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Taste, Time, and Trust in Kigali Kitchens: Ethnographic Insights for Durable Clean-Cooking Adoption

Jeremiah Thoronka^{1*}

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ABSTRACT

Drawing on ongoing ethnographic fieldwork in Kigali (January–July 2025), this article explains why many urban households continue to “stack” charcoal, firewood, LPG, and electric appliances despite expanding access to modern options. I advance a practice-proximal framework, Taste, Time, and Trust (T³), that diagnoses where clean-cooking transitions stall and specifies how programmes can convert one-off trials into durable practice. Taste captures sensory expectations and culinary identities that organise what counts as “good food”. Time attends to everyday temporalities, procurement, ignition, monitoring, and cleanup, through which technologies either compress or expand the day. ‘Trust’ refers to reliability, safety, and service ecologies spanning devices, fuels, vendors, technicians, and advice networks. The analysis demonstrates that affordability and availability rarely translate into exclusive use without T³ alignment. The article offers narrative experiences, cross-household patterning, and operational indicators for programme design in Kigali, emphasising cooking co-design, reliability guarantees, whole-household behaviour change communication (BCC), and after-sales ecosystems. The findings respond to persistent gaps in the literature on adoption metrics and stakeholder engagement by centring lived practice and specifying standardisable measures of sustained use.

INTRODUCTION

The Problem in Everyday Cooking

In Kigali’s apartment blocks and hillside neighbourhoods, new energy objects have arrived. Bright LPG cylinders lean against painted kitchen walls; electric rice cookers share counter space with blackened charcoal stoves. Yet the promise of “clean” remains fragile in practice. Across my field sites, households rotate between devices, stacking, to meet the sensory, social, and economic demands of daily life. This rotation undermines the health, climate, and gender benefits associated with exclusive use of modern fuels, a pattern consistent with systematic reviews showing that price and access alone seldom secure durable change (Vigolo *et al.*, 2018; Evans *et al.*, 2018; van der Kroon *et al.*, 2013). Market-level initiatives and BCC campaigns have improved awareness and trial purchases, but cost salience, uneven message reach, and heterogeneous preferences persist (Evans *et al.*, 2018). Meanwhile, broader energy transition constraints, thin service networks, finance bottlenecks, and policy uncertainty filter into the kitchen as reliability concerns (Pereira *et al.*, 2025).

This study asks: How do taste, time, and trust co-produce (or erode) clean-cooking transitions in Kigali households, and how can programmes operationalise these dimensions to convert trials into sustained practice? I respond with an ethnography of kitchens and an analytic framework, T³, that is diagnostic, implementable, and measurable.

State of the Art: From Adoption Factors to Practice Proximities

Research on household energy has catalogued drivers and barriers; incomes, fuel prices, availability, attitudes, perceived risks/benefits, and social influence (Vigolo *et al.*, 2018; van der Kroon *et al.*, 2013; Lewis & Pattanayak, 2012). Urban consumers often value convenience and status yet continue to seek heat profiles, aromas, and social warmth associated with fires, helping explain persistent stacking (Vigolo *et al.*, 2018). BCC studies across Bangladesh, Kenya, and Nigeria show promise for market effects but emphasise cost salience and the need for mixed methods and longitudinal designs (Evans *et al.*, 2018). Critical reviews caution that the “clean/improved” label carries socio-technical assumptions that unravel without contextual engagement across household decision nodes (Lindgren, 2020). At the system level, developing contexts face acute constraints in skilled technicians, credit, and market thickness, while high capital expenditure and policy ambiguities are shared across settings (Pereira *et al.*, 2025).

This article extends that literature by relocating analysis to the level of practice proximities, the embodied, temporal, and relational dynamics of cooking. Following practice theory and interpretive and narrative anthropology, I treat taste as both chemical and cultural; time as the choreography of procurement-to-cleanup; and trust as the multi-scalar ecology linking devices and households to

¹ School of Global Studies, Thammasat University, Sierra Leone

* Corresponding author’s e-mail: jeremiahthoronka1@gmail.com

vendors, services, and authorities (Jeuland & Pattanayak, 2012; Kar & Zerriffi, 2018; Ruiz-Mercado & Masera, 2015; Troncoso *et al.*, 2013).

MATERIALS AND METHODS

Kitchens as Field Sites

Fieldwork took place across the three districts of Kigali from January to July 2025, with ongoing follow-up. I purposively sampled 50 households to capture diversity in fuel stacks, tenure, and income, prioritising women’s perspectives as primary cooks while tracking household decision nodes. The dataset comprises 100 observed cooking sessions, 20 semi-structured interviews, 10 focus group discussions, and 15 transect walks linking kitchens to vendor points and repair shops.

Trained assistants provided language mediation in Kinyarwanda/English. As a male researcher with prior energy-access field experience in Rwanda, I practised reflexive fieldwork; interviews were often negotiated amid cooking, childcare, and neighbours’ visits; rapport hinged on eating together, waiting through power flickers, and accompanying refill trips. Ethics approval was granted by the Thammasat University Ethics Review Committee and the National Council for Science and Technology (NCST).

Analysis proceeded in three steps. First, I produced thick descriptions of cooking events, preserving the sequencing of tasks and sensory judgments. Second, I coded materials against the T³ schema and built cross-household “preference bundles” (sensory–temporal–trust configurations). Third, I triangulated patterns with prior syntheses on adoption drivers (Vigolo *et al.*, 2018; van der Kroon *et al.*, 2013), BCC effects (Evans *et al.*, 2018), and transition barriers (Lindgren, 2020; Pereira *et al.*, 2025).

RESULTS AND DISCUSSIONS

Findings: Narrative Vignettes of Taste, Time, and Trust

Taste as Threshold, Not Bonus

On a Saturday morning in Kinyinya, an elder woman stirred beans simmering on LPG while her niece rinsed rice for the electric cooker. As steam lifted, the elder switched off the cylinder and moved the pot to a small charcoal stove, remarking, “Rice from the pot is respectable for guests; the cooker makes it too soft for weddings.” Younger cooks in the compound praised the rice cooker’s uniformity, no scorched bottoms, predictable yields, and less hovering but reiterated that festive dishes “need smoke.” These accounts resist the treatment of taste as a mere attribute tacked onto an otherwise rational choice; instead, taste functions as an evaluative threshold that confers or withholds social legitimacy. Textures (“firm grains”, “separate beans”, “crisped onions”) and aromas (“a hint of smoke”, “nutty rice”) are not decorative preferences but embodied tests of competence, respect, and care. When LPG or electric cookers fail these tests for particular dishes or occasions, households justify

stacking a charcoal option “for real meals,” even when cleaner devices are otherwise appreciated for everyday fare (Ruiz-Mercado & Masera, 2015; Vigolo *et al.*, 2018). The Kinyinya vignette makes visible how culinary authority is negotiated intergenerationally. Elders deploy taste as a moral adjudicator, upholding ritual adequacy and hospitality codes, while younger cooks experiment with appliances that promise reliability and time savings. This is not simple resistance to novelty: it is a situated calibration of sensory standards to social obligations. Households weigh whether a device can consistently reproduce “event-grade” outcomes under scrutiny from kin and guests. A second story from Nyamirambo shows that thresholds can change. A young salaried couple hosts weeknight dinners using LPG and a rice cooker exclusively. The wife notes, “We learnt the cooker’s ‘hard rice’ setting from TikTok; now even my aunt accepts it.” Through iterative tinkering, adjusting water ratios, pre-toasting grains in the cooker’s sauté mode, and finishing with a quick LPG sear to evoke Maillard notes, the couple translates appliance outputs into recognisable textures. In doing so, they lower the social threshold that once excluded electric rice from ceremonial spaces.

These practices align with evidence that adoption entails behavioural work, not just acquisition (Kar & Zerriffi, 2018). Programs that foreground convenience without enabling culinary equivalence risk plateauing at partial use (Lewis & Pattanayak, 2012). Our diaries show cooks actively “co-designing” recipes with devices: they map cooker settings to desired textures, play with lid-on/off timing to manage residual steam, and combine fuels to stage flavour. In this light, taste is not exogenous to technology; it is co-produced through repeated trials, peer tips, and platformed knowledge (short videos, WhatsApp recipes). When initiatives supply sensory-oriented guidance, texture maps, dish-specific protocols, and flavour-preserving hacks, households report greater willingness to retire charcoal for occasions previously deemed non-negotiable. Conversely, where such guidance is absent, taste remains a gatekeeper that justifies stacking despite cost or health rationales (Vigolo *et al.*, 2018; Ruiz-Mercado & Masera, 2015).

Importantly, the “threshold” metaphor clarifies why binary models (traditional vs. modern) mispredict transitions. Households are not climbing a linear energy ladder so much as moving between platforms to satisfy dish-specific sensory norms (van der Kroon *et al.*, 2013). Clean devices succeed when they cross the sensory bar for high-stakes dishes, not merely when they are faster, cheaper, or cleaner on average. Recognising taste as a threshold reframes program design: it shifts investments from generic demonstrations to dish-anchored, outcome-equivalent protocols that render LPG and electric cooking socially credible, not just technically feasible (Jeuland & Pattanayak, 2012; Troncoso *et al.*, 2013).

Time Gains, Temporal Friction

In Gisozi, a mother of three described how the rice

cooker allowed her to supervise homework while dinner progressed unattended: “It watches the rice for me.” Across time-use diaries, electric and LPG devices compressed active cooking minutes and reduced the vigilance required to maintain heat. The benefits were felt most during multitasking periods, particularly late afternoons when childcare, small trades, and household coordination peak. Yet these gains were fragile. A surprise cylinder depletion at 6 p.m., a two-hour evening power flicker, or a circulating rumour of tariff hikes could convert saved minutes into losses: late meals, upset children, and reputational strain when guests arrived to half-cooked rice. One respondent concluded, “Charcoal does not betray you if you keep it dry.” The statement captures a repeated calculation: speed matters, but reliability organises trust.

Our data, therefore, distinguish between two temporal attributes: micro-efficiency (reduced active minutes) and macro-reliability (day-level predictability). Households do not simply minimise cooking minutes; they seek assurance that meals will be ready at the socially expected times. LPG and electric cooking perform well on micro-efficiency yet remain vulnerable to failures in supply (refill logistics, cash timing) and infrastructure (grid stability). When these uncertainties rise above a tacit tolerance threshold, families maintain charcoal as insurance, even when LPG is nominally affordable. The diaries show a consistent “temporal insurance” logic: keeping a bag of charcoal or a portable stove offsets the risk of evening disruptions during exams, market days, or anticipated visitors. In effect, stacking is not merely cultural inertia; it is a rational hedge against cascading temporal failures. These findings extend behaviour change communication (BCC) insights that cost salience and heterogeneous reach shape adoption (Evans *et al.*, 2018). Programs that focus narrowly on price or device speed miss the lived arithmetic by which time savings “count” only when dependable. For instance, a 20-minute saving that collapses once a week due to outages may net out as a reputational liability for primary cooks responsible for punctual hospitality. Our respondents explicitly framed time in social rather than clock terms: “being ready when guests come from church”, “not keeping the children hungry after school”, or “serving before news begins”. Clean cooking initiatives can therefore enhance exclusivity by targeting temporal friction directly: synchronised cylinder reminders tied to household payday cycles, micro-depot networks that reduce last-mile refill uncertainty, outage-aware recipe cards that swap to lower-risk dishes during peak instability, and real-time vendor alerts that preempt empty-cylinder surprises.

Moreover, temporal friction interacts with learning curves. As cooks become skilled at using their appliances, batching legumes on weekends, and using keep-warm functions strategically, the perceived vulnerability window shrinks. Where vendors and peers provide guidance on “temporal choreography” (which dishes to start when and how to stage side dishes on residual heat), LPG and

electric devices become not just faster but more reliable in practice. Conversely, in settings with thin after-sales support, rumour-driven tariff anxieties, and erratic refill services, households rationally scale back exclusivity. Recognising time as both gain and risk urges a redesign of metrics: beyond average minutes saved, programs should track “on-time meal reliability” as a primary outcome. Doing so aligns with broader critiques that improved technologies diffuse when they improve the cadence of everyday life, not merely its aggregates (Kar & Zerriffi, 2018; Lewis & Pattanayak, 2012).

Trust Networks and the Social Life of Safety

Purchases and use are distributed across gendered roles: men often finance devices and fuels; women and adolescent daughters operate them; neighbours and relatives circulate advice, cautionary tales, and repair contacts. A mother of three summarised the asymmetry: “He pays for the cylinder, but I fear the fire. If the man hears from a man on the radio, he believes.” This comment illustrates how authority over safety knowledge is socially routed: messages validated by male peers or public figures can unlock budgets, while the everyday calculus of risk is borne by primary cooks. Where programs train only the principal user, misgivings among other decision-makers persist, stalling exclusivity and mirroring critiques that adoption efforts miss intra-household decision nodes and gendered trust channels (Lindgren, 2020; Evans *et al.*, 2018).

Our interviews reveal trust as enacted practice rather than abstract belief. Confidence in LPG or electric devices is reproduced, or eroded, in service encounters: the ease of contacting a technician, the transparency of refill pricing, the punctuality of delivery, and the willingness of vendors to demonstrate regulator checks. Households with access to robust after-sales ecologies, WhatsApp refill reminders, verified installers, and clear helplines reported fewer safety-related interruptions and a greater willingness to retire charcoal. By contrast, where services were thin or technicians scarce, minor incidents (a whiff of gas, a loose hose, a tripped breaker) propagated through rumour networks into durable caution, raising abandonment risk in step with the finance and capacity constraints identified at the system level (Pereira *et al.*, 2025).

Trust also travels laterally. Women’s groups, church fellowships, and neighbourhood savings clubs act as reputational amplifiers for both good and bad experiences. Demonstrations conducted within these groups, showing leak-testing with soapy water, practising cylinder handling, or troubleshooting cooker error codes, had outsized effects compared to generic market-square demos. Participants emphasised that “seeing someone like me” execute safety routines mattered more than one-off media campaigns. This aligns with evidence that adoption hinges on credible messengers and socially proximal proof, not only on information volume (Vigolo *et al.*, 2018; Lewis & Pattanayak, 2012). Moreover, training

men who control payments to recognise and fund routine safety, hoses, regulators, and periodic checks proved as pivotal as training cooks. Where men perceived safety accessories as “extras”, households deferred replacements and reverted to charcoal at the first scare.

Programmatically, our results suggest three leverage points. First, re-target training from “primary cook only” to “household safety triad”: the payer, the operator, and a community validator (e.g., a respected neighbour or local technician). Second, institutionalise service reliability as a safety outcome. Fast, affordable regulator replacements and 24-hour fault response reduce both objective risk and rumour-driven anxiety. Third, embed trust infrastructures in existing social circuits: vendor-hosted WhatsApp groups for blocks of customers, public dashboards for refill prices, and periodic “safety sabbaths” after church or market days where checks are performed collectively. In short, trust is not a static attitude to be persuaded; it is a social relation maintained through predictable, respectful service and visible competence across the household network (Lindgren, 2020; Evans *et al.*, 2018; Pereira *et al.*, 2025; Kar & Zerriffi, 2018).

Analytic Contribution: The T³ Framework Conceptual Core

Taste denotes sensory outcomes and culinary identity. If rice texture or bean mouthfeel diverges from recognised standards, households retain fires “for real meals,” undermining exclusivity (Vigolo *et al.*, 2018; Troncoso *et al.*, 2013). Time captures both compression of labour (ignition, monitoring, and cleanup) and reliability of schedules (no surprise outages or late refills). Time gains must be bankable to matter (Evans *et al.*, 2018). Trust spans device safety/durability, fuel/service predictability, and credibility of advice circulating through households and neighbourhoods. Thin service chains degrade trust, even when devices are affordable (Pereira *et al.*, 2025; Lindgren, 2020). Rather than treating adoption as a binary outcome, T³ is diagnostic: when sustained use falters, is the binding constraint a sensory mismatch (Taste), temporal uncertainty (Time), or service/knowledge gaps (Trust)? This explains why subsidies or one-off promotions often underperform; without T³ alignment, financial access does not convert into durable practice (Vigolo *et al.*, 2018; Kar & Zerriffi, 2018).

Operationalisation: Indicators and Thresholds

To operationalise the T³ framework within routine program monitoring, we specify a compact battery of practice-proximal indicators that elevate measurement beyond device ownership toward sustained and exclusive use. For Taste, we track hedonic ratings ($\geq 5/7$) for staple dishes (e.g., rice, beans) prepared on LPG/electric versus charcoal and codify dish-specific texture descriptors recorded by cooks (“grain-separate”, “firm,” “slightly smoky”), with in-situ validation during observed sessions. For Time, we measure median minutes from ignition to boil and from cooking completion to cleanup; maintain

an outage/refill log capturing the frequency and timing of electricity interruptions and empty-cylinder events; and compute the rolling 30-day share of meals completed without recourse to contingency stoves. For Trust, we record refill lead times (days) and their monthly variance; repair response times (hours) and first-fix success; safety knowledge scores (0–10) among cooks and co-decision-makers (including men and adolescents); perceived price fairness (Likert) alongside the transparency of vendor communications; and the household-wide reach of behavior-change communication disaggregated by channel and audience. Together, these indicators translate narrative proximities into programmable, auditable metrics and align monitoring with field-relevant outcomes, namely, durable practice and exclusivity of use, thereby addressing long-standing calls for robust adoption measures (Troncoso *et al.*, 2013; Ruiz-Mercado & Masera, 2015).

Implications for Policy and Programs Culinary Co-Design (Taste)

Product demonstrations should be paired with recipe-adaptation labs that treat sensory performance as a first-order design requirement rather than a secondary benefit. In our sites, cooks used “guided tinkering” to map desired textures and aromas to specific device workflows, e.g., selecting a rice cooker’s firmer setting, pre-toasting grains in sauté modes, controlling lid-off finishing to vent residual steam, or applying brief LPG sears to evoke Maillard notes that elder kin associate with “event-grade” rice. These seemingly minor adjustments consistently lowered resistance among older relatives and ceremonial gatekeepers, who judge culinary success through texture, separation, and aroma. Programs should therefore train frontline staff to troubleshoot culinary outcomes, not only safety and efficiency, because sensory success is the threshold condition for device exclusivity (Vigolo *et al.*, 2018; Lewis & Pattanayak, 2012).

Operationally, culinary co-design requires a shift from generic demos to dish-anchored protocols. Facilitators can co-produce “sensory equivalence sheets” that specify water ratios, timing bands, and optional finishing steps for canonical dishes (e.g., wedding rice, beans, celebratory pilau). Peer-led micro-labs, hosted through churches, savings groups, or neighborhood associations, should culminate in take-home “texture maps” translating appliance settings into locally recognised outcomes. To accelerate diffusion, programs can curate short video reels and WhatsApp tip cards featuring respected local cooks reproducing ceremonial textures on LPG and electric devices. This aligns with evidence that adoption depends on socially proximate proof and credible messengers as much as on device attributes (Vigolo *et al.*, 2018).

Culinary co-design should also address stacking explicitly. Rather than condemning “backup” fuels, labