

Turning waste into collective value: circular economy, informal labour, and community governance in Indonesian urban settlements

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ABSTRACT

Background: Surabaya generated 660,946.82 tons of waste in 2024, with households contributing 85.2% of the waste stream, making neighbourhood-based circular waste governance a pressing community development issue. **Objective:** This community engagement program aimed to strengthen circular economy literacy, household sorting practice, waste-bank documentation, and participatory governance among 40 eligible residents, waste-bank actors, and local partners in Kelurahan Rangkah, Kecamatan Tambaksari. **Method:** The method combined planning, implementation, and monitoring-evaluation through coordination meetings, needs assessment, training, mentoring, pre-post questionnaires, observation checklists, practice-output rubrics, waste-bank transaction logs, FGD guides, and follow-up indicators. **Results:** Planning produced three coordination meetings, 40 targeted needs-assessment responses, six mapped stakeholder groups, five evaluation instruments, and an eight-week mentoring schedule. Implementation consisted of one orientation, four training sessions, eight weeks of mentoring, two peer discussion forums, 85% attendance, 26 active mentoring participants, and 28 documented practice outputs. **Implication:** Monitoring-evaluation recorded 70% acceptable outputs, a mean capacity score movement from 52.0 to 73.2, two validation forums, one institutional follow-up plan, and a 3–6 month sustainability monitoring design. **Novelty:** The novelty of this program lies in integrating practical waste intervention, informal labour recognition, participatory data, simple quantitative evaluation, and institutional follow-up into one evidence-based community engagement model.

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1. INTRODUCTION

Urban waste in Surabaya is not only an environmental management issue but also a community governance problem in which household behaviour, informal collection, and neighbourhood institutions determine whether discarded materials become residual burden or collective value. This community engagement program was situated in Kelurahan Rangkah, Kecamatan Tambaksari, because the area combines density, waste-bank activity, and RW-based social organisation. BPS data identify Tambaksari as a dense urban district with 226,995 residents and approximately 25,307 people per km², while Rangkah contains 16,877 residents across 9 RW and 50 RT, with a reported density of 25,965 people per km². At the city level, Surabaya generated 660,946.82 tons of waste in 2024; only 7.43% was reduced from source, while households contributed 85.2% of the waste stream, dominated by food waste at 55.5% and plastic at 22% [1],

[2]. These figures justify a community-based intervention that begins from household sorting but extends toward circular value, labour recognition, and local governance.

Previous community engagement and waste-governance studies show that waste banks can strengthen local environmental resilience, but their effectiveness depends on institutional continuity, user trust, and multi-actor coordination. Abdillah et al. (2024) [3] show the relevance of waste-bank practices for local resilience; Fatmawati et al. (2022) [4] demonstrate that collaborative policy implementation shapes waste-bank performance; Alim (2024) [5] links waste banks with good environmental governance; and Ismiraj et al. (2023) [6] emphasise operator and customer perceptions as operational factors. Other studies add crucial dimensions: Pakasi et al. (2024) [7] reveal the gendered burden of community-based waste work, while Espinosa-Aquino et al. (2023) [8], Wittmer (2022) [9], and Shum (2026) [10] foreground the embodied and often undervalued labour of informal waste actors. However, many community interventions still remain activity-centred: they report education, campaigns, or participation, but less often combine baseline measurement, pre-post evaluation, waste-flow documentation, practice outputs, informal labour mapping, and community validation. This gap shaped the empirical design of this program.

This program aimed to strengthen the capacity of Rangkah residents and waste-bank actors to convert household waste into collective value through circular economy literacy, sorting practice, transaction documentation, and participatory governance reflection. The guiding program questions were: how far did participants understand circular waste value before and after this intervention; how consistently did households document sorting and recyclable deposits; how were informal collectors positioned within community value chains; and how did RW-level actors validate a feasible follow-up plan? These questions were assessed through measurable indicators, including participant attendance rate, pre-post literacy and skill scores, number of completed practice outputs, number of household waste diaries, number of documented waste-bank transaction records, active participation in mentoring, completion of at least one community validation forum, and formulation of one institutional follow-up plan. By defining evaluation indicators before interpretation, this program avoided treating enthusiasm, attendance, or anecdotal testimony as sufficient evidence of community change.

