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A SUSTAINABILITY REPORTING MODEL FOR COMMUNITY-BASED HOUSEHOLD WASTE MANAGEMENT PROGRAMS WITHIN THE GLOBAL PLASTICS TREATY FRAMEWORK

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Abstract:
The global plastic pollution crisis has driven the development of the Global Plastics Treaty, which positions reporting as a fundamental pillar of treaty effectiveness. However, reporting mandates have remained nationally oriented and have not accommodated community-based waste-management initiatives at the local level. Bali Province faces an increasingly acute waste emergency — intensified by the closure of the Suwung landfill and a 100% source-separation policy effective from July 2026 — while community-based programs such as waste banks and TPS3R facilities lack standardized reporting systems. This study develops a sustainability reporting model for community-based household waste-management programs in Bali that is aligned with the Global Plastics Treaty framework and GRI 306: Waste 2020. Using a qualitative multiple-case-study design, data were collected through in-depth interviews, observation, document review, and focus group discussions with stakeholders. Data were analyzed using the Miles and Huberman interactive model. The study produced a tiered reporting model comprising three indicator levels: basic community indicators (waste volume, participation, waste managed, residual waste, and revenue); intermediate regency/city indicators (per-capita generation, recycling, landfill diversion, and economic impacts); and advanced provincial, national, and international indicators (plastic consumption, waste leakage, and greenhouse gas emissions) aligned with Article 15 of the Global Plastics Treaty. The model incorporates a bottom-up reporting flow from communities to the treaty secretariat, supported by multilayered verification and policy feedback. The study contributes to sustainability accounting literature and provides operational guidance for communities and local governments in Bali. It demonstrates that the effectiveness of the Global Plastics Treaty depends on bridging global mandates and local practices and positioning communities as an integral component of the solution to the global plastic pollution crisis.

Keywords: Sustainability Reporting, Community-Based Waste Management, Global Plastics Treaty, GRI 306

INTRODUCTION

The plastic pollution crisis has become one of the most urgent environmental challenges of the twenty-first century, transcending national boundaries and threatening terrestrial and marine ecosystems. The landmark UNEA-5.2 resolution adopted in March 2022 marked a major turning point in global environmental governance, when Member States agreed on a mandate to develop a legally binding international instrument on plastic pollution, including pollution in the marine environment. Negotiations conducted by the Intergovernmental Negotiating Committee (INC) have proceeded through several sessions, beginning with INC-1 in Punta del Este, Uruguay (November 2022), and continuing through INC-5.3 in Geneva, Switzerland (February 2026), which elected a new

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INC Chair, Ambassador Julio Cordano of Chile. Nevertheless, the negotiations reached a critical juncture after INC-5.2 in Geneva in August 2025 ended without agreement on the treaty text, leaving several alternative drafts and divergent views among Member States regarding the design of the agreement (Rahayu et al., 2026). Fundamental questions concerning the institutional architecture—whether the treaty will be dynamic and include mechanisms for progressively strengthening ambition or instead become a fragmented framework with limited collective impact—remain at the center of the debate (Kabir et al., 2020).

Within the emerging Global Plastics Treaty framework, reporting and monitoring are positioned as fundamental pillars of effective implementation. The reporting of statistical data throughout the plastics life cycle is a standard feature of multilateral environmental agreements, as demonstrated by greenhouse gas emissions inventories under the UNFCCC and the Paris Agreement, production and import data on ozone-depleting substances under the Montreal Protocol, and mercury emissions inventories under the Minamata Convention (Heidbreder et al., 2019; Yin et al., 2019). In the context of the plastics treaty, reporting serves two principal purposes: first, it complements environmental monitoring by providing information on pollution sources and trends that cannot be obtained through environmental monitoring alone; second, it enables conclusions to be drawn regarding the overall effectiveness of the new instrument, thereby informing priorities and subsequent measures. Experts from the International Science Council emphasize that a robust, science-based, and globally standardized monitoring and reporting system will be decisive for the treaty's success in reducing the plastic pollution crisis (Novakovic et al., 2023; Saputra et al., 2021). However, reporting mandated under international agreements has historically focused primarily on the national level, with Parties reporting to treaty secretariats, without systematically reaching or accommodating community-based waste-management initiatives at the local level (Ahmed et al., 2024).

