



Structural Barriers to Effective Radio-Based Waste Management Campaigns and Enforcement in Aba, Nigeria

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ABSTRACT

Background: Radio-based sanitation campaigns are typically evaluated by their effect on awareness, attitudes, and behaviour. Whereas numerous studies exist on such effects, there remains a gap on how institutional conditions limit residents' ability to act on campaign messages. This study therefore investigated those barriers.

Objective: This study examined the structural barriers limiting the effectiveness of a radio-based waste management campaign by the Abia State Environmental Protection Agency in Aba, Nigeria.

Method: This mixed-methods secondary analysis used survey responses from 319 residents and interviews with ten stakeholders, guided by participatory communication, planned behaviour, and procedural justice theories.

Result: Residents cited irregular broadcasting (37.6%), inadequate disposal infrastructure (26.7%), and weak enforcement (21.3%) as leading constraints. Key informants corroborated the infrastructure gap and described resident resistance to enforcement.

Conclusion: Communication gains face a structural ceiling where infrastructure and enforcement legitimacy remain unaddressed; progress requires structural investment and procedurally fair enforcement.

Unique Contribution: The study shifts evaluation from message effects to the structural conditions surrounding a radio campaign, applying procedural justice theory to enforcement in a Nigerian city.

Key Recommendation: Agencies should pair radio campaigns with regular broadcasting, adequate disposal infrastructure, and procedurally fair enforcement.

Keywords: waste management, structural barriers, enforcement, procedural justice, radio campaigns



INTRODUCTION

Environmental sanitation remains a persistent challenge across Nigerian urban centres, and Aba, a densely populated commercial city in Abia State, is no exception. Indiscriminate waste dumping at roadsides, streets, and waterways poses a severe challenge to environmental safety and public health in the city (Ezechi et al., 2017). Okoro and Anorue (2020) argue that inadequate civic compliance with waste management contributes to recurrent flooding during rainy seasons, while Nwankwo and Okafor (2022) note that waste management is both an environmental and a climate issue, contributing to greenhouse gas emissions and urban flooding. Achi (2019) observes that waste generation in Nigerian cities increases by 5–7% annually, far outpacing disposal services.

Effective waste management is both a behavioural and a structural problem: municipal sustainability depends heavily on citizens' awareness, compliance, and participation, and equally on collection infrastructure, enforcement capacity, and institutional coordination (Ogu, 2020). Where citizens are informed and engaged, compliance with waste management policy improves markedly and sustainable disposal practices become entrenched (Pezzullo & Cox, 2021). In response, the Abia State Environmental Protection Agency (ASEPA) has employed radio-based sanitation campaigns — jingles, drama sketches, phone-in programmes, and interviews to create awareness, shape attitudes, and improve waste disposal behaviour among Aba residents.

Radio remains an important and widely accessible medium for public communication in Sub-Saharan Africa, particularly among low-income and semi-literate populations (Moemeka, 1991, 2019), and can promote awareness, attitude formation, and behavioural change when effectively harnessed (Nwabueze, 2018). Aba, now one of Nigeria's leading commercial hubs, offers a compelling case for examining the barriers that stand between an active radio campaign and sustained behavioural change; as Nwankwo (2021) observes, the very features that made Aba a business hub also underlie its persistent waste management crisis.

Despite ASEPA's periodic clean-up exercises and radio campaigns, poor sanitation practices persist, raising questions about the limits of radio as a behaviour-change tool. Radio may create awareness, but it cannot by itself overcome structural barriers such as inadequate collection infrastructure, weak enforcement, poor institutional coordination, and residents' practical constraints. Mass media campaigns can raise awareness without guaranteeing behavioural compliance (Agwu, 2012). Indiscriminate dumping in drainage channels has repeatedly been linked to perennial flooding and heightened susceptibility to vector-borne diseases, a situation fuelled by weak institutional coordination among environmental agencies, poor funding, inadequate waste infrastructure, and public apathy toward environmental cleanliness (Ogu, 2020). Whereas numerous studies have examined the effect of radio campaigns in Nigeria and Sub-Saharan Africa on awareness, attitudes, and reported waste practices (Awashima & Santas, 2025; Ezeaka & Bartholomew, 2025), there remains a gap on how residents' perceived barriers limit the translation of radio messages into compliant behaviour. Communication campaign evaluation risks telling only half the story if it documents what a campaign achieved without examining what residents identify as barriers to acting on it. This study therefore investigated



those barriers by pursuing two objectives: (i) to identify the barriers limiting the effectiveness of ASEPA's radio waste management campaign; and (ii) to determine the improvements residents prioritise for enhancing campaign effectiveness.

LITERATURE REVIEW

Structural and Institutional Barriers to Waste Management

International literature documents that solid waste management outcomes in developing countries are shaped as much by structural and institutional constraints as by public awareness (Bufoni et al., 2016). Bufoni et al. (2016) analysed the design documents of 432 large waste management projects registered under the Clean Development Mechanism between 2004 and 2014. They grouped the declared barriers into five types: technological, financial, human resources, regulatory, and socio-political. This pattern is directly relevant here, where ASEPA's campaign messaging appears well received while the infrastructural and enforcement mechanisms needed to operationalise residents' resulting intentions remain inadequate. Writing on Aba itself, Ezechi et al. (2017) describe indiscriminate dumping at roadsides, streets, and waterways and report that efforts to improve waste management had not recorded significant success.

Enforcement, Compliance, and Legitimacy

A related literature examines why environmental enforcement succeeds or fails independent of resourcing. Tyler's (2003) procedural justice framework argues that citizens' willingness to comply is shaped less by the threat of sanctions than by whether authorities exercise power fairly and consistently; where legitimacy is contested, even well-resourced enforcement tends to generate resistance. Murphy et al. (2009) found across taxation, social security, and law enforcement that procedural fairness became more important for compliance precisely where citizens questioned the legitimacy of the rule being enforced. Applied to waste management, this suggests enforcement resistance of the kind reported by ASEPA personnel is unlikely to resolve through intensified sanctions alone, particularly where residents are sanctioned without a corresponding improvement in disposal infrastructure.

Radio Campaigns and the Limits of Awareness-Only Approaches

Radio has repeatedly been shown effective at building awareness and shaping attitudes in African sanitation campaigns. Awashima and Santas (2025) found measurable gains in reported waste practices from radio programming in Benue State and Abuja, and Ezeaka and Bartholomew (2025) link community radio exposure to environmental awareness across Sub-Saharan Africa. What this literature addresses less directly is the structural ceiling on what communication alone can achieve, the point at which further message exposure yields diminishing returns because the remaining barrier is material or institutional rather than informational. This study treats residents' own identification of structural barriers, and stakeholders' own account of enforcement resistance, as primary data in their own right.



Nigerian Solid Waste Governance Context

Nigeria's state environmental protection agencies, of which ASEPA is representative, typically combine public communication, infrastructure provision, and regulatory enforcement within a single mandate. Yet, these functions are rarely resourced proportionally. Scholarship elsewhere has proposed reforms such as public-private partnerships in waste collection, decentralised ward-level enforcement structures, or dedicated levies earmarked for infrastructure rather than general revenue. The ASEPA case offers a concrete illustration of why such reforms are frequently proposed: communication strategies may succeed well enough to expose the institutional bottleneck downstream of them.

THEORETICAL FRAMEWORK

This study is framed by three complementary theories. The Participatory Development Communication Theory (Servaes, 1999; Tufte, 2017) holds that sustainable social change occurs when people are actively involved in identifying problems and evaluating outcomes. In ASEPA's case, this is evident in call-in programmes and street interviews across Rhema University Radio, Legend FM, and Magic FM, through which residents express grievances and evaluate ASEPA's services. The Theory of Planned Behaviour's construct of perceived behavioural control (Ajzen, 1991) holds that behavioural intention translates into behaviour only where individuals perceive themselves genuinely able to act; a resident persuaded by ASEPA's messaging may still fail to dispose of waste properly where no reachable bin exists, or discount future messaging where broadcasting is irregular. Procedural Justice and Legitimacy Theory (Tyler, 2003; Murphy et al., 2009) supplies a framework for interpreting the enforcement-resistance dynamic reported by this study's key informants. It asks whether residents perceive enforcement as procedurally fair and paired with adequate infrastructure, or as punitive and disconnected from service delivery. That perception predicts whether compliance or resistance results. Read together, these frameworks position the barriers examined here as structural and relational conditions that determine whether communication-driven attitude change converts into sustained behavioural outcomes.

Earlier studies show that radio can raise awareness (Awashima & Santas, 2025; Ezeaka & Bartholomew, 2025) and that structural constraints undermine waste management generally (Bufoni et al., 2016; Ezechi et al., 2017). They have not examined how residents and campaign stakeholders themselves identify the barriers between a radio campaign and compliant behaviour, or how enforcement resistance relates to those barriers. This study addresses that gap using residents' survey responses and stakeholder interviews on ASEPA's campaign.

METHODS

This study adopted a mixed-methods secondary analysis of data originally collected for an evaluation of ASEPA's radio-based waste management campaign among Aba residents. The original study employed a concurrent mixed-methods design combining a structured survey and key informant interviews; the present analysis re-examined a distinct subset of that data — items addressing perceived barriers and improvement priorities, and interview passages addressing



operational and enforcement challenges not previously analysed as a focused set. Secondary analysis was appropriate because the two survey questions on barriers and suggested improvements were non-programme items. They did not concern exposure to, or evaluation of, specific programmes, so the original programme-focused analysis did not examine them as structural questions. These items were reported descriptively in the first author's M.Sc. thesis (Torty, 2026), which found increased awareness, attitude change, and behaviour change.

The survey population comprised residents of Aba North and Aba South Local Government Areas, Abia State, with a projected population of 791,320 at the time of the original study. According to the National Bureau of Statistics, Aba North has an estimated 159,842 residents and Aba South 631,478. Using the Yamane (1967) formula with a 5% margin of error, a target sample of 400 respondents was calculated and proportionally distributed across the two Local Government Areas: 81 respondents for Aba North and 319 for Aba South. Of the 400 questionnaires administered, 377 were returned. Of these, 319 were from respondents who listen to radio and were therefore relevant to the study. These 319 responses formed the final usable sample. Key informant interviews were conducted with ten purposively selected stakeholders directly involved in the design or broadcast of ASEPA's campaign, comprising ASEPA officials and staff of partner radio stations (Legend FM, Magic FM, and Rhema University Radio). ASEPA's Aba Zonal Office has over 35 staff, but only the four communication staff responsible for campaign strategy, message framing, and community engagement were included, because of their expert knowledge and experience in campaign development and implementation. The other six informants were radio station staff, two from each station, involved in campaign design, production, and broadcast.

The analysis drew on two survey questions: one on factors limiting campaign effectiveness (Q14) and one on improvement priorities (Q15). Respondents selected one option for each question, and the options were ranked by selection frequency. The instrument was developed with reference to prior Nigerian environmental communication research and refined through pilot administration, with response options generated from that pilot phase and consultation with ASEPA personnel.

Qualitative data were derived from key informant interview passages addressing institutional perspectives, infrastructure demand signalled through listener call-ins, and enforcement officers' accounts of resident resistance during compliance encounters. Interviews were audio-recorded with consent and transcribed verbatim. The transcripts were read repeatedly, meaningful units of text were coded, and similar codes were grouped into categories and broader themes. The original analysis covered campaign objectives, message framing, dissemination strategies, institutional challenges, and audience engagement. For the present analysis, passages bearing on infrastructure adequacy, broadcast consistency, and enforcement dynamics were re-examined and grouped into three themes: infrastructure, broadcasting, and enforcement. Respondent-linked raw data were not available for this secondary analysis, and no inferential statistical testing was conducted. This constraint is addressed in the discussion section below.



RESULTS

Barriers to Campaign Effectiveness

Table I presented the factors residents identified as limiting the effectiveness of ASEPA's radio campaign, ranked by frequency of selection.

Table I: Barriers Limiting the Effectiveness of ASEPA's Radio Campaign

Barrier	Respondents (f)	%	Rank
Irregular broadcast of sanitation messages	120	37.6%	1st
Inadequate waste disposal facilities/bins	85	26.7%	2nd
Weak law enforcement of sanitation regulations	68	21.3%	3rd
Limited dialect-specific/local-language programming	30	9.4%	4th
General public indifference	16	5.0%	5 th

Irregular broadcast scheduling was the most frequently cited barrier (37.6%), followed by inadequate disposal infrastructure (26.7%) and weak enforcement (21.3%). Notably, none of the top three barriers related to message awareness, which the original evaluation found to have increased.

Residents' Improvement Priorities

Table II presents residents' self-reported priorities for improving campaign effectiveness.

Table II: Residents' Suggestions for Improving ASEPA's Radio Campaign

Suggested Improvement	Respondents (f)	%	Rank
Regular, multi-station broadcast scheduling	133	41.7%	1st
Provision of more disposal facilities/bins	70	21.9%	2nd
Strengthened enforcement / community task-force mobilization	60	18.8%	3rd
Dialect-specific and interactive programming	34	10.7%	4th
Framing messages around health benefits	12	3.8%	5th
Engage local influencers and community leaders	10	3.1%	6th



Improvement priorities mirrored the barriers identified: broadcast consistency (41.7%), infrastructure (21.9%), and enforcement (18.8%) together accounted for over four-fifths of all responses. The correspondence between barriers and priorities is evidence of consistency between perceived barriers and preferred interventions.

From the qualitative findings, the key informant accounts were consistent with these survey findings, although they reflect institutional perspectives rather than residents' own experiences. ASEPA officials acknowledged that radio remained critical for public environmental communication but reported that the agency was actively working to expand disposal bins across Aba, describing facility provision as essential to sustaining proper disposal behaviour. Radio station personnel also reported this infrastructural demand, noting that listeners frequently called in during sanitation programming to request additional bins, an unprompted convergence among residents' survey responses, station call-in patterns, and ASEPA's own internal assessment.

Most directly relevant to enforcement, ASEPA personnel described experiencing direct resistance from residents when sanctioning sanitation violations. They characterised enforcement encounters as frequently contentious. This was consistent with the survey finding that weak enforcement was the third most-cited barrier. Read through procedural justice theory, which forms part of this study's theoretical framework, it suggests that the enforcement gap may reflect contested legitimacy as well as insufficient regulatory activity. The interviews did not establish why residents resisted, and no informant linked the confrontation to missing infrastructure. Because this account was offered primarily by ASEPA personnel, it should be read as a credible institutional pattern rather than a claim about the prevalence of resistance across the full resident population. The survey data (21.3% citing weak enforcement) provided population-level corroboration of the enforcement concern.

DISCUSSION

These findings indicate that ASEPA's radio campaign operates within a structural environment that constrains how fully its communicative gains can translate into sustained behaviour change. Consistent with the Socio-Ecological Model's emphasis on institutional and policy-level determinants of behaviour (McLeroy et al., 1988), residents did not identify message awareness as a limiting factor. The original evaluation found increased awareness, attitude change, and behaviour change; residents pointed instead to broadcast irregularity, infrastructure inadequacy, and enforcement weakness. This pattern is consistent with the Theory of Planned Behaviour, where perceived behavioural control is constrained by external conditions (Ajzen, 1991). One plausible interpretation is that residents hold favourable attitudes yet find consistent proper disposal difficult where bins are scarce and enforcement is contested. This remains an interpretation, because the present analysis did not test it directly.

The enforcement-resistance finding adds an important qualification, which procedural justice theory helps interpret. Tyler's (2003) framework suggests that compliance depends on whether authority is exercised fairly. Murphy et al.'s (2009) finding is that procedural fairness matters most where legitimacy is already in question. Together, they suggest that weak enforcement here



does not reflect only inadequate agency capacity but also active residents' resistance. That resistance is plausibly rooted in perceptions of enforcement as punitive and disconnected from the infrastructural support residents say they need. However, it was reported mainly by ASEPA personnel, so this remains a plausible interpretation rather than an established fact. This reading is consistent with the broader literature on regulatory barriers (Bufoni et al., 2016). A practical implication follows: strengthening enforcement without addressing its perceived legitimacy, for instance without pairing it with visible infrastructural improvements, risks deepening resistance rather than improving compliance.

Taken as a whole, the barriers and priorities identified suggest structural constraints on further campaign effectiveness: residents are aware and attitudinally persuaded, but structural conditions, not further messaging, now represent the binding constraint. The relatively low frequency with which residents cited general indifference (5.0%) indicates that apathy was not the main barrier residents identified.

For ASEPA and comparable agencies, three practical implications follow directly from residents' own priorities. First, broadcast consistency should be treated as an operational priority equal to message design. Second, infrastructural expansion should be sequenced alongside, rather than after, communication campaigns. Third, enforcement strategy should explicitly address perceived legitimacy, for example by visibly linking enforcement to infrastructural improvements and training personnel in procedurally fair engagement rather than relying on sanctions alone. Agencies designing radio campaigns might also build structured feedback mechanisms directly into campaign design so structural barriers surface systematically rather than requiring dedicated secondary research.

Several limitations qualify these findings. The barriers and improvement-priorities items were measured through respondent selection frequencies rather than a validated multi-item scale, and response options may have shaped which barriers respondents identified. Respondent-linked raw data were unavailable, precluding statistical testing of associations between barriers and individual outcomes; relationships described here are interpretive rather than statistically established. The enforcement-resistance account draws its operational detail primarily from ASEPA personnel rather than residents directly, and should be read accordingly. Because this study re-analysed data shared with a companion analysis of interpersonal communication from the same dataset, and because the survey items were first reported descriptively in the first author's thesis, these analyses should be read and cited as companion analyses of a single dataset. Finally, the procedural justice literature applied here was developed substantially in North American and Australian regulatory contexts (Tyler, 2003; Murphy et al., 2009); its application to Aba should be read as a first extension rather than a confirmed cross-cultural generalisation. Future research should measure residents' perceptions of enforcement fairness directly using validated procedural justice scales, and compare multiple Nigerian state environmental agencies to establish whether these barriers are a general pattern or specific to ASEPA.



CONCLUSION

Based on the results, this study concludes that radio communication alone is insufficient to produce sustained waste management behaviour in Aba where structural and institutional conditions remain inadequate. Residents identified irregular broadcast, inadequate infrastructure, and weak enforcement as the principal constraints on further progress. Key informant accounts, read through procedural justice theory, add an important qualification: enforcement weakness may reflect contested legitimacy and active residents' resistance, not merely institutional under-capacity. This matters because further messaging alone is unlikely to close the gap between awareness and compliant behaviour. Further gains in Aba's waste management outcomes are therefore more likely to come from structural and institutional investment, paired with procedurally fair enforcement, than from continued communication-only intervention — pointing toward broadcast consistency, infrastructural expansion, and legitimacy-oriented enforcement as residents' own prioritised directions for campaign redesign.

Ethical Clearance

This study re-analysed de-identified, aggregate-level data and previously collected interview material from research that received institutional ethical clearance at the time of original data collection.

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Conflict of Interest

The authors declare no conflict of interest.

Authors' Contributions

Felicia Terty conceived and designed the study, collected the data, led the analysis, and drafted the manuscript. Happiness Emmanuel critically revised the manuscript for important intellectual content, contributing to the tightening and refinement of the argument and prose. All authors approved the final version for submission and are accountable for all aspects of the work.



Data Availability Statement

The datasets on which conclusions were made for this study are available on reasonable request.

Artificial Intelligence (AI) Use Disclosure

During the preparation of this manuscript, the author(s) used Grammarly for language editing and revision of the text in response to reviewer comments, and formatting assistance. The author(s) carefully reviewed, revised, and verified all outputs generated by the tool and take full responsibility for the accuracy, originality, and integrity of the manuscript content.

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