

Application of the United Nations Framework Classification for Resources (UNFC) and the United Nations Resource Management Systems (UNRMS)

Case Study

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Title

Reusable Packaging in Banyuwangi: Transfer - Learning from Jakarta for Circular Resource Management

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Abstract & Relevance to the Expert Group on Resource Management (EGRM)

Abstract

This case study examines the development of a reusable packaging intervention in Banyuwangi, Indonesia, informed by transfer-learning from Alner's operational reuse model in Jakarta. The case combines insights from a 2024 pilot in Banyuwangi with operational evidence from Jakarta and situates both within the wider regency-scale transition in waste and plastics management. The findings so far - from the pilot and from Jakarta - highlight the importance of price, convenience, trust, return effort and merchant mediation for uptake. The case study demonstrates how circular enterprise practice, place-based governance and wider resource-management systems can work together to support waste prevention, resource efficiency and local value creation. It is a UNRMS-oriented case¹ and offers transferable lessons for other lower- and middle-income contexts.

Relevance to EGRM

This case demonstrates how a reuse/refill system can function as a circular resource-management intervention in a lower- and middle-income setting. Drawing on insights from our 2024 Banyuwangi pilot and Alner's operational model in Jakarta, it shows that successful uptake depends on affordability, trust, convenience, merchant participation and supportive local infrastructure. The project fosters capacity-building by training local warung operators and local researchers, illustrates innovation by adapting a proven deposit-and-reward model to a village-based context, supports just transition by creating jobs and empowering small businesses, and advances global collaboration by connecting enterprise, academia and community partners across regions. In doing so, it contributes directly to the UNECE/EGRM goals of promoting sustainable resource-management best practice, supporting innovation and capacity-building, and facilitating cross-regional knowledge exchange.

Introduction, Scope and Context

This case combines insights from a 2024 pilot reusable packaging intervention in Banyuwangi run based on the operational learning from Alner's reuse model. It examines how Alner's reuse model, which is established in Jakarta, can be adapted and embedded in a lower- and middle-income context where single-use packaging is deeply integrated into everyday retail practices and where successful uptake depends on how reuse works in routine purchasing, return, and circulation practices rather than on packaging substitution alone.

The case is meaningful for an EGRM/ UNECE audience because it treats packaging not simply as waste, but as a resource the value of which can be retained through circulation, return and repeated use. This aligns with the UNECE emphasis on sustainable resource management, value creation, stakeholder roles, and adaptive implementation under UNRMS – oriented case writing. It is also relevant because the Indonesian evidence base shows that upstream packaging solutions face context-specific barriers in low- and middle-income settings, including inconvenience, behaviour change, higher costs or deposit requirements, hygiene concerns, limited availability, and trust-related issues². The wider rationale for selecting Banyuwangi is that it is not an isolated pilot site, but a place where broader system-change efforts are already underway.

Our systems - based research in Indonesia using the Complex Value Optimisation for Resource Recovery (CVORR+) decision-making framework and analytical toolkit has shown that plastic circularity depends on interactions across environmental, economic, and social technical, and political dimensions³. Simultaneously, similar work in Banyuwangi has highlighted the importance of stakeholder coordination because downstream waste management priorities can overshadow preventive upstream measures⁴. Banyuwangi therefore provides an important empirical setting for understanding stakeholder dynamics, cross - scale coordination, and the enabling conditions required for systemic intervention. This wider transition context includes ongoing work linked to the Plastics in Indonesian Societies Relay programme (PISCES; www.relay.piscespартnership.org) and collaborative programmes such as Project STOP (www.stopoceanplastics.com), forming part of the wider transition context.

Methodologically, this case is best framed as a UNRMS application narrative rather than a UNFC classification exercise. The emphasis is therefore on transformation, adaptability, governance, stakeholder roles, capacity - building, operational learning, and continual improvement. The Banyuwangi component draws on empirical pilot evidence, while the Jakarta component provides an operational reference point through Alner's established reuse model and its documented growth in sales points, users, products sold and avoided single use packaging. The expected contribution of the case is to show how enterprise practice, place - based experimentation, and wider territorial system conditions can be connected to support circular resource management, just transition, and international knowledge - sharing on transferable reuse models.

Normative References and Linkages

This case is linked to the 2030 Agenda for Sustainable Development, with particular relevance to SDG 12 (Responsible Consumption and Production), SDG 11 (Sustainable Cities and Communities), SDG 14 (Life Below Water), and SDG 17 (Partnerships for the Goals). These goals are directly relevant to reusable packaging as an upstream circular intervention that supports waste prevention, resource efficiency, reduced leakage to the marine environment, and cross-sector collaboration.

At the national level, the case aligns with Indonesia's policy framework for reducing plastic pollution and strengthening waste reduction. The most directly relevant anchor is Minister of Environment and Forestry Regulation No. P.75/2019 on the Roadmap for Waste Reduction by Producers⁵, which is

highly pertinent to packaging reduction and producer – facing waste prevention measures. It also aligns with Presidential Regulation No. 83/2018 on Marine Debris Management⁶, which provides the broader national framework for addressing plastic leakage and marine pollution.

Within the UNECE/ EGRM context, the case is best understood through the United Nations Resource Management System (UNRMS) Principles and Requirements, especially emphasis on transformation, adaptability, stakeholder coordination, value creation, and continual improvement. This submission is therefore presented as a UNRMS-oriented case study.

Definitions and Terminology

For the purposes of this case study, **reusable packaging** refers to packaging designed to remain in circulation through repeated use, return, cleaning, and redistribution, rather than being discarded after a single use. In this case, reusable packaging is understood not as a simple packaging substitute, but as part of a wider socio- technical system the performance of which depends on user participation, return practices, merchant involvement, and operational coordination.

Refill refers to a mode of product delivery in which a product is dispensed into a reusable container rather than sold in a new single use package each time. In this case study, refill is treated as one possible operational form within a broader **reuse system**, but the case is not limited to refill alone.

A **reuse system** refers to the organisational, behavioural, and logistical arrangements through which Packaging is circulated, returned, and prepared for repeated use. This includes actors, incentives, return practices, retail participation, and the operational conditions that make repeated circulation possible in everyday purchasing settings.

Circular packaging is used here to refer to packaging approaches that seek to reduce waste and retain material value through reuse, refill, return, and other upstream interventions that prevent packaging from becoming waste at the point of first consumption. In the Indonesian context, the term is used in contrast to single use packaging systems which are linear and dominate many everyday retail transactions.

An **upstream packaging intervention** refers to a strategy that addresses packaging waste before it is created, typically by redesigning how products are delivered, purchased, used, and returned. In this case, reusable packaging is treated as an upstream intervention because it aims to prevent waste generation at source rather than relying only on downstream collection and disposal.

Circular resource management is used in this case to describe the management of packaging as a resource, the value of which can be retained through circulation, repeated use, and reduced material leakage. The term is used to connect the pilot to wider UNECE/ EGRM concerns with value retention, transformation, and sustainable resource management.

Transfer - learning refers to the structured adaptation of lessons from one operating context to another. Here, it refers to how operational learning from Alner's Jakarta reuse model informed the development of the Banyuwangi pilot, while recognising that local retail practices, user behaviour, affordability, trust, and governance conditions require contextual adaptation rather than direct replication

A **warung** is a small, neighbourhood – based retail outlet that plays an important role in everyday purchasing in Indonesia. In this case, warungs are important not only as sales points, but also as socially – embedded intermediaries that can influence whether reuse systems are perceived by customers as practical, trustworthy, and worthwhile.

A **systems - based approach** refers to an approach that examines how environmental, economic, social, technical, and political factors interact across the plastics value chain, rather than treating packaging uptake as a purely technical or behavioural issue. In this case, the systems framing is informed by PISCES research in Indonesia, including related stakeholder and value-chain analysis used to identify systemic barriers, enabling conditions, and points for intervention. Within that systems framing, **internal stakeholders** are actors directly involved in the physical flow of plastic materials and products, such as manufacturers, retailers, consumers, and waste handlers, while **external stakeholders** are actors who influence the system without directly handling materials, such as regulators, financial actors, and community organisations. This distinction is useful for understanding how reuse pilots interact with wider governance and enabling conditions.

Finally, this submission is presented as a **UNRMS - oriented case study**. In line with the UNECE template, this means the case is framed around transformation, adaptability, stakeholder coordination, value creation, operational practice, and continual improvement.

Background Information

Setting and scale: Banyuwangi is a large regency in East Java (about 3,594 km²) with a mid-2024 population of approximately 1.79 million spread across 25 districts and 217 villages. Retail and consumption are dominated by thousands of small, neighbourhood-based outlets - warung, traditional markets and MSMEs rather than by a few formal supermarkets. Official village data counted roughly 253 markets, more than 18 000 stores and over 6,000 warungs even before 2020; most businesses are individual enterprises. This village-embedded retail pattern means household consumption and packaging waste arise through numerous dispersed points of sale and use, including food sellers, tourism micro-businesses and community networks, rather than through a handful of large chains. Banyuwangi local government has tried to bolster this informal economy through its “Smart Kampung” programme, which combines digital services with economic empowerment, and through campaigns encouraging spending in traditional markets and warungs. However, waste generation outstrips waste - management capacity: the regency produces roughly 316 000 tonnes of municipal solid waste annually ,yet only about 50 000 tonnes can be formally managed. Studies of riverine plastic leakage into the Bali Strait attribute Banyuwangi’s high leakage to high population density, limited waste-management infrastructure and reliance on rivers for daily activities such as washing, fishing and waste disposal.

Existing waste initiatives: Over the past five years Banyuwangi has launched several complementary initiatives to improve waste services and reduce marine plastic leakage. The biggest is Project STOP Banyuwangi Hijau, which is working with the regency to create what it describes as Indonesia’s first regency-wide circular waste - management system. Project STOP reports that by the end of 2024 its services reached more than 517,000 people and that the system now combines household collection, sorting, behaviour-change outreach and material - recovery facilities, with further expansion planned.

In parallel, the regency has a 20-year Solid Waste Master Plan developed within the CLOCC programme. That plan envisions integrating waste banks, private value - chain collection and formal waste services, improving fee-collection mechanisms and strengthening governance. Community-level initiatives such as waste banks (bank sampah) and door-to-door outreach remain central to waste prevention, but coverage is still incomplete and participation uneven, especially in rural and coastal districts. These structural gaps underpin the need for upstream interventions that prevent waste at source, such as reusable packaging systems, rather than relying solely on downstream collection.

Early pilot experience. Under the PISCES Relay programme, Brunel University London, Enviu and Alner ran Indonesia's first returnable and reusable food-packaging system in Banyuwangi from mid – February to the end of May 2024⁷. The pilot offered dry staples – seasoning, soy sauce, rice and cooking oil in reusable containers of 60g, 60ml, 150g, 200ml, 2kg and 5L) through local warung and community-linked stores and one supermarket. Kelapa Dua Rice Mill, Bango/Unilever and Bimoli were the partners for the pilot. The products and packaging types and sizes were chosen based on PISCES waste and litter surveys in Banyuwangi, representing those that are most mismanaged. The pilot demonstrated technical feasibility, consumer acceptance and environmental benefit, but was discontinued because there was no permanent operational facility and no financially sustainable, locally embedded operating model. Insights from the pilot showed that uptake depended less on pro-environment attitudes than on price, convenience, trust, return effort, packaging-product fit and seller mediation; these factors underscored the need to adapt reuse systems to the realities of lower - and middle - income retail settings (see Annex 1).

RE:Hub: To address those limitations, the same partners are now establishing the **Reuse & Refill Living Lab (RE:Hub)**. The RE:Hub is described as a small, operational reuse and refill hub embedded within a local market and operated by Alner. It serves two purposes:(1) to create a permanent, locally operated demonstration site that can deliver refill and prefilled product options to consumers at scale; and (2) to generate high-quality empirical evidence on the economic, social, behavioural and gendered dimensions of reuse systems in a developing-country context. Brunel provides applied research design, oversight and knowledge exchange, while Alner manages daily operations, staffing, supply chains and local finance. The RE: Hub intends to reduce packaging costs for households, support employment and address plastic pollution as a development constraint.

Operational leadership: The RE:Hub is operated by Alner, which handles daily operations, staffing, supply chains and local financial management. Brunel University London / PISCES Relay provides applied research design, oversight and knowledge exchange; the RE:Hub is designed to generate high-quality evidence on the economic, social, behavioural and gendered dimensions of reuse systems. The RE:Hub sits within Banyuwangi's wider waste-management transition, which includes the Project STOP Banyuwangi Hijau initiative and collaboration with the regency government. Project STOP is building a regency-wide circular waste system and provides an enabling context for upstream reuse interventions. Local authorities are therefore key partners in integrating the hub into existing waste services and ensuring alignment with regency policy. Permits and licences: As a pilot reuse/refill facility, the RE:Hub does not involve subsurface resource extraction, so no UNFC permitting applies; however, it operates under local business and food-safety regulations.

Transfer learning from Jakarta: The RE:Hub draws directly on Alner's operational model in Greater Jakarta. Alner is an Indonesian circular economy company that develops and operates reuse and refill

systems for daily consumer goods. The company was formed within Enviu's venture-building ecosystem in 2019, launched commercially in March 2020 under the name Koinpack, and rebranded as Alner in 2022. Since then, it has built a managed packaging loop in which reusable containers are filled, distributed through warungs, waste banks, peer-to-peer agents, community sales points, and online channels, then collected, cleaned, quality-checked, and recirculated.

In Jakarta, the reuse system operates through a deposit-and-reward logic. Depending on the product and channel, consumers either pay a small deposit, receive cashback, or obtain another return-linked value when empty packaging is brought back. The exact amount varies by packaging type and partner, but the principle is consistent: to reduce the barrier to first purchase while maintaining return rates high enough to keep circulation viable. Reusable containers are supplied to brand or channel partners, filled through controlled processes, distributed to retail and community sales points or directly to consumers, returned after use, collected and sorted, then cleaned, sanitised, quality-checked, and recirculated. Alner's South Jakarta facility serves as a cleaning, warehousing, and operational hub, with internal operating information indicating a cleaning capacity of around 1,000 to 1,500 containers per day. Packaging that fails inspection is removed from the circulation loop and directed to the most appropriate downstream pathway, including recycling where feasible.

Over time, the Jakarta model has expanded from early proof-of-concept activity into a larger multi-channel system involving FMCG partnerships, direct-to-home delivery, refill-on-the-go concepts, and physical retail touchpoints. Public and internal reporting together indicate a strong growth trajectory: by 2022 Alner had already reached 150+ points of sale and 2,500+ consumers⁸; by 2024 the TRANSFORM-Alner programme had empowered 675 MSMEs / refill providers and refilled 77,624 litres of product; and by 2025 the wider operating narrative described roughly 750 micro-retailers or sales points, 3,000+ customers, 284,000 litres delivered, and close to 1 million units of single-use packaging avoided. While these figures reflect different reporting moments and programme boundaries, the overall direction of travel is clear: growing channel diversity, stronger partnerships, and progressively larger product and packaging volumes under circulation.

For the Banyuwangi case study, Jakarta matters not as a model to copy directly, but as a mature operating reference point. The key lesson is that reuse succeeds when it is practical, affordable, trusted, and embedded in existing retail habits (Annex 2). Transfer-learning should therefore be adaptive, not mechanical: Banyuwangi can draw on Jakarta's SOPs and commercial logic, but pricing, outreach, merchant incentives, and return design must still be localised to fit village-based retail settings and local purchasing routines.

UNRMS Integration

Project maturity: In Banyuwangi, RE:Hub is an early operational reuse-and-refill intervention designed to build on the lessons of the 2024 Banyuwangi reuse pilot, which ran from mid-February to end-May 2024. That pilot demonstrated technical feasibility and some market uptake, but also showed that reuse in this setting cannot be judged only by environmental ambition; it depends on whether the system works in everyday retail practice. At the same time, the case draws on Alner's more established operational model in Greater Jakarta, which provides an existing reference point for implementation, logistics and scaling. The case therefore sits between a tested pilot, an early operational hub, and a

wider scaling pathway. Its purpose is to test and stabilise a locally operated reuse system and to generate policy - relevant evidence.

UNRMS Principles & Requirements – Application Narrative

Transformation: The transformation sought in this case is a shift from single-use packaging to a circular system in which packaging remains in circulation through return, cleaning and repeated use. Evidence from the Banyuwangi pilot showed that such a shift is possible, but that uptake depends on the practical conditions through which reuse is delivered. In particular, the pilot found that price, convenience, trust, return effort and merchant mediation shaped participation more strongly than pro-environment attitudes alone. Sales were achieved, but the return rate remained relatively low at 13.1%, despite a much higher stated willingness to pay, indicating that environmental intent does not automatically translate into routine return behaviour. (See Annex 1; Annex 4c) This reinforces the need to treat reuse as a socio-technical and market system rather than a simple packaging substitution. RE:Hub is intended to respond to those constraints by creating a more stable, locally embedded model that can lower packaging costs, reduce waste at source and improve the conditions under which reuse becomes workable in everyday life. In Jakarta, Alner's deposit-and-reward system incentivises returns and reuse, using durable packaging that can withstand up to 50 cycles and contains 5 % post-consumer resin. RE:Hub will adapt this model to a village-based retail context, helping to optimise packaging use and supporting a just transition to circular resource management.

Adaptability to local priorities: The pilot showed clearly that reuse must be adapted to the realities of lower- and middle-income retail settings in Banyuwangi. Product uptake varied according to packaging fit, price sensitivity and trust in the product-container combination. Consumers often preferred larger quantities of rice and oil; carrying convenience mattered, especially for people travelling by two-wheeler; and some consumers were hesitant about certain products, particularly oil and seasoning, because they were unsure about the packaging (Annex 4B). Store type also mattered: regular warung with loyal local customers appeared better placed to support sales, while community stores faced additional workload and seasonal constraints. These findings imply that RE:Hub cannot simply replicate the Jakarta model. It must adapt deposit levels, product ranges, container sizes, retail partnerships, merchant support and return arrangements to fit local purchasing habits, affordability constraints and trust dynamics (see Annex 1; Annex 4c).