The gap between global reporting mandates and the realities of local waste management is particularly relevant in Indonesia, especially in Bali. The island, internationally renowned as a tourism destination, faces an increasingly severe waste crisis. Bali received nearly 6.95 million international visitors in 2025, with Australian tourists accounting for approximately 23% of total arrivals. This growth in tourism directly increases consumption and packaging waste, yet it has not been matched by an adequate waste-management system. The Sarbagita Suwung Regional Final Disposal Site (TPA), which serves Denpasar, Tabanan, Gianyar, and Badung and processes approximately 1,300 tons of waste per day, began discontinuing the acceptance of organic waste in April 2026 and is scheduled to close completely in August 2026. The closure has proceeded without a functioning alternative infrastructure, triggering open burning in residential yards and illegal dumping into rivers. Sungai Watch has recorded a sharp increase in the volume of plastic captured by its floating barriers since the partial closure of the Suwung landfill. Bali's waste composition indicates that approximately 60% is organic, while the proportion of plastic increased from 16% to 20% in 2025, despite the Provincial Government's implementation of the Bali Clean Waste Movement (Sari et al., 2026; Towansiba et al., 2024).

In response to this crisis, the Bali Provincial Government has introduced several policies. Bali Governor Regulation No. 47 of 2019 on Source-Based Waste Management (Pengelolaan Sampah Berbasis Sumber, PSBS) assigns regents and mayors responsibility for strengthening waste management in their respective jurisdictions so that waste can be resolved at the village level without burdening other areas. This policy was followed by Bali Governor Circular No. 09 of 2025 on the Bali Clean Waste Movement, which prohibits open dumping and promotes restrictions on single-use plastics. The PSBS Palemahan Kedas (PADAS) Strategic Program, promoted by PSBS

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Ambassador Mrs. Putri Koster, emphasizes two principal measures: separating organic and inorganic waste at source and positioning village heads as the primary coordinators responsible for organizing communities, temples, markets, and schools in waste management. The stated target is to resolve Bali's waste problem by 2027 through the complete closure of landfills. In July 2026, a requirement for 100% source separation came into force, covering households, banjar community units, markets, hotels, and offices (Ardini & Fahlevi, 2024).

Alongside these top-down policies, community-based initiatives have emerged as bottom-up responses to Bali's waste crisis. Waste banks distributed across Bali's nine regencies and city mobilize public participation through the social principle of mutual cooperation (gotong royong). In Bebalang Customary Village, a three-category separation system—organic, inorganic, and residual waste—has been implemented since August 2025. Tanjung Benoa achieved 100% waste separation and was recognized by the Ministry of Home Affairs as Indonesia's best TPS3R facility in 2024, making it a model considered ready for replication. A case study of Delterra's work in Kekeran Village documented an increase in household waste-separation participation from 6% to 70%, driven by a 'no separation, no collection' policy and intensive monitoring. Nevertheless, sustainability remains a major challenge. Community-based waste management faces continuity constraints because the quantities of waste generated are inconsistent, and although facilities such as TPS3R are recognized at the regency level, they frequently lack comprehensive scientific assessment. More fundamentally, separated waste ultimately returns to landfills when no functioning market or buyer is available (Saputra, Laksmi, & Noordin, 2025).

The critical gap identified in this study is the absence of a sustainability reporting model specifically designed for community-based household waste-management programs in Bali while also aligned with the reporting framework of the Global Plastics Treaty. Although the Global Reporting Initiative (GRI) has developed Sustainability Reporting Standards covering waste (GRI 306: Waste 2020), using an approach that connects materials and waste and assists reporters in identifying and managing waste-related practices and impacts throughout the value chain, the standard was designed for organizations in general and does not specifically accommodate the distinctive characteristics of community-based programs in developing countries (Giannarakis, 2014; Troisi et al., 2023). Conversely, although the Global Plastics Treaty mandate requires statistical reporting across the full plastics life cycle—from the production and consumption of primary and recycled polymers upstream to plastic-waste management downstream, including generation, collection, landfilling, incineration, recycling, and leakage—the proposed reporting mechanism remains macro-level and nationally oriented. No framework currently bridges the global reporting mandate with the realities of community-based waste management at the local level, particularly in an island context with a complex governance structure such as Bali (Kaban et al., 2025).