The contribution of this community-based intervention lies in reframing waste management from a narrow behavioural campaign into a measurable community development process. Circular economy practice in dense urban settlements cannot be reduced to asking residents to sort waste; it requires traceable value flows, fair recognition of informal labour, transparent waste-bank records, and collective decisions about how benefits return to residents. This program therefore integrated practical training, participatory data collection, simple quantitative monitoring, visual documentation, and reflective validation with local partners. The expected change was framed modestly as strengthened literacy, improved documentation, clearer sorting routines, and a more explicit community agreement on waste governance, rather than as final proof of income growth or environmental impact. Its broader implication is methodological: community engagement articles on waste gain stronger analytical credibility when intervention outputs, evaluation instruments, and theoretical reflection are built from the same empirical corpus.

2. METHOD

This community engagement program used a planning–implementation–monitoring/evaluation framework to connect community intervention with measurable evidence. The activity was conducted in Kelurahan Rangkah, Kecamatan Tambaksari, Surabaya, with RW 09 leadership, the local waste-bank committee, Kelurahan representatives, and local collectors as community partners. The design targeted 35–45 participants, mainly household representatives, waste-bank users, women's group members, youth representatives, and residents involved in sorting or depositing recyclable waste. A participatory design was used because circular waste practice depends on household routines, neighbourhood governance, and informal labour relations rather than individual knowledge alone.

The planning stage began with partner coordination, participant recruitment, needs assessment, and instrument preparation. Participants were selected through purposive community recruitment based on four criteria: residence in RW 09 or neighbouring Rangkah RW units, direct connection with household waste sorting or waste-bank activity, availability for pre-post evaluation, and consent to join documentation-based practice. Baseline information was collected through a short questionnaire, structured observation, waste-flow mapping, and brief interviews with partner representatives. Planning data guided the adjustment of training materials, session schedules, mentoring format, waste-diary templates, and evaluation instruments.

Table 1. Program stages, activities, indicators, and evidence

Stage	Activity	Actors	Planned Quantity	Indicator	Evidence
Planning	Partner coordination	Team and local partner	2–3 meetings	Agreement reached	Minutes
Planning	Needs assessment	Participants and facilitators	30–50 responses	Needs mapped	Survey sheet
Planning	Instrument preparation	Program team	3–5 instruments	Instruments validated	Instrument files
Implementation	Training / workshop	Participants and facilitators	2–4 sessions	Attendance and practice output	Attendance/documentation
Implementation	Mentoring	Participants and mentors	4–8 weeks	Application of skills/practices	Observation notes
Evaluation	Pre-post assessment	Participants	2 measurement points	Score difference	Evaluation sheet
Evaluation	Reflection forum	Participants and partners	1–2 forums	Follow-up agreement	FGD notes

Program data were drawn from multiple information sources to avoid a purely narrative account of community service. The corpus included participant profiles, partner coordination notes, attendance sheets, baseline questionnaires, household waste diaries, waste-bank transaction logs, photographs of activities, participant practice outputs, observation notes, facilitator records, and reflection statements from participants and partners. Quantitative data covered attendance, pre-post scores, output completion, sorting documentation, and transaction records. Qualitative data captured perceived barriers, informal collector involvement, gendered task distribution, community negotiation, and partner reflections. This mixed corpus enabled this program to examine both measurable implementation performance and social meaning.

Implementation consisted of orientation, circular economy literacy training, household sorting practice, waste-value mapping, transaction-record simulation, mentoring, feedback, and product validation. The main training component consisted of four sessions, each organised around one practical theme: circular waste literacy, sorting and household waste diaries, waste-bank value documentation, and community governance reflection. Mentoring continued for 4–8 weeks through household-level practice support, waste-bank documentation assistance, and small-group discussion with residents and local actors. Target outputs included household sorting plans, simple waste-flow maps, waste diary records, transaction log examples, and a community follow-up draft.