Review, feedback and audit: The case already contains a basis for review and feedback through the monitoring and evaluation methods used in the pilot. The Banyuwangi pilot combined structured seller and consumer questionnaires, field observations, debriefing, and sales/return monitoring. Primary data collection involved 9 sellers and 48 consumers, and was preceded by a capacity-building workshop for the survey team (see Annex 4A). The pilot also generated operational sales and return data, including evidence on product performance and packaging return rates. (See Annex 1; Annex 4c). These mechanisms provide the foundation for RE:Hub's review and audit approach: routine monitoring of sales, returns, pricing, convenience, merchant experience and user feedback, combined with iterative adaptation of the intervention as evidence emerges.

Organisational & Stakeholder Context

Institutional setup and governance: The RE:Hub is operated by Alner, which is responsible for daily operations, staffing, supply chains, and local financial management. The operational model draws on

Alner's Jakarta reuse system, which works through a managed packaging loop and deposit-and-reward logic adapted to different products and channels. In practice, reusable containers are supplied, filled, distributed to retail and community sales points, returned after use, collected, cleaned, sanitised, quality-checked, and recirculated. Alner's experience in Jakarta therefore provides the operating reference for how the Banyuwangi hub can manage circulation, cleaning, and system integrity, even though local pricing and return arrangements will need to be adapted.

Brunel University London / PISCES provides applied research design, oversight, knowledge exchange, and dissemination. Local points of sale, including warungs and community-linked outlets, act as distribution partners, and consumers return packaging through these outlets. The wider regency government and Project STOP Banyuwangi Hijau provide an enabling environment for circular waste management and help integrate the hub into existing services. In Jakarta, Alner has worked with a range of partners including warungs, waste banks, peer-to-peer sellers, community-run sales points, FMCG brands and ecosystem partners such as Enviu, Unilever / TRANSFORM, Nestlé Indonesia, and ADB-linked programmes. Across these arrangements, roles are divided across packaging provision, filling, retail distribution, customer education, return collection, cleaning, and impact tracking, with Alner acting as the core system operator responsible for day-to-day execution, SOPs, and system integrity. Similar partnership logics will be adapted for Banyuwangi.

Stakeholder roles and responsibilities: Alner handles operations, training of local staff and ensuring hygiene and quality standards; Brunel leads research, monitoring and policy dissemination; local authorities facilitate integration with waste services; warung operators mediate sales and returns; consumers participate by returning packaging; Enviu (from the first pilot) remains a strategic partner for system innovation. Commitment to long-term value creation is evident in Alner's mission to replace single-use packaging and empower small businesses and low-income consumers. In Jakarta, stakeholder experience has shown that warungs, waste banks, and local intermediaries are not merely distribution channels but also part of the trust infrastructure of the system, helping explain the model, reduce friction, and anchor participation in everyday routines; this is a key lesson for Banyuwangi.

Sustainable Development & Just Transition Alignment: Value-chain integration and SDGs. Reuse integrates supply (brands, packaging producers, cleaning logistics) and demand (retailers and consumers) across the value chain. Packaging contains post-consumer resin and can be recycled at end of life; return schemes incentivise consumers to bring back containers. The project aligns with SDG 12 (responsible consumption and production), SDG 11 (sustainable cities and communities), SDG 14 (life below water) and SDG 17 (partnerships). It supports social and economic goals by empowering warung operators and creating jobs, providing an affordable alternative for lower-income consumers, and reducing plastic pollution. The research includes gender-disaggregated analysis and aims to inform policy on inclusive, just transition strategies.

KPIs, monitoring and audit plan: The MEA approach collects data on adoption, refill frequency, pricing and affordability, operational costs and logistics, and gender-disaggregated participation. Additional key indicators will include packaging return rates, material savings, local employment created, consumer satisfaction, and deposit redemption. Public reporting from Alner's earlier Koinpack phase suggests that return performance can improve substantially as routines and incentives mature, underlining the importance of tracking both return timing and return volume. By comparison, the Banyuwangi pilot recorded a much lower observed return rate, reinforcing the need for locally adapted

return design, merchant support, and ongoing monitoring. An audit of packaging losses and contamination will be conducted through Alner's cleaning and refilling processes. The evaluation team will produce site reports, case studies, and policy briefs for national and international dissemination (see Annex 5).

Planning & Management: Short-, medium- and long-term planning. In the short term, the project focuses on setting up the facility, recruiting and training local staff, and stabilising operations. In the medium term, it seeks to test scalability, refine the business model, assess user behaviour and evaluate economic viability. In the long term, the aim is to embed the reuse system within the regency's waste-management infrastructure and to inform national policy and scaling to other regions.

Timeline and scale: The Jakarta model provides a useful scaling reference. Alner was formed within Enviu's venture-building ecosystem in 2019, launched commercially in March 2020, and rebranded in 2022. By 2022 it had already reached more than 150 points of sale and 2,500 consumers, and subsequent reporting indicates continuing growth in partnerships, refill volumes, and micro-retail reach (Annex 2). In Banyuwangi, the initial pilot ran from mid-February to the end of May 2024 and tested reusable packaging through local warungs, community-linked stores, and a small supermarket format. The RE:Hub represents the next stage: a more permanent, locally embedded operational platform intended to move from short-term pilot activity toward a more stable and scalable system. Critical control points and review triggers include return rates, packaging loss, revenue and cost recovery, consumer adoption and the ability to maintain hygiene standards; decisions on scaling or modifying the intervention will be based on these indicators and stakeholder feedback. A central planning lesson from Jakarta is that reverse logistics is usually harder than forward distribution, so scaling depends not only on growing sales points but on maintaining disciplined collection, sorting, washing, and recirculation systems.

Capacity Building: Communication, information systems and training. The project emphasises building local capacity through recruitment and training of local operational staff and gender-responsive roles. Alner provides training, standard operating procedures and quality control, while Brunel provides research training and oversight. Community engagement and marketing campaigns will raise awareness and build trust, drawing on Alner's experience partnering with small businesses and waste banks. Data management will rely on monitoring systems established through the MEA framework, and findings will be shared through knowledge-exchange events, site visits and public-interest outputs.

Operations and Risk Management: Operational controls and standard operating procedures: The hub uses a deposit-and-reward scheme that rewards customers for returning packaging. Its operational template is drawn from Alner's Jakarta model, where reusable containers are supplied, filled, distributed through retail and community channels, returned after use, collected and sorted, then cleaned, sanitised, quality-checked, and recirculated (See Annex 3). Packaging that fails inspection is removed from the circulation loop and directed to an appropriate downstream pathway, including recycling where feasible. Local staff are trained in warehousing, last-mile distribution and site coordination. Risk assessments focus on hygiene, contamination, consumer trust, deposit affordability and potential regulatory barriers; mitigation measures include quality-control checks, small and refundable deposits, and transparent communication. A key operational lesson from Jakarta is that reuse systems face both behavioural and logistical risks. Convenience, affordability, and trust must be maintained simultaneously: if return points are too distant, deposits are poorly calibrated, or merchant routines

become burdensome, participation can weaken. Jakarta's experience suggests that consumer adoption increases when return points are close, routines are simple, and the transaction feels familiar. It also shows that reverse logistics requires strong operational discipline. These lessons reinforce the Banyuwangi pilot findings that price, convenience, trust, return effort, and merchant mediation are central to uptake, and justify the RE:Hub's emphasis on local adaptation rather than direct replication.

Continual Improvement and Feedback: Mechanisms for corrective action and adaptive management. The project embraces continuous improvement by incorporating regular site visits, data analysis and stakeholder feedback into operations. Lessons from the early Banyuwangi pilot - such as the importance of pricing, convenience and trust - are already being used to adjust the RE:Hub model. From the Jakarta model, an additional lesson is that transfer-learning should be adaptive rather than mechanical: Banyuwangi should draw on Jakarta's SOPs and commercial logic, but still localise pricing, outreach, merchant incentives, and return design. In particular, Jakarta shows that trust-building with retailers, making return routines simple, and treating local intermediaries as part of the participation infrastructure are all critical to long-term system performance. Monitoring data will inform adjustments to product ranges, deposit values and service design, while feedback from consumers and warung operators will guide training and outreach. Findings will be shared with policymakers and peers to support replicability and scaling, and the project will adapt its strategy as new evidence emerges. This integrated narrative emphasises that RE:Hub is more than a simple pilot; it is an attempt to operationalise a circular packaging system within a lower- and middle-income setting, using lessons from Jakarta to catalyse system change in Banyuwangi while aligning with UNECE/UNRMS principles.

Social, Environmental and Just Transition Considerations

Social equity, community engagement and local benefit: The case explicitly addresses equity and inclusivity. The earlier pilot showed that reuse adoption in Banyuwangi is driven less by pro - environment attitudes than by price, convenience, trust, return effort and merchant mediation. This implies that any reuse system must be affordable and easy to use for low - and middle - income consumers. RE:Hub therefore, uses a low deposit/reward model and aims to reduce packaging costs and household expenditure. Data collection and analysis are gender - disaggregated, reflecting women's central role in food purchasing and informal retail. Training local operational staff, including women and warung owners, creates employment and builds capacity. Alner's model empowers small businesses and low - income consumers by providing an affordable alternative to single-use packaging. The pilot and RE:Hub also engage consumers and warung operators in co-producing case studies and feedback, ensuring local voices shape system design.

Worker safety, retraining and job creation: The RE:Hub involves recruiting and training local staff in refill operations, warehousing, distribution, and data collection. This creates new jobs and equips workers with skills relevant to emerging circular - economy markets. Alner's established SOPs for cleaning, refilling and quality control provide a model for safe operation, while Brunel's oversight ensures adherence to hygiene standards and risk - management protocols. The project's focus on deposit/reward schemes accessible to low-income consumers reduces the risk of exclusion, and by empowering warung operators it supports local livelihood transitions.

Environmental stewardship and climate resilience: Indonesia faces severe plastic pollution due to high population densities, limited waste-management infrastructure and reliance on rivers for daily

activities. Reuse systems directly address these environmental challenges by preventing plastic waste at source and reducing leakage into rivers and the Bali Strait. Alner's packaging incorporates post-consumer resin and is designed for up to 50 use cycles, reducing demand for virgin plastic and supporting recycling markets. The RE:Hub sits within the wider Project STOP Banyuwangi Hijau initiative, which is building a regency-wide circular waste system and has expanded waste-service access to more than 517,000 people. By integrating reuse with improved waste infrastructure, the project contributes to environmental stewardship, reduces open burning and marine pollution, and supports climate-resilience objectives.

Cultural heritage, community identity and participatory decision-making: Banyuwangi's retail landscape is dominated by warung, traditional markets and MSMEs embedded in village life; official data count over 6 000 warung and 18 000 stores across the regency. The pilot demonstrated that warung operators play a crucial role in mediating reuse, building trust, explaining deposit schemes and encouraging returns. Embedding the RE:Hub in a local market ensures that the initiative respects community identity and leverages existing social networks. Participatory elements include co-produced case studies, feedback sessions and policy dissemination. The broader PISCES stakeholder-mapping work emphasises the need for cross-stakeholder collaboration and warns that focusing on downstream waste management can create lock-ins. By engaging warung, households, local authorities, Project STOP and external stakeholders, the RE:Hub fosters an inclusive, systemic approach to resource management that aligns with just-transition principles.

Economic Analysis & Value Creation Pathways

Economic viability, cost-benefit logic, and market outlook. The Banyuwangi pilot indicates that reusable packaging can generate interest and sales in a lower- and middle-income retail setting, but that uptake is highly sensitive to price, convenience, trust, and return effort. This means that the economic viability of reuse in this context depends not only on environmental benefit, but on whether the offer is perceived by consumers and retailers as practical and worthwhile in everyday purchasing. The pilot showed that value perception is strongly shaped by price and incentives, while actual return behaviour may remain lower than stated willingness when return routines are inconvenient or the benefit is unclear. This reinforces the need for careful calibration of deposit/cashback design, packaging format, and merchant support.

The Jakarta experience provides a stronger operating reference point for the economic case. Alner's model has expanded from an early proof-of-concept into a broader multi-channel reuse and refill platform. Public and internal reporting indicate that by 2022 the model had already reached 150+ points of sale and 2,500+ consumers, preventing 502,180 single-use plastic units; by 2024 the TRANSFORM-Alner programme reported 675 MSMEs / refill providers, 77,624 litres refilled, and 4,412 kg of new plastic packaging reduced; and by 2025 Alner's wider operating narrative described roughly 750 micro-retailers or sales points, more than 284,000 litres delivered through partnership-led systems, and close to 1 million units of single-use packaging avoided. Although these figures reflect different reporting moments and programme boundaries, they show that reuse can develop into a commercially meaningful, partnership-driven system rather than remaining a small pilot intervention.

Potential value creation over time: Value creation in this case occurs across several dimensions.

For consumers, reuse can reduce packaging costs where refill/reuse formats are competitively priced and return-linked incentives are clear. For retailers and local intermediaries, it can create new forms of customer engagement, repeat purchasing, and participation in a differentiated circular retail model. For local economies, it can support jobs and enterprise activity linked to filling, collection, cleaning, logistics, monitoring, and retail participation. For brands and ecosystem partners, it creates a practical route for reducing packaging waste and testing alternatives to single-use delivery systems. In this sense, the case is not only about packaging substitution, but about developing a circular service model that retains value across multiple actors over time.

Resource circularity and resource efficiency: The resource-management value of the model lies in keeping packaging in circulation through repeated use rather than allowing it to become waste after a single transaction. In Jakarta, Alner's managed loop involves packaging provision, controlled product filling, distribution, return collection, cleaning, sanitisation, quality checking, and recirculation. Packaging formats have included PET, HDPE, PP, glass, and bulk jerrycan-based systems, selected according to product compatibility, recoverability, cleaning feasibility, and cost. This operating logic improves resource efficiency by reducing demand for new single-use packaging and by extending the functional life of packaging already in circulation. The Banyuwangi case adopts this same circular logic but seeks to adapt it to a village-based retail setting and lower-income purchasing environment. The pilot's evidence that only 13.1 % of containers were actually returned - despite higher stated willingness - underscores the importance of deposit incentives and merchant mediation to ensure containers return into the system. With proper incentives and logistics, the RE:Hub can increase return rates and achieve higher resource efficiency.

Opportunities for private sector mobilisation: The RE:Hub relies on partnerships between Alner, local warung operators, community-linked retailers, distributors, and wider ecosystem partners. In Jakarta, Alner has worked with warungs, waste banks, peer-to-peer sellers, community-run sales points, and institutional or commercial partners including Enviu, Unilever / TRANSFORM, Nestlé Indonesia, and ADB-linked programmes. These relationships allow reuse to be embedded within existing supply and retail systems while sharing operational responsibilities across packaging provision, filling, distribution, customer education, return collection, cleaning, and impact tracking. There is also scope for public-private collaboration, where municipal authorities provide enabling regulatory support and local infrastructure, while private partners invest in packaging, logistics, and consumer-facing delivery systems. If adapted successfully, the model could contribute to local economic development by linking circular delivery systems with small-retail livelihoods, local service provision, and wider territorial waste-transition efforts.

Interpretation for Banyuwangi: Taken together, the pilot evidence and Jakarta experience suggest that reuse can create environmental and economic value, but only when system design reduces participation friction and aligns circular goals with real retail routines. For Banyuwangi, this means that economic viability should not be judged only by product sales, but by the interaction between uptake, return performance, merchant workload, reverse logistics, and the long-term stability of local partnerships. The economic lesson is therefore not simply that reuse can work, but that it works best when circularity is built into an operationally disciplined and socially grounded delivery system.

Policy, Governance & Legal Considerations

Regulatory context (national, regional, international): This case sits within a policy environment in Indonesia that increasingly supports upstream waste prevention, producer responsibility, and marine plastic reduction. At national level, the most directly relevant instrument is Minister of Environment and Forestry Regulation No. P.75/2019, which requires producers in manufacturing, retail, and food and beverage sectors to prepare and implement waste-reduction roadmaps, including measures relating to products, packaging, and containers. This is directly relevant to reusable packaging because it provides a policy basis for reduction, reuse, and redesign of packaging systems. The case also aligns with Presidential Regulation No. 83/2018 on Marine Debris Management, which established Indonesia's national action framework for reducing marine plastic leakage. At regency level, the Banyuwangi case sits within a wider territorial transition that includes the 20-year Waste Masterplan developed through the CLOCC programme and the expanding Project STOP Banyuwangi Hijau system, both of which strengthen the enabling environment for upstream circular interventions.

Permits, compliance, licensing, transparency and reporting requirements: As a reuse/refill intervention, RE:Hub is not governed by extractive-resource permitting requirements under UNFC-style classification. Instead, the relevant compliance issues relate primarily to retail operations, food and product handling, packaging safety, hygiene, storage, cleaning, and local business permissions. In practical terms, the case operates within local business and public-health regulatory frameworks rather than mineral or energy licensing regimes. In Banyuwangi, the RE:Hub is governed through a formal collaboration agreement between Brunel University London and Alner (PT Solusi Sircular Indonesia), which defines collaborative responsibilities for implementation of the project. Under this arrangement, Alner is responsible for operational delivery, while Brunel provides research oversight, evidence generation, and knowledge exchange support. Transparency in this case also requires clear documentation of stakeholder roles, operating procedures, return and refill processes, and reporting arrangements used to track uptake, returns, losses, and learning over time. Specific local licences or food-handling approvals can be added here once confirmed by Alner and local partners.

Institutional governance and stakeholder participation: Institutionally, the case is governed through collaboration between enterprise, research, and place-based system actors. Alner leads operational delivery of the reuse model, including logistics, container circulation, cleaning, and day-to-day management. In Jakarta, Alner has acted as the core system operator across multiple channels, coordinating packaging provision, controlled filling, retail and community distribution, customer education, return collection, cleaning, and impact tracking. Brunel University London, through PISCES and PISCES Relay, provides research design, monitoring, knowledge exchange, and evidence generation. In Banyuwangi, this is connected to a wider territorial governance setting in which local government, community-level retail actors, and broader waste-system initiatives such as Project STOP Banyuwangi Hijau are relevant enabling actors. In governance terms, the case therefore illustrates not only a business model, but a multi-actor resource-management arrangement requiring coordination across supply, retail, return, monitoring, and local policy environments.

Corporate and social responsibility: The case also has a strong corporate and social responsibility dimension. Reusable packaging is not framed only as a commercial delivery model, but as part of a broader effort to reduce plastic leakage, support local livelihoods, and create more inclusive and socially grounded forms of circularity. This is especially important in Banyuwangi, where small retailers, warung, and village-based community structures are central to everyday purchasing and therefore to any transition away from single-use packaging. The case's emphasis on affordability, merchant

participation, local employment, adaptation to lower- and middle-income conditions, and collaboration across public, private, and community actors supports its relevance to just transition and responsible resource management.

Key Findings, Lessons Learned and Recommendations

Summary of key findings: This case shows that reusable packaging can be introduced in a lower- and middle - income retail setting, but that its success depends less on environmental aspiration alone than on whether the system is workable in everyday practice. Evidence from the Banyuwangi pilot indicates that uptake was shaped by the interaction of price, convenience, trust, packaging fit, return effort, and merchant mediation, rather than by pro-environment attitudes alone. The pilot, therefore, confirms that reuse in this setting must be understood as a socio-technical and place-based system, not simply as a packaging substitution.

Assessment of UNRMS implementation: strengths and challenges: A major strength of the case It combines three levels of evidence: a real-world pilot in Banyuwangi, an operating reuse model in Jakarta, and a wider territorial context in which circular waste-management initiatives are already underway. This gives the case a strong basis in transformation, adaptability, stakeholder coordination, and continual improvement, which are central to the UNRMS framing. The Banyuwangi pilot generated empirical evidence through structured seller and consumer surveys, field observations, and operational monitoring, providing a foundation for learning and adaptation. The Jakarta experience adds a second strength: it shows that reuse can move beyond proof-of-concept into a larger, partnership-based system with multiple sales channels and operational routines for collection, cleaning, and recirculation. However, the case also shows clear challenges. Actual participation and return behaviour remained constrained by affordability, practical inconvenience, and trust-related frictions. The contrast between stated willingness and observed behaviour is especially important: the pilot recorded 305 items sold in 11 weeks but only a 13.1% actual return rate (40/305), indicating that expressed support for reuse does not automatically translate into routine participation.

Social, environmental and economic outcomes and trade-offs: Socially, the case highlights the importance of warung and community-linked retail as trusted intermediaries in everyday purchasing and shows that merchant participation can strongly influence whether reuse is perceived as credible and worthwhile. Environmentally, the case demonstrates the potential of reuse as an upstream intervention in a setting where food-related flexible packaging is a significant source of mismanaged plastic waste. Economically, the pilot indicates that value perception is highly sensitive to price and incentives, and that return behaviour involves its own cost–benefit calculation. This creates a central trade-off: lowering deposits and simplifying returns may improve participation, but the system must remain operationally viable and capable of recovering containers at sufficient rates to generate environmental benefit. The evidence, therefore, suggests that circular value is created only when environmental aims, user convenience, merchant workload, and operational economics are aligned.

Lessons learned: Several lessons emerge clearly. First, price matters, but not only as headline cost; it shapes perceived value, incentive sensitivity, and comparison with familiar low-cost single-use formats. Second, return is a distinct behavioural challenge and should not be assumed from purchase alone. Third, store type and seller mediation matter: retail uptake depends on whether merchants see the model as workable and whether they are able to explain and normalise it for consumers. Fourth,

packaging and product fit matter: size, portability, storage, and trust in the product–container combination all influence adoption. Fifth, reuse systems in this context require adaptation, not replication: operational learning from Jakarta is highly valuable, but it must be modified to reflect local incomes, retail routines, and trust relations in Banyuwangi. Jakarta also shows that convenience, affordability, trusted intermediaries, and disciplined reverse logistics are critical to scaling, and that transfer-learning works best when it is adaptive rather than mechanical.

Recommendations for resource management, policy, governance, replicability, and scaling:

For resource management, the case supports treating packaging as an anthropogenic resource whose value should be retained through circulation, return, and repeated use rather than lost after one transaction. For policy, upstream reuse interventions should be recognised more explicitly alongside downstream collection and recycling in plastic and waste strategies. For governance, successful implementation requires coordinated roles across enterprise, research, local government, retailers, and community actors, with clear arrangements for logistics, quality control, monitoring, and feedback. For replicability, future pilots should prioritise trusted local retail channels, simplify return processes, make savings more visible, and tailor deposit and packaging formats to local purchasing behaviour. For scaling, the evidence suggests that reuse is most likely to succeed when it is embedded within wider territorial transition efforts, supported by merchant training, adaptive monitoring, and partnerships that connect local implementation with wider system change. In particular, future scaling should pay close attention to reverse logistics, because collection, sorting, and washing are often more difficult to stabilise than forward distribution.

Relevance to EGRM / UNECE Community and Knowledge Sharing

This case can inform peers, countries, agencies, and practitioners across regions because it shows how a reuse intervention can be developed in a lower- and middle-income, village-based retail context, rather than in a highly formalised supermarket or platform economy. It demonstrates that successful circular resource management depends not only on technical design, but on whether systems fit everyday retail practices, local trust relations, affordability constraints, and merchant routines. In this sense, the case is useful beyond Indonesia: it offers insight into how reuse models can be adapted for settings where small shops, informal or semi-formal retail, and distributed community networks are central to consumption. It is therefore relevant to EGRM's wider interest in capacity-building, knowledge exchange, and good practices in sustainable resource management.

Several transferable lessons and best practices emerge. First, reusable packaging should be treated as a system, not as a stand-alone product substitution. Second, uptake depends strongly on price, convenience, trust, return effort, packaging fit, and merchant mediation, which means that local adaptation is essential. Third, return systems must be designed to reduce friction and make value visible to users. Fourth, trusted local retailers can play a decisive role in normalising participation. Fifth, pilots are most useful when they combine operational testing with structured monitoring, stakeholder feedback, and iterative redesign. These lessons are relevant to governments, municipalities, enterprises, and research organisations seeking to embed upstream waste prevention into broader circular economy transitions.

The case also contributes to UNECE's longer-term resource-management objectives by extending UNRMS-oriented thinking into the field of anthropogenic resources and circular delivery systems.

Rather than treating packaging as waste after one transaction, the case frames it as a resource whose value can be retained through circulation, return, cleaning, and repeated use. It also shows how resource management objectives can be linked to wider social and territorial goals, including affordability, local employment, community participation, and reduction of plastic leakage. In doing so, it supports the broader UNECE emphasis on sustainable resource management, innovation, cross-sector partnership, and just transition.

Finally, the case contributes to knowledge sharing by bringing together three forms of evidence: empirical learning from the 2024 Banyuwangi pilot, operational learning from Alner's Jakarta model, and a wider systems perspective on the conditions required for circular transition in Banyuwangi. This combination makes the case especially useful for the EGRM/UNECE community because it does not present reuse as a generic solution; instead, it shows how enterprise practice, place-based governance and adaptive learning can be connected in order to build more workable and transferable circular resource-management models. The case therefore offers UNECE and EGRM a practically grounded example of how circular resource-management principles can be translated into an everyday consumer - packaging system in a lower- and middle-income context, with lessons that are relevant for replication, adaptation, and international exchange.

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Annex 1. Summary of the 2024 Banyuwangi pilot

Pilot element	Details
Location	Banyuwangi, East Java, Indonesia
Pilot period	Mid-February to end-May 2024
Pilot setting	Neighbourhood retail settings, primarily warungs
Main purpose	To test reusable food packaging in everyday, small-scale retail practice
Product categories tested	Seasoning, soy sauce, rice, cooking oil
Store / outlet types	Regular warungs, community-linked stores, and a supermart format
Survey period	17–22 April 2024
Seller sample	9 sellers
Consumer sample	48 consumers
Store breakdown in survey sample	6 regular stores; 3 community stores
Main uptake dimensions	Price, incentives, convenience, trust, return behaviour, packaging fit, merchant mediation
Main pilot outcome	Technical feasibility and consumer interest were demonstrated, but uptake and return depended strongly on practical and economic conditions rather than environmental aspiration alone

Source note: Adapted from the Banyuwangi pilot documentation.

Annex 2. Jakarta–Banyuwangi transfer-learning timeline

Year	Jakarta / Alner milestone	Relevance for Banyuwangi
2019	Venture formation within Enviu's venture-building ecosystem	Established the initial enterprise model behind later transfer-learning
2020	Commercial launch as Koinpack with reusable FMCG packaging and deposit-and-reward logic	Provides the earliest operating model for reuse/refill in daily goods
2021	Early grants and recognition; continued expansion into community-based channels	Demonstrates the importance of ecosystem support during early growth
2022	Scale-up to 150+ points of sale and 2,500+ consumers; 502,180 single-use plastic units prevented	Shows that the model can move beyond proof-of-concept into wider circulation

2023	Rebrand to Alner; deeper FMCG pilots and stronger reverse-logistics systems	Demonstrates maturing operations and stronger partner integration
2024	TRANSFORM / Unilever milestone: 675 MSMEs / refill providers; 77,624 litres refilled; 4,412 kg new plastic packaging reduced	Provides evidence that reuse can be embedded in broader partnership-based scaling
2025	Broader ecosystem expansion to roughly 750 micro-retailers / sales points and close to 1 million packaging units avoided	Illustrates how reuse can become a larger, partnership-driven platform
2026	Newer physical touchpoints and Bali expansion	Shows movement toward structured multi-city partnerships; Jakarta remains the most mature operational reference for Banyuwangi

Source note: Adapted from Alner Overview and Timeline for Case Study.

Annex 4A. Survey and participation summary

Indicator	Value
Sellers surveyed	9
Consumers surveyed	48
Community stores in seller sample	3
Regular stores in seller sample	6
Surveyors involved in fieldwork	16
Capacity-building workshop held before fieldwork	Yes

Annex 4B. Consumer profile summary

Variable	Value
Female respondents	81.3%
Average age	46.5 years
Average years of schooling	11.7 years
Average family size	3.6
Average monthly household expenditure	IDR 1,920,213
Average monthly household income	IDR 4,084,884
Average commute time	6.5 minutes

Main transport mode	2-wheeler motor (64.6%)
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Annex 4C. Analytical dimensions used in the pilot evaluation

Dimension	Main measure(s)	Data source	Relevance to uptake
Retail context and seller mediation	Store type, seller motivations, repeat-customer profile, willingness to continue	Seller questionnaire, field observation	Shows how merchants shape participation
Product–package fit and convenience	Consumption practices, package fit, carrying/storage convenience	Consumer questionnaire, comments, field observation	Indicates whether packaging fits everyday routines
Price and perceived value	Willingness to pay, responses to discounts and non-price incentives	Consumer questionnaire	Shows how value and incentives shape uptake
Return behaviour	Willingness to return, awareness of savings, observed returns	Consumer questionnaire, operational monitoring	Distinguishes purchase from return behaviour
Environmental orientations	Self-reported pro-environment and altruistic behaviour	Consumer questionnaire	Helps compare environmental attitudes with actual practice

Annex 5. Monitoring and KPI framework for RE:Hub

KPI	What it measures	Why it matters	Indicative data source
Number of participating outlets	Retail reach of the intervention	Indicates scale and local embedding	Operational records
Number of participating consumers	User reach	Indicates adoption and demand	Operational records / surveys
Refill frequency	How often reusable formats are used	Indicates routine participation	Sales / refill records
Packaging return rate	Proportion of packaging returned	Critical to circular performance	Return tracking system
Deposit redemption / cashback uptake	Use of return-linked incentives	Shows whether incentive design is working	Transaction records

Packaging losses / rejects	Containers lost or removed from circulation	Indicates system efficiency and operational risk	Cleaning / QA records
Material savings / SUP avoided	Packaging waste prevented	Indicates environmental value creation	Impact tracking / reporting
Consumer satisfaction	Perceived usefulness, trust, convenience	Helps guide adaptation and redesign	Consumer feedback / surveys
Merchant retention / willingness to continue	Ongoing participation of outlets	Indicates business-model fit	Seller surveys / partner records
Local employment created	Jobs supported through operations	Indicates socio-economic contribution	Project staffing records
Gender-disaggregated participation	Participation by gender	Supports inclusive monitoring and just-transition framing	Survey and monitoring data