The complexity of waste governance in Bali reinforces the urgency of developing a contextual reporting model. Waste management operates at the village level and is divided between customary governance structures (desa adat) and administrative village structures (desa dinas), making island-wide coordination highly difficult. Many local sorting centers are over capacity or non-operational, while government-funded equipment often remains unused (Saputra & Jayawarsa, 2025). In this context, an effective sustainability reporting model must accommodate diverse community initiatives, meaningfully measure environmental and social impacts, and provide data that can be aggregated to higher levels to meet national and international reporting requirements (Saputra & Dharmawan, 2025b). Research on the application of sustainability accounting within Indonesia's circular waste economy remains limited, and a study of waste banks in Bontang recommended a simple triple-bottom-line reporting template. However, that recommendation has

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not been systematically linked to the Global Plastics Treaty framework and has not been tested in Bali's distinctive sociocultural and tourism context (Dewi et al., 2025; Saputra & Dharmawan, 2025a).

Based on the foregoing discussion, this study aims to develop a sustainability reporting model for community-based household waste-management programs in Bali that is aligned with the Global Plastics Treaty framework (Saputra, Jayawarsa, & Laksmi, 2025). The research questions are: (1) What are the characteristics of existing community-based household waste-management programs in Bali, and what sustainability reporting practices have been implemented? (2) Which key sustainability reporting indicators are relevant to community-based programs within the reporting mandate of the Global Plastics Treaty? (3) How can a comprehensive and contextual sustainability reporting model be designed to bridge community-level reporting with national and international reporting requirements? This study is expected to contribute theoretically to the literature on sustainability accounting and environmental governance, particularly in the context of multilateral agreements and local implementation. In practical terms, the resulting model can guide communities, local governments, and other stakeholders in measuring, reporting, and improving the sustainability performance of waste-management programs while supporting Indonesia's future reporting obligations under the Global Plastics Treaty (Saputra, Laksmi, & Noordin, 2025). In other words, the study addresses how global reporting mandates can be translated into meaningful accountability practices at the community level and how community experience and data can enrich and strengthen the global reporting system—an especially relevant endeavor amid the critical momentum of global plastics treaty negotiations and Bali's ongoing waste emergency (Saputra, Laksmi, & Dharmawan, 2025).

METHODS

Research Approach and Design

This study employed a qualitative approach with a case-study design. The qualitative approach was selected because it enables an in-depth and comprehensive understanding of the processes, activities, and events occurring within waste-management communities. The exploratory nature of this study—which seeks to develop a sustainability reporting model that has not previously been formulated—requires a rich understanding of sociocultural context, institutional dynamics, and existing reporting practices in the field, which can be captured most effectively through qualitative inquiry (Aspers & Corte, 2019).

The case-study design was selected because the research focuses on a contemporary phenomenon within its real-life context, where the boundary between phenomenon and context is not always clearly defined. Bali, with its dual governance structures of customary and administrative villages and its diverse community-based waste-management initiatives, constitutes a bounded system that can be examined holistically. The case-study approach allows the researchers to explore how community-based waste-management programs operate, how sustainability reporting is—or is not—practiced, and how the Global Plastics Treaty framework can be integrated into the local context (L. Haven & Van Grootel, 2019; Myers, 2019).

An instrumental case-study design was used, in which the selected cases were examined not only for their intrinsic significance but also to generate broader insight into the development of a sustainability reporting model. The cases served as instruments for understanding a more general issue and developing theoretical propositions that can be tested in other contexts (Nassaji, 2020).

Unit of Analysis and Case Selection the unit of analysis was community-based household waste-management programs in Bali Province. Cases were selected purposively according to the

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following criteria: (1) the program had operated for at least two years; (2) it involved active community participation in waste separation and processing; (3) it had a clear institutional structure; (4) it was documented or maintained operational records; and (5) it represented geographic and management-type variation within Bali, including urban, semi-urban, and rural contexts. Based on these criteria, the study involved three to four cases selected from Bali's regencies and city. Potential research sites included: (a) the Pamanku Lestari Waste Bank in Kuta, which has successfully increased public environmental awareness; (b) the TPS3R facility of Munggu Customary Village, which represents a local-wisdom-based waste-management model; (c) the waste-separation program in Bebalang Customary Village, which has applied a three-category separation system since August 2025; and (d) the Tanjung Benoa TPS3R facility, recognized as Indonesia's best TPS3R in 2024. These cases enabled the study to capture variation in program scale, community participation, institutional models, and management outcomes (Gray et al., 2020; Hayashi Jr et al., 2019).

Data Sources and Data Collection Techniques the study used multiple sources of evidence to support triangulation and strengthen the validity of the findings (Busetto et al., 2020; Myers, 2019). Data were collected through the following techniques:

In-Depth Interviews Semi-structured in-depth interviews were conducted with key informants selected purposively. These informants included: (a) managers of community-based waste-management programs, including waste-bank heads and TPS3R coordinators; (b) customary and administrative village officials involved in waste-management policy; (c) participating community members or waste-bank customers; (d) officials of the Bali Provincial or regency/city Environmental and Sanitation Services; (e) officials of the Community and Village Empowerment Service involved in program facilitation; and (f) academics or practitioners with expertise in sustainability reporting or waste management in Bali. The interviews explored program characteristics and existing reporting practices, indicators considered important by stakeholders for measuring program success, challenges and opportunities in implementing reporting, and perceptions of alignment with the Global Plastics Treaty reporting mandate.

Field Observation observations were conducted at the community waste-management program sites included in the study. They covered: (a) community waste-separation processes; (b) the operation of waste-processing facilities, including TPS3R facilities and waste banks; (c) managers' recording and documentation mechanisms; (d) interactions between managers and community members; and (e) infrastructure and supporting facilities. Both participant and non-participant observation were used, and findings were documented in field notes.

Document Review socument review was used to collect relevant secondary data. The documents examined included: (a) provincial and regency/city waste-management policy documents, including Bali Governor Regulation No. 47 of 2019, Governor Circular No. 09 of 2025, and Governor Instruction No. 8324 of 2021; (b) operational reports from community-based waste-management programs; (c) data from the National Waste Management Information System (SIPSN); (d) documents related to Global Plastics Treaty negotiations, including draft treaty texts and Indonesia's position papers; (e) sustainability reporting standards such as GRI 306: Waste 2020; and (f) previous research on waste management in Bali.

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Focus Group Discussions (FGDs) To facilitate dialogue among stakeholders and collectively explore perceptions of relevant reporting indicators, FGDs were conducted with participants representing program managers, community representatives, local government, academics, and nongovernmental organizations. The FGDs helped identify areas of agreement and disagreement concerning what should be reported and how the reporting process should be undertaken.

Research Instruments the researcher served as the primary instrument, supported by: (a) a semi-structured interview guide developed from the research questions and literature review; (b) an observation sheet for systematically recording field findings; (c) a document checklist; and (d) an FGD guide. The interview guide was pilot-tested with one or two informants to ensure the clarity and relevance of the questions before broader application.

Data Analysis sata were analyzed using the Miles and Huberman interactive model, which comprises three concurrent processes: data reduction, data display, and conclusion drawing or verification. Analysis was conducted simultaneously with data collection, allowing the researchers to refine the focus and obtain additional data when required. After each case was analyzed, a cross-case analysis was conducted to identify common patterns, contextual differences, and lessons from each case (Au, 2019). This cross-case analysis generated propositions concerning the elements required in the sustainability reporting model and how the model could be adapted to different contexts (Horton, 2022; Rania et al., 2021).

Model Development

The final stage of the analysis involved developing a sustainability reporting model for community-based household waste-management programs. The model was developed by synthesizing findings corresponding to the three research questions (Borodako, 2023; Isensee et al., 2023): (1) existing program characteristics and reporting practices; (2) relevant key indicators; and (3) the need to bridge community-level reporting with global mandates. The resulting model encompassed: (a) reporting objectives and principles; (b) measurable and relevant reporting indicators that consider environmental, social, and economic dimensions under the triple-bottom-line approach; (c) reporting formats and frequency; (d) data-collection and verification mechanisms; and (e) reporting flows from the community level to regency/city, provincial, national, and international levels. The model was validated through stakeholder discussions to ensure its relevance and feasibility.

RESULT AND DISCUSSION

Based on field data obtained through in-depth interviews, participant observation, document review, and focus group discussions with stakeholders in Bali—including waste-bank managers, customary and administrative village officials, the Bali Provincial Environmental Service, academics, and practitioners—the study produced a sustainability reporting model for community-based household waste-management programs aligned with the Global Plastics Treaty framework (Ahmed et al., 2024; Saputra et al., 2021). The model was developed through a synthesis of findings related to three research questions (Ardini & Fahlevi, 2024): (1) the characteristics of community-based waste-management programs in Bali and their existing reporting practices; (2) relevant key sustainability reporting indicators; and (3) the need to bridge community-level reporting with national and international reporting mandates.

The model is founded on three principal pillars. First, the Global Plastics Treaty reporting framework requires statistical reporting throughout the plastics life cycle. As experts from the International Science Council have emphasized, a robust, science-based, and globally standardized monitoring and reporting system will be decisive in reducing the plastic pollution crisis. Reporting

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under multilateral environmental agreements has two principal purposes: complementing environmental monitoring by providing information on pollution sources and trends, and enabling conclusions regarding the instrument's overall effectiveness (Heidbreder et al., 2019; Kabir et al., 2020; Yin et al., 2019). Upstream reporting covers statistics on the production and consumption of primary and recycled polymers, whereas downstream reporting covers plastic-waste generation, collection, landfilling, incineration, recycling, and leakage. The treaty is likely to adopt a hybrid approach that balances national action plans with a global transparency and monitoring framework.

Second, GRI 306: Waste 2020 provides guidance for organizations to report waste-related impacts. It requires disclosure of the quantity and composition of waste generated and how that waste is recovered or disposed of. GRI 306 contains three specific disclosures: Disclosure 306-3 (Waste generated), Disclosure 306-4 (Waste diverted from disposal), and Disclosure 306-5 (Waste directed to disposal), reflecting the waste-management hierarchy (Chen et al., 2022; Dorfleitner et al., 2020). Third, the contextual characteristics of community-based waste management in Bali include dual governance structures involving customary and administrative villages, diverse management models such as waste banks, TPS3R facilities, and source-separation programs, and sustainability challenges arising from inconsistent waste volumes and the absence of functioning markets for separated materials (Henisz & McGlinch, 2019; Li et al., 2021). Field findings indicate that although programs such as the Tanjung Benoa TPS3R facility and Bebalang Customary Village have achieved substantial progress in waste separation, systematic sustainability reporting remains highly limited. Most programs maintain only simple operational records without comprehensively measuring environmental and social impacts (Escrig-Olmedo et al., 2019; Li et al., 2021; Saygili et al., 2022).

The Developed Sustainability Reporting Model the sustainability reporting model consists of four main components (Sanjayani et al., 2024; Sara & Saputra, 2021): (1) reporting objectives and principles; (2) tiered reporting indicators; (3) reporting formats and mechanisms; and (4) a reporting flow from communities to the international level.

Reporting Objectives and Principleshe model was designed around four principal objectives. First, it provides a measurement and reporting framework that enables community-based programs in Bali to comprehensively assess sustainability performance across environmental, social, and economic dimensions under the triple-bottom-line approach. Second, it produces data that can be aggregated from the community level to regency/city, provincial, and national levels to meet Indonesia's reporting requirements under the Global Plastics Treaty. Third, it strengthens program accountability to stakeholders, including communities, local governments, and donors. Fourth, it provides feedback for the continuous improvement of community-based waste-management programs. The model is based on the following principles: (a) relevance—indicators must correspond to the context and capacity of communities in Bali; (b) measurability—indicators must be objectively measurable using available or collectable data; (c) alignment—indicators must be consistent with Global Plastics Treaty reporting mandates and GRI standards; (d) participation—the development and implementation of reporting must involve stakeholders at all levels; (e) simplicity—reporting formats must be readily understood and implemented by program managers with limited capacity; and (f) sustainability—the reporting system must remain viable over the long term without continuous dependence on external assistance.

Tiered Reporting Indicators

Based on an analysis of the Global Plastics Treaty mandate, GRI 306: Waste 2020, and the needs and capacities of communities in Bali, the model proposes three tiers of reporting indicators:

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Basic Level (Community) — minimum indicators required from every community-based program:

1. Incoming waste volume: the total household waste received by the program during each reporting period (kg/day or kg/month), classified as organic, inorganic, residual, or hazardous waste.
2. Household participation rate: the number or percentage of households actively participating in waste separation.
3. Waste managed: the volume of organic waste processed into compost, animal feed, or other products and the volume of inorganic waste recycled or sold.
4. Residual waste: the volume of waste still transported to a landfill or released into the environment.
5. Program revenue: income derived from the sale of recyclable materials and/or community service fees.

Intermediate Level (Regency/City and Province) — aggregated indicators for reporting to local government:

1. Waste generation per capita: the average quantity of waste generated per household or per person per day.
2. Separation rate: the percentage of households that consistently separate waste within a jurisdiction.
3. Recycling rate: the percentage of inorganic waste successfully recycled relative to total inorganic waste generated.
4. Reduction of waste sent to landfill: the percentage decrease in waste entering landfills as a result of the program.
5. Local economic impact: the economic value generated by waste management, including waste-bank revenue and employment creation.

Advanced Level (National/International) — indicators aligned with the Global Plastics Treaty reporting mandate:

1. Plastic production and consumption data: household-level plastic consumption per capita.
2. Plastic-waste management: the generation, collection, recycling, and environmental leakage of plastic waste.
3. Reduction of single-use plastics: the decrease in single-use plastic consumption resulting from program interventions.
4. Emissions and releases: emissions from waste management, including open burning and landfilling, and releases of microplastics into the environment.
5. Contribution to the Sustainable Development Goals: contribution to SDG Target 12.5 on waste reduction.

Reporting Formats and Mechanisms

The model proposes tiered reporting formats adapted to the capacities of communities in Bali:

1) **Monthly Reporting (Community Level):** Each community-based program, including waste banks and TPS3R facilities, prepares a simple report covering the basic-level indicators. The report takes the form of a straightforward table that can be completed manually or through a simple digital application. Field findings indicate that several

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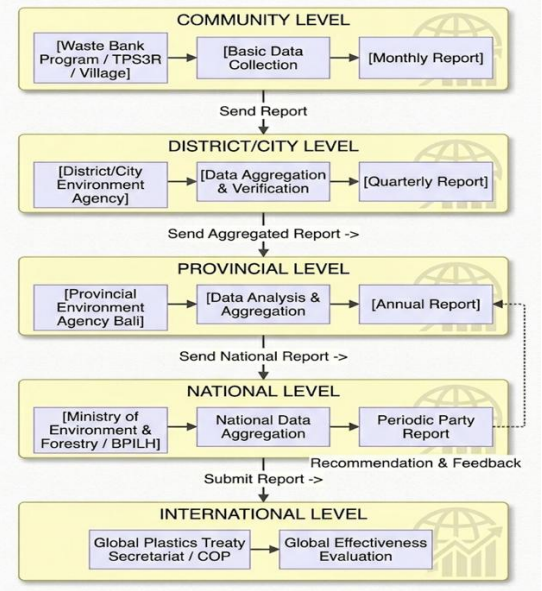
programs, including the Tanjung Benoa TPS3R facility and Bebalang Customary Village, already maintain operational records, although these have not been standardized. The model recommends a standardized format developed jointly with the Environmental Service to ensure data consistency across programs.

2) **Quarterly Reporting (Regency/City Level):** Monthly reports from all programs within a regency or city are aggregated by the regency/city Environmental Service to produce a jurisdiction-level report covering the intermediate indicators. The report also includes trend analysis and identifies implementation challenges.
3) **Annual Reporting (Provincial and National Levels):** The Bali Provincial Government aggregates data from all regencies and the city to prepare an annual report covering advanced indicators. This report provides a basis for fulfilling Indonesia's reporting obligations under the Global Plastics Treaty, as stipulated in Article 15, which requires each Party to report the actions and measures it has implemented. Indonesia has expressed support for reporting provisions that reflect the needs of developing countries while emphasizing flexibility in their implementation.

Reporting Flow from the Community to the Global Level

The model proposes a reporting flow that connects community-level reporting with the global reporting mandate, as illustrated in the following diagram:

Figure 1. Sustainability Reporting Flow



This flow is consistent with a transparent bottom-up approach that combines national reporting with a global environmental monitoring system, as recommended by experts. It also accords with Indonesia's position that national plans should form the backbone of treaty implementation, accompanied by a proposed regional communication forum connecting national, regional, and global action (Saputra, Jayawarsa, & Laksmi, 2025; Saputra & Laksmi, 2024).

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Implementation and Verification Mechanisms the model also incorporates implementation and verification mechanisms to ensure the credibility and continuity of reporting:

Capacity Building and Training: The Bali Provincial Government, in collaboration with the Community and Village Empowerment Service and academic institutions, provides regular training for community-based program managers on data collection, record-keeping, and report preparation. The training also explains the importance of data for meeting national and international reporting obligations.

Data Verification: To ensure data accuracy, the model proposes a multilayered verification mechanism comprising: (a) internal verification by program management; (b) cross-verification among programs within the same area; (c) verification by facilitators from the regency/city Environmental Service; and (d) sample audits by the Provincial Environmental Service. This mechanism is important because field findings indicate discrepancies between self-reported data and actual conditions.

Incentives and Disincentives: To promote reporting compliance, the model recommends incentives for programs that consistently submit timely and accurate reports, including technical assistance, equipment, or public recognition. Conversely, programs that fail to report may be subject to delayed assistance or the withdrawal of official status.

Use of Digital Technology: The model promotes digital technology to facilitate data collection and aggregation. Several initiatives in Bali have demonstrated its potential in waste management, including Kedonganan's barcode-based digital recording system for documenting waste volumes and the accuracy of separation, as well as a waste-bank application used by more than 30,000 customers in Bali. An integrated digital platform for sustainability reporting would substantially support implementation of the model.

Model Validation the model was validated through a series of stakeholder discussions involving representatives of community-based programs, the Bali Provincial and regency/city Environmental Services, academics, and waste-management nongovernmental organizations. The validation process found the model relevant and feasible for implementation, subject to several observations:

First, program managers appreciated the simplicity of the basic indicators, which do not impose an excessive administrative burden. They emphasized the importance of continuous training and facilitation, particularly for data collection and completion of reporting forms.

Second, the Bali Provincial Environmental Service responded positively because the model provides a systematic framework for collecting data from previously dispersed and non-standardized community-based programs. The agency also recognized the model's potential to support the targets of the Bali Clean Waste Movement and the PSBS Palemahan Kedas (PADAS) Strategic Program.

Third, academics emphasized the importance of further developing the model, particularly to enable more detailed measurement of environmental impacts, such as greenhouse gas emission reductions and the prevention of microplastic leakage. This recommendation is consistent with the International Science Council's call for indicators that identify leakage sources and establish baselines for the presence of plastics in the environment and in organisms.

Fourth, nongovernmental organizations and practitioners highlighted the importance of clear incentive mechanisms to encourage community participation in reporting. They also recommended integrating the model with existing waste-management information systems,

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such as the National Waste Management Information System (SIPSN), to avoid duplication and ensure data continuity.

Implications of the Model

The developed sustainability reporting model has several important implications. Theoretically, it enriches the literature on sustainability accounting and environmental governance by providing a framework that bridges the reporting mandates of multilateral agreements and the realities of community-based waste management at the local level. The model demonstrates that sustainability reporting need not become an administrative burden for communities but can instead function as a tool for performance measurement, learning, and enhanced accountability.

Practically, the model provides operational guidance for communities, local governments, and other stakeholders to measure, report, and improve the sustainability performance of waste-management programs. By adopting the model, community-based programs in Bali can demonstrate their tangible contribution to reducing plastic pollution while meeting the data requirements of national reporting under the Global Plastics Treaty.

At the policy level, the model provides recommendations for the Bali Provincial Government and the Government of Indonesia in developing an integrated reporting system extending from communities to the national level. It may also inform Global Plastics Treaty negotiations, particularly regarding how reporting mechanisms can accommodate community-based initiatives in developing countries.

CONCLUSION

This study developed a sustainability reporting model for community-based household waste-management programs in Bali aligned with the Global Plastics Treaty framework. Addressing the gap between nationally oriented global reporting mandates and the realities of community-level waste management, the study employed a qualitative case-study approach across several community-based programs in Bali. The findings indicate that existing reporting practices remain limited to simple operational records and do not comprehensively measure environmental and social impacts. The study formulated three tiers of reporting indicators: basic community indicators covering waste volume, participation rates, waste managed, residual waste, and revenue; intermediate regency/city indicators covering per-capita waste generation, recycling rates, landfill diversion, and economic impacts; and advanced provincial, national, and international indicators covering plastic consumption, waste leakage, and greenhouse gas emissions, aligned with GRI 306 and Article 15 of the Global Plastics Treaty.

The developed model comprises reporting objectives and principles, tiered indicators, periodic reporting formats and mechanisms, and a bottom-up reporting flow from communities to the treaty secretariat, supported by multilayered verification and policy feedback. The model contributes theoretically to the sustainability accounting literature, practically by providing operational guidance for communities and local governments, and at the policy level by supporting Indonesia's reporting obligations. Future research should undertake pilot testing, develop a digital platform, conduct longitudinal studies, and adapt the model to other contexts. The model affirms that the effectiveness of the Global Plastics Treaty depends on the capacity to bridge global mandates and local practices, thereby positioning Bali's communities as an integral part of the solution to the global plastic pollution crisis.

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