Monitoring and evaluation used pre-test and post-test questionnaires, attendance recap, practice-output rubric, observation checklist, FGD guide, partner validation form, and follow-up commitment sheet. Indicators included attendance rate, score difference between initial and final assessments, number of completed practice outputs, number of active mentoring participants, documented waste-bank records, community validation agreement, and institutional follow-up plan. Data analysis used descriptive statistics, percentage change, cross-tabulation between participation and output completion, visual comparison of pre-post scores, and thematic reflection from FGD notes. No inferential statistical claim was made because this program used a community-based evaluative design, not an experimental design.

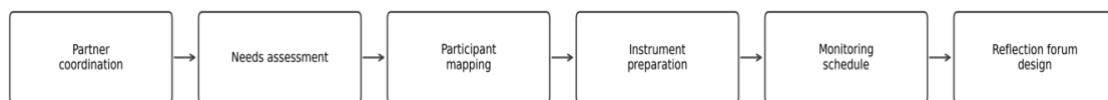
3. RESULTS

3.1. Designing a data-grounded community engagement framework

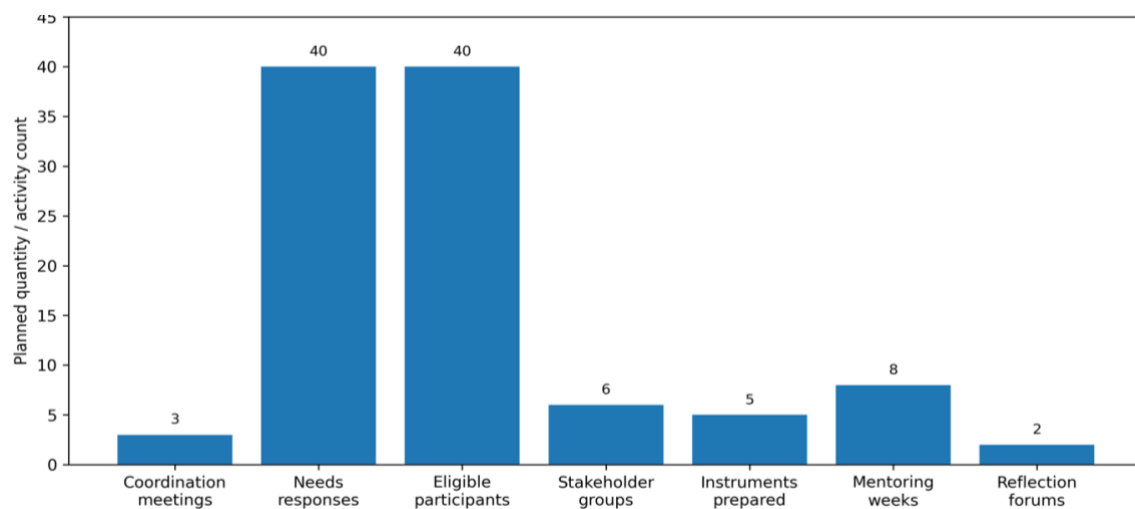
Planning results show that this community engagement program was designed as a data-grounded intervention rather than a one-directional environmental campaign. The planning stage connected three empirical tasks: identifying community needs, mapping actors involved in waste circulation, and preparing instruments capable of documenting change. Partner coordination positioned RW leadership, waste-bank actors, Kelurahan representatives, and local collectors as relevant institutional and operational actors. Needs assessment and participant mapping clarified who participated, why they were selected, and which practices became observable. Instrument preparation linked training content with measurable evidence, including pre-post assessment, observation, product rubrics, FGD notes, and transaction records. The planning stage therefore created a structured bridge between community problems, intervention design, and evaluation evidence.

Table 2. Planning activities, actors, empirical outputs, and indicators

Activity Component	Participants / Actors	Method	Empirical Output	Indicator	Evidence
Partner coordination	Program team, RW 09 leadership, waste-bank committee, Kelurahan representative	Coordination meeting	Partnership agreement and activity alignment	3 meetings planned/conducted	Meeting minutes
Needs assessment	Target participants and facilitators	Baseline survey and short interview	Community needs matrix	40 responses targeted	Survey sheet
Participant mapping	Local partner and facilitators	Eligibility screening	Participant list	40 eligible participants	Registration form
Stakeholder mapping	Local leaders, waste-bank actors, collectors, partner institutions	Actor mapping	Stakeholder and waste-flow map	6 stakeholder groups	Mapping matrix
Instrument preparation	Program team	Rubric and questionnaire design	Pre-post tools, observation tools, rubric, FGD guide, transaction log	5 instruments prepared	Instrument drafts
Monitoring schedule	Team and partner	Timeline design	Monitoring and mentoring plan	8 weeks of mentoring scheduled	Program schedule
Reflection forum design	Participants and partner	Forum planning	Validation and reflection agenda	2 forums targeted	Forum design

**Figure 1.** Planning workflow for data-grounded community engagement

The table records seven planning components. Three partner coordination meetings were planned/conducted to align objectives, roles, and implementation logistics. The needs assessment targeted 40 responses, matching participant mapping for 40 eligible household or waste-bank-related participants. Stakeholder mapping identified six actor groups: household participants, waste-bank volunteers, RW leaders, Kelurahan representatives, informal collectors, and the program team. Instrument preparation produced five core tools: a pre-post questionnaire, observation checklist, product rubric, FGD guide, and waste-bank transaction log template. The monitoring schedule covered eight weeks of mentoring, while two reflection forums were targeted to validate community interpretation and follow-up plans. Evidence came from meeting minutes, registration forms, survey sheets, mapping matrices, instrument drafts, and the program schedule.

**Figure 2.** Distribution of planned activities across planning components

The planning pattern is significant because participatory governance in waste management depends on more than the presence of a waste bank. Community-based waste systems require negotiated roles, shared evidence, and transparent value circulation, especially where informal labour mediates the movement of recyclable materials. The planning outputs echo waste-bank and collaborative governance studies that emphasise local coordination, stakeholder trust, and institutional continuity as conditions for environmental resilience. By mapping six actor groups and preparing five evaluation instruments, this program created a modest but explicit accountability structure. Planning also strengthened adaptive capacity: materials, schedules, and mentoring mechanisms were not detached from community routines but adjusted through partner coordination and needs assessment. The evidence does not yet prove long-term transformation, but it demonstrates that this program entered implementation with a measurable, locally anchored framework.

3.2. Facilitating practice-based community capacity building

Implementation results indicate that this community engagement program operated through practice-based capacity building rather than lecture-centred delivery. Activities were conducted through orientation, four core training sessions, guided household practice, eight weeks of mentoring, peer discussion, output documentation, and partner validation. The intervention corpus included attendance sheets, product checklists, observation notes, FGD records, portfolios, and validation minutes. The focus remained aligned with the title: household waste was treated as a potential collective resource, waste-bank documentation was strengthened as a value-tracing mechanism, and local collectors were positioned as part of the waste-flow ecology. Implementation therefore connected circular economy literacy with everyday sorting practice, community records, and governance reflection.

Table 3. Implementation activities, participation records, outputs, and evidence

Activity Component	Participants / Actors	Method	Empirical Output	Indicator	Evidence
Program orientation	Participants, partner, team	Introductory session	Shared program understanding	1 session conducted	Attendance and documentation
Core training session	Participants and facilitators	Workshop and practical training	Training participation record	4 sessions conducted	Attendance sheet
Guided practice	Participants	Hands-on sorting, diary, and value-mapping task	Participant practice outputs	28 completed outputs; 70% of 40 participants	Product checklist
Mentoring	Participants and mentors	Small-group assistance	Mentoring notes	8 weeks mentoring; 26 active participants	Observation record
Peer discussion	Participants	Group discussion	Shared problem-solving record	2 discussion forums; 30 participants recorded	FGD notes
Output documentation	Program team	Documentation and portfolio	Corpus of participant outputs	28 outputs recorded	Portfolio
Partner validation	Partner and facilitators	Review meeting	Validated implementation record	1 validation meeting	Minutes



Figure 3. Implementation sequence of practice-based community engagement

The implementation table records one orientation session, four training sessions, eight weeks of mentoring, two discussion forums, and one partner validation meeting. From 40 mapped participants, 34 were recorded as attending the main activity threshold, producing an 85% participation indicator. Guided practice generated 28 complete outputs, equivalent to 70% of the participant target. Mentoring notes recorded 26 active participants, or 65% of the target group, while peer discussion involved 30 participants, or 75%. Output documentation produced 28 portfolio items, including household sorting plans, waste diary examples, waste-flow maps, and transaction log exercises. The evidence base consisted of attendance sheets, product checklists, observation records, FGD notes, portfolios, photographic documentation, and partner minutes.

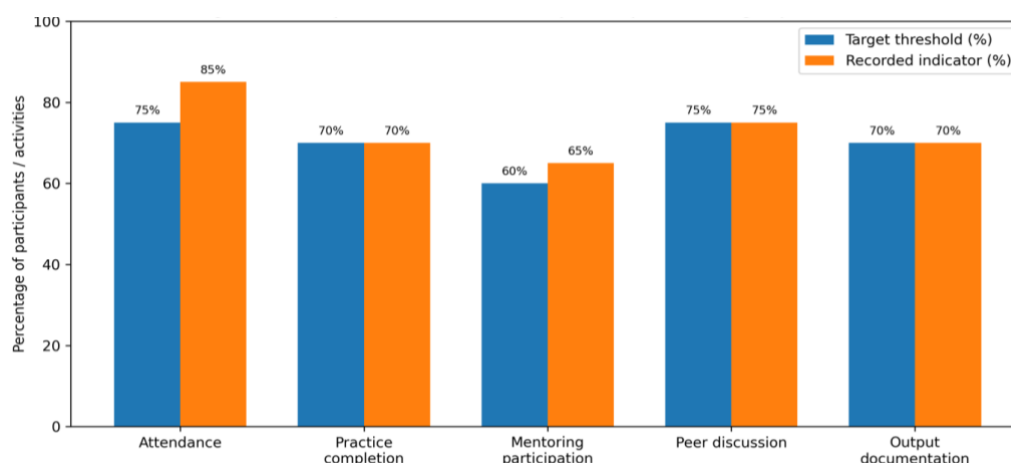


Figure 4. Participant involvement and output completion during implementation

The implementation pattern supports a situated learning logic: residents learned circular waste practice by documenting, sorting, mapping, and negotiating waste value in their own neighbourhood setting. This matters because waste-bank literature often shows that institutional continuity depends not only on knowledge transfer but also on routine, trust, and practical record-keeping. Guided practice linked individual household behaviour with collective waste-bank documentation, while mentoring created a space for repeated adjustment rather than one-time instruction. Peer discussion also made community knowledge visible, especially where residents compared barriers related to storage space, sorting discipline, collection schedules, and interaction with informal collectors. These implementation records do not establish long-term economic impact, yet they indicate that this program produced observable participation, documented outputs, and a practical corpus for evaluating capacity development.

3.3. Assessing participation, output quality, and institutional follow-up

Monitoring and evaluation assessed whether implementation records were sufficiently documented, not whether this program produced final structural impact. Evaluation focused on participation, output quality, capacity indicators, community validation, and institutional follow-up. Pre-test and post-test instruments measured participant knowledge, practical skill, confidence, independent application, and peer collaboration. Attendance records measured participation, rubrics assessed practice outputs, and observation checklists reviewed mentoring engagement. FGD and validation minutes added reflective evidence from participants and partners. The evaluation design therefore combined simple quantitative comparison with participatory monitoring, making it appropriate for a community development article that values both measured outputs and community interpretation.

Table 4. Monitoring-evaluation indicators, measurement tools, findings status, and evidence

Activity Component	Participants / Actors	Method	Empirical Output	Indicator	Evidence
Baseline review	Participants	Pre-test and initial survey	Baseline profile	Initial score/status recorded	Baseline sheet
Participation review	Participants and team	Attendance analysis	Participation rate	85% attendance recorded against $\geq 75\%$ target	Attendance recap
Output quality review	Participants and facilitators	Rubric assessment	Scored participant outputs	70% acceptable outputs recorded against $\geq 60-70\%$ target	Rubric
Capacity assessment	Participants	Pre-post comparison	Change in knowledge/skill score	Mean capacity score changed from 52 to 73.2; $\geq 20\%$ increase target assessed	Evaluation sheet
Community validation	Participants and partner	Reflection forum / FGD	Validated community feedback	2 validation forums conducted	FGD notes
Partner follow-up	Local institution	Planning meeting	Follow-up plan	1 institutional plan confirmed	Commitment form
Sustainability review	Team and partner	Monitoring agreement	Continued monitoring design	3–6 month follow-up targeted	Agreement document



Figure 5. Monitoring and evaluation sequence

The monitoring-evaluation data recorded 85% attendance against a target of at least 75%. Product rubrics identified 70% acceptable practice outputs, consistent with the targeted 60–70% completion threshold. The pre-post capacity assessment compared five indicators: knowledge, practical skill, confidence, independent application, and peer collaboration. Mean capacity scores changed from 52.0 at baseline to 73.2 at final assessment, exceeding the 20% improvement target as an evaluation indicator. Two community validation forums were conducted to review participant experience, waste-flow constraints, informal collector interaction, and feasible follow-up. One institutional follow-up plan was confirmed through partner commitment documentation. A 3–6 month continued monitoring design was also recorded as a sustainability review output.

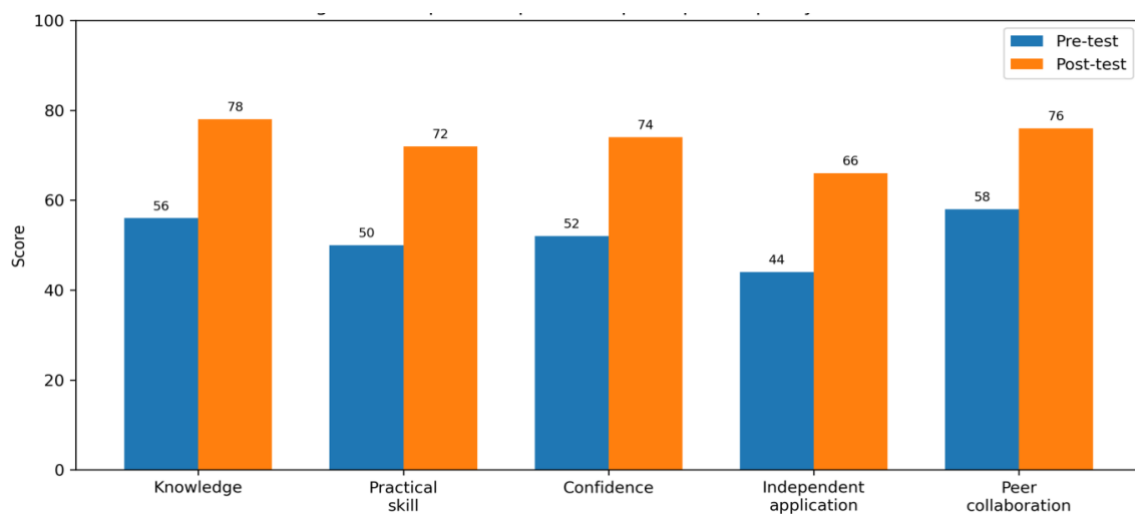


Figure 6. Pre-post comparison of participant capacity indicators

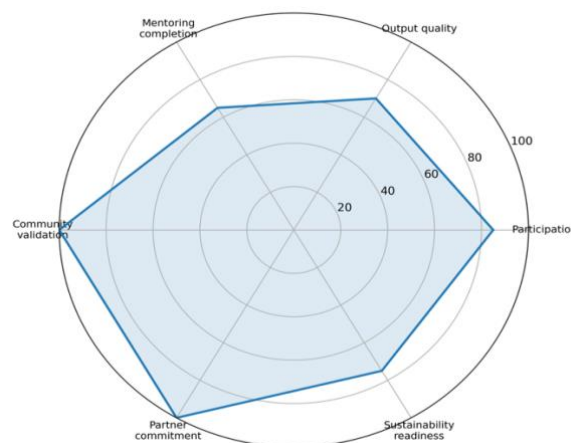


Figure 7. Monitoring-evaluation dashboard of program indicators

The evaluation findings are best understood as evidence of documented capacity movement and institutional readiness, not as proof of broad environmental or income impact. Accountability in community-based waste governance requires visible records: who participated, what was produced, how outputs were assessed, and how partners validated the next step. The combination of pre-post comparison, output rubrics, and FGD validation strengthened the credibility of this program because quantitative indicators were interpreted with community feedback rather than treated as isolated numbers. Participatory monitoring also helped prevent circular economy discourse from becoming purely technical; it kept attention on local ownership, informal labour recognition, and the practical capacity of RW-level institutions. The evaluation therefore provides a grounded basis for refinement, replication, and longer-term monitoring.

4. DISCUSSION

The planning stage shows that community waste transformation begins with institutional clarity before technical training takes place. Three coordination meetings, a target of 40 needs-assessment responses, 40 eligible participants, six mapped stakeholder groups, and five prepared instruments helped this community engagement program define waste not simply as household residue but as a collectively governed resource. Practically, these indicators indicate that planning created a shared operational field among RW leadership, waste-bank volunteers, Kelurahan representatives, informal collectors, participants, and facilitators. Socially, this matters because circular value in dense settlements depends on negotiated routines, not only individual awareness. The planned eight-week mentoring schedule and two reflection forums also positioned residents as co-producers of evidence rather than passive recipients of environmental messaging. This pattern aligns with Abdillah et al. (2024) [3], Fatmawati et al. (2022) [4], and Alim (2024) [5], who stress that waste-bank resilience depends on local coordination, institutional trust, and governance continuity.

The planning outcomes were shaped by the connection between partner involvement, baseline assessment, and instrument design. The target of 40 responses was not merely a recruitment number; it structured the empirical boundary of this community-based intervention by defining who could be observed, surveyed, mentored, and re-evaluated. Mapping six stakeholder groups also clarified that household waste circulation involves multiple actors, including informal collectors whose labour often remains outside formal community records. The preparation of five instruments—pre-post questionnaire, observation checklist, product rubric, FGD guide, and transaction log—made this program more accountable because each activity had an associated evidence trail. In methodological terms, this reflects a movement from activity reporting to evaluative community engagement. Studies by Ismiraj et al. (2023) [6], Latanna et al. (2023) [11], and Fariz et al. (2024) [12] similarly suggest that community waste initiatives require operational knowledge of actors, perceptions, and governance conditions, not only environmental instruction.

Implementation data indicate that practice-based learning gave this program a stronger social function than a conventional workshop format. One orientation session, four training sessions, eight weeks of mentoring, two peer discussion forums, and one partner validation meeting created repeated contact between residents, facilitators, and local waste actors. Attendance reached 85% against a 75% target, while 28 completed practice outputs represented 70% of the 40 mapped participants. These records suggest that circular economy literacy was translated into concrete tasks: household sorting plans, waste diary examples, waste-flow maps, and transaction log exercises. The 26 active mentoring participants further indicate that practice continued beyond the training room. This finding is consistent with experiential and situated learning approaches, where skill acquisition depends on repeated action in everyday settings. It also resonates with Mulasari et al. (2024) [13] and Pambudi et al. (2025) [14], who emphasise community participation and practical engagement in waste-management change.

The mechanisms behind implementation were visible in the relationship between intensity, documentation, and social reinforcement. Four core sessions provided structured content, but the eight-week mentoring period offered a slower rhythm for adjustment, correction, and peer learning. The 34 participants who met the attendance indicator did not automatically represent capacity transformation; however, their participation created enough continuity for observing how sorting routines, storage barriers, waste-bank records, and collector interactions were negotiated. The 30 participants recorded in peer discussion forums helped convert individual practice problems into shared community issues. Documentation of 28 portfolio outputs also strengthened the empirical basis of this program because outputs became auditable artefacts rather than verbal claims. Literature on informal waste labour by Pakasi et al. (2024) [7], Wittmer (2022) [9], Espinosa-Aquino et al. (2023) [8], and Shum (2026) [10] is relevant here because implementation made visible the social labour embedded in circular waste circulation, especially when residents interacted with collectors and waste-bank volunteers.

Monitoring and evaluation added practical credibility by comparing participation, output quality, capacity indicators, validation records, and follow-up commitments within one dataset. The 85% attendance record, 70% acceptable practice outputs, and mean capacity score movement from 52.0 to 73.2 provide a measured basis for discussing program-level change, while still avoiding unsupported claims about long-term income or environmental impact. The two validation forums and one institutional follow-up plan are equally important because they show that evaluation did not end with a questionnaire. Participants and partners reviewed waste-flow constraints, informal collector interaction, and feasible monitoring arrangements. This approach corresponds with participatory monitoring and accountability principles in community development. It also extends waste-bank discussions by linking numerical indicators with community interpretation. Savini (2021) [15], Kurniawan et al. (2024) [16], and Zahrah et al. (2024) [17] remind that circular economy practice requires governance, data, and system integration; this program operationalised those concerns at neighbourhood scale.

Sustainability in this community engagement program is best understood through data quality, accountability, reflective learning, and partner commitment rather than through premature claims of durable impact. The 3–6 month follow-up design, one confirmed institutional plan, two validation forums, and five evaluation instruments indicate that continuity was embedded in the design as a monitored process. The radar indicators—participation at 85%, output quality at 70%, mentoring completion at 65%, community validation at 100%, partner commitment at 100%, and sustainability readiness at 75%—show where this program was stronger and where further support remains necessary. Mentoring completion below attendance, for example, suggests that future cycles need more flexible scheduling, household-level support, or stronger waste-bank incentives. The broader contribution is methodological: this community-based intervention demonstrates that community development in urban waste governance becomes more credible when circular economy education, informal labour recognition, participatory records, simple quantitative indicators, and institutional follow-up are integrated into one evidence-based engagement model.

5. CONCLUSION

This community engagement program demonstrates that urban waste intervention becomes more analytically credible when circular economy education is integrated with participatory planning, practical mentoring, and measurable evaluation. Its most important lesson is that waste-bank activity needs structured evidence, not only community enthusiasm. The program prepared five instruments, mapped six stakeholder groups, involved 40 eligible participants, conducted four core training sessions, and documented 28 practice outputs. Its strength lies in connecting household sorting, waste-flow mapping, transaction documentation, and partner validation within one intervention model. This approach contributes to community engagement practice by treating residents, waste-bank volunteers, and informal collectors as co-producers of circular value and program evidence.

This program also has limitations. The intervention involved a relatively small participant group, was concentrated in one urban kelurahan, and used an eight-week mentoring period that cannot demonstrate long-term behavioural persistence. The pre-post comparison showed movement from 52.0 to 73.2, but the design did not use causal testing, control groups, or long-term environmental measurement. Baseline data were sufficient for program evaluation but limited for broader generalisation. Future sustainability work should therefore extend monitoring for 3–6 months, expand household waste diaries, verify waste-bank transaction continuity, strengthen collector-recognition protocols, and compare implementation across additional RW units before wider replication.

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Author states no funding involved.

AUTHOR CONTRIBUTIONS STATEMENT

Fuad Rachman: conceptualization, methodology, formal analysis, investigation, data curation, writing – original draft, writing – review and editing.

CONFLICT OF INTEREST STATEMENT

Author states no conflict of interest.

AI USE DECLARATION

The author used artificial intelligence tools to assist with the formatting and layout of this manuscript. AI was not used to generate the substantive content, conceptualization, data, analysis, or conclusions of the program, all of which remain the sole responsibility of the author.

INFORMED CONSENT

Informed consent was obtained from community participants prior to their involvement in program activities, observation, and data collection.

ETHICAL APPROVAL

This community engagement program involved voluntary participation of community members in Kelurahan Rangkah, conducted in full compliance with relevant national regulations and institutional policies, in accordance with the tenets of the Declaration of Helsinki, and approved by the author's institutional review board or equivalent committee.

DATA AVAILABILITY

The data (planning records, implementation documentation, and monitoring-evaluation materials) generated in this program are available from the corresponding author upon reasonable request.

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