the oil was reused or discarded. These findings indicate that awareness of the existence of waste does not, by itself, lead to organized management practices. Previous research data indicate an average increase of 34% in public understanding and knowledge of waste in Bandar Lampung.

Informants from MSMEs (pecel lele vendors and fried-snack sellers) explained that the repeated use of cooking oil was associated with considerations regarding raw material expenditures and business operating costs. Community-based management practices have also emerged through waste bank institutions. Documentation of activities at Bank Sampah Berkah records the introduction of a used cooking oil savings service, which provides containers to the community and implements a periodic collection mechanism. The program targets 18 waste bank customers participating in the used cooking oil savings scheme, with a potential volume of 18 liters per collection point, and has 20 members. SPPGs collect 50 liters of used cooking oil per month, with a total of 79 SPPGs, while each MSME contributes 1 liter, with 15 MSMEs having participated. In terms of the potential number of MSMEs in Bandar Lampung, the total number of registered Business Identification Numbers (Nomor Induk Berusaha/NIB) is approximately 51,630 businesses as of July 2025.

The findings also indicate that decisions regarding used cooking oil management are associated with environmental awareness, ease of access to collection services, household habits, certainty of collection, and perceived benefits. An analysis based on interviews with culinary business operators across various subdistricts in Bandar Lampung indicates that operating cost considerations influence decisions regarding the use and handover of used cooking oil. Repeated oil use is maintained because it is perceived to reduce raw material costs by up to 35%. The implication is that moral appeals and environmental education need to be complemented by easily accessible collection mechanisms and transparent incentives.

Polycentric Governance and Community-Based Supply Chain Innovation

The field findings identified Bank Jelantah Berkah and Bank Sampah Emak.id as intermediary nodes connecting households, culinary business operators, and subsequent collectors. The reported roles include receiving used cooking oil, weighing it, recording transactions, determining its value, making payments or recording savings, and transferring the collected oil to subsequent actors. Three forms of participation—donation, savings, and direct sales—allow residents to participate according to their respective social and economic motivations. Empirically, this

mechanism demonstrates efforts to organize previously dispersed feedstock and connect household activities with collection networks.

The fact that collection challenges have emerged in the context of Bandar Lampung can also be observed through developing programs. Bank Sampah Berkah has established 18 collection points in Kedaton, Way Halim, Kemiling, and Langkapura, and has developed a used cooking oil savings service involving collection containers and periodic collection. This represents a community-based collection initiative, but it cannot be used to conclude that all urban villages in Bandar Lampung are already served. Access challenges are also related to the locations of waste sources. Bandar Lampung has a large population and widely distributed urban activities.

An interview with the Director of Bank Jelantah Berkah on March 10, 2026, identified several stages in the used cooking oil collection mechanism. These stages include receiving oil from the community, weighing it, recording its value, making payments, and distributing the collected oil. The interview information also indicated the availability of used cooking oil collection services from residents at certain locations. This mechanism positions Bank Jelantah Berkah as an intermediary institution between used cooking oil owners and parties that receive or further process the oil. Documentation of the Bank Jelantah Berkah program also records a collection model operating at the urban village level through donation, savings, and buying-and-selling schemes for used cooking oil. These data provide information about the operational mechanisms and service arrangements available. This study has not yet obtained quantitative data on the total volume of oil collected by Bank Jelantah Berkah during the research period.

The interview with the head of Bank Sampah Emak.id on March 15, 2026, indicated that used cooking oil management is conducted through a collection mechanism involving the community. These activities are incorporated into a community-based waste management system. The interview data identified the receipt and collection of used cooking oil from residents as part of the institution's activities. Information regarding service mechanisms also indicated the use of direct handover and collection services under certain circumstances. The field findings have not yet yielded quantitative data on the number of households specifically depositing used cooking oil through Bank Sampah Emak.id, the volume of oil received each month, the number of transactions, or the frequency of collections during the research period.

Institutional Support and the Role of Digital Technology

Interviews with local government representatives indicated the existence of institutional facilitation, infrastructure strengthening, and support for community-based collection activities. These roles have the potential to help connect community initiatives with waste management agendas and circular economy development. An interview with the Head of the Environmental Agency of Bandar Lampung City on March 20, 2026, indicated the involvement of local government institutions in environmental management and the development of waste management institutions. The interview data identified a relationship between used cooking oil management and the existence of waste banks and community groups engaged in collection activities. Documentation of activities at Bank Sampah Beringin Jaya also recorded the involvement of government institutions in developing used cooking oil savings activities. The documented activities included mentoring, infrastructure strengthening, and the development of collection activities. These findings are not used to claim the level of success of government policies, as the study has not yet obtained policy evaluation indicators, program achievement data, or comparisons of conditions before

and after program implementation. An interview with a representative of the Cooperative Agency of Bandar Lampung City on March 20, 2026, provided information on the relationship between used cooking oil management and MSME empowerment and development activities. The informant provided insights into the role of MSMEs in community economic activities and the need for guidance for business activities related to the environment. The interview findings indicate that used cooking oil management may involve MSME operators as both sources of used cooking oil and participants in waste utilization activities.

The research findings describe the Bank Sampah Emak.id platform as a tool for recording and coordinating data on households, MSMEs, and collectors. Location mapping and geotagging features were reported to assist with route planning, while price dashboards and volume records have the potential to improve transaction traceability. Transportation costs decreased from IDR 2,500 to IDR 1,000 per liter per collection point, equivalent to a 60% reduction based on an arithmetic comparison of the two figures. These findings indicate that the role of digital technology in the hybrid circular model primarily lies in information coordination, material flow recording, and the management of relationships among stakeholders. Technology does not replace the role of community organizations; its benefits depend on data quality, operator capacity, consistency of use, and agreements regarding the division of responsibilities. Therefore, the research findings support the understanding that digital systems should be viewed as part of social and institutional governance rather than as standalone solutions.

2. Discussion

The findings reveal a significant psychological–behavioral gap among housewives and The findings of this study reveal a gap between environmental awareness and actual waste cooking oil (WCO) management practices in Bandar Lampung. Although 30% of household informants reported storing used cooking oil for collection, the remaining 70% admitted to reusing or disposing of it. Among culinary micro, small, and medium enterprises (MSMEs), repeated oil use was associated with raw material cost savings of up to 35%. These findings indicate that WCO management practices are influenced not only by environmental awareness and concern but also by economic considerations, limited collection facilities, and the accessibility of waste management services. This perspective is consistent with research on pro-environmental behavior, which emphasizes the importance of considering behavioral and contextual factors in explaining the gap between environmental attitudes and actions (Lange, 2023). Logistical efficiency, the arrangement of collection points, and transportation costs within the WCO supply chain are important factors in supporting resource recovery and its utilization as a feedstock for biodiesel production. From the perspective of *Maqāṣid al-Sharī'ah*, responsible WCO management can be interpreted as supporting *ḥifẓ al-nafs* (the protection of life) by reducing potential health and environmental risks, as well as *ḥifẓ al-māl* (the protection of wealth) through the recovery of resources that retain economic value. Overall, these findings indicate the need for an integrated approach combining environmental education, accessible collection services, and transparent economic incentives to strengthen community

participation and develop a more sustainable community-based WCO supply chain (Norita Mohd Nasir et al., 2022)

The presence of Bank Jelantah Berkah and Bank Sampah Emak.id demonstrates the potential of circular hybrid models to connect WCO management practices at the household and micro, small, and medium enterprise (MSME) levels with downstream collection and utilization networks. This model is considered hybrid because it combines community participation, economic mechanisms involving donations, savings schemes, and direct sales, as well as an ecological orientation toward recovering waste as a valuable resource. From the perspective of polycentric governance, the involvement of multiple actors can enhance coordination in waste management, although its effectiveness depends on sustained participation, relationships among actors, and cooperation mechanisms capable of overcoming collective action barriers (Hao et al., 2023). The establishment of 18 collection points and the involvement of MSMEs, as indicated by the research findings, suggest the development of a local aggregation mechanism with the potential to support a continuous supply of WCO for valorization processes, including its use as a feedstock for biodiesel production. This circular hybrid model can be interpreted as an effort to translate Islamic values into economic and environmental practices through responsible resource management. Within the framework of *Maqāṣid al-Sharī'ah*, this practice derives its normative foundation from the objectives of Islamic law, which emphasize human welfare and the sustainable management of resources (Azmin Shompa et al., 2024). The principles of *amānah* (trust and responsibility), *khalīfah* (the stewardship of the Earth), and *'adl* (justice) further provide an ethical foundation for transparent weighing procedures, clear pricing, accountable transactions, and equitable benefit-sharing. This interpretation is consistent with studies on Muslim environmental ethics that emphasize collective responsibility and environmental justice (Gade, 2023). The contribution of this model lies not only in transforming WCO from waste into a productive resource but also in its potential to promote circular economy practices oriented toward the objectives of Islamic law.

Digital coordination and institutional support strengthen the potential of circular hybrid models to promote WCO valorization in urban Muslim communities in Bandar Lampung. The reported reduction in transportation costs from IDR 2,500 to IDR 1,000 per liter per collection point is equivalent to a 60% reduction, based on a comparison of the two figures. This finding indicates the potential for improved logistical efficiency, although attributing the cost reduction directly to digitalization requires additional evidence. Conceptually, digital technologies can support the circular economy by enhancing supply chain visibility, information integration, material traceability, and coordination among actors(Kurniawan et al., 2022). Mapping collection locations, geotagging, updating price information, and recording volumes have the potential to reduce information asymmetry among households, MSMEs, community organizations, and collectors, while facilitating the monitoring of WCO flows from sources to downstream users. These benefits are consistent with Ersoy et al., (2022), who emphasize the role of information technology and

knowledge sharing in strengthening circular supply chains. Accurate and verifiable digital records can support *ḥifẓ al-māl* (the protection of wealth) by enhancing transaction accountability, transparency in economic value, and the reduction of unnecessary costs. However, technology does not, in itself, guarantee the achievement of *maṣlaḥah* (public benefit). Its contribution depends on data quality, accessibility, operator capacity, information protection, and fairness in pricing and benefit distribution(Norita Mohd Nasir et al., 2022). These findings indicate that integrating *Maqāṣid al-Sharīʻah*, Islamic Eco-Ethics, and green behavior perspectives provides a broader interpretation of urban WCO valorization than technical efficiency alone. *Maqāṣid al-Sharīʻah* provides a normative orientation toward well-being and harm prevention; Islamic environmental ethics frames resource management as a responsibility grounded in stewardship, trust, moderation, and justice; and behavioral perspectives explain why awareness may fail to translate into action when collection accessibility, economic incentives, and habitual practices remain constrained. The contribution of this study lies in articulating these dimensions within a community-based circular hybrid model that connects household participation, intermediary institutions, public-sector facilitation, economic incentives, and digital coordination

D. Conclusion

The main finding of this study reveals that the barriers to waste cooking oil (WCO) management in urban Muslim communities in Bandar Lampung stem not merely from limited environmental awareness, but also from a gap between knowledge and actual practices, exacerbated by economic considerations and limited access to collection services. As many as 70% of household informants continued to reuse or dispose of used cooking oil, whereas only 30% stored it for collection. Among culinary MSMEs, repeated oil use was maintained because it was perceived to reduce raw material costs by up to 35%. This study finds that integrating community-based collection institutions, donation, savings, and direct-sale schemes, as well as digital coordination, has the potential to strengthen feedstock aggregation and improve logistical efficiency. The reduction in transportation costs from IDR 2,500 to IDR 1,000 per liter represents a 60% decrease, although the specific contribution of digitalization to this reduction requires further investigation.

The principal contribution of this study is the formulation of a circular hybrid model that integrates polycentric governance, community participation, institutional support, economic incentives, and digital technology within the framework of *Maqāṣid al-Sharīʻah*. This framework positions the protection of life (*ḥifẓ al-nafs*), the protection of wealth (*ḥifẓ al-māl*), trustworthiness (*amānah*), and justice (*ʻadl*) as ethical foundations for WCO management. These findings underscore that Islamic values must be translated into concrete practices, including responsible collection, transparent transactions, and equitable benefit-sharing. The effectiveness of this model depends on accessible collection

services, reliable economic incentives, and coordination among stakeholders rather than on moral awareness alone.

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F. Author Contributions Statement

This article represents a collaborative contribution by all authors. The first author contributed to research conceptualization, field data collection, qualitative data analysis, and manuscript preparation. The second author contributed to the methodological framework, data validation, coding, and interpretation of findings. The third author contributed to theoretical analysis, discussion development, and critical revision of the manuscript. All authors reviewed and approved the final manuscript and agreed to be accountable for the integrity of the research. The study employed an exploratory qualitative case study design to examine the transformation of used cooking oil into biodiesel through community-based supply chain innovation in Bandar Lampung, Indonesia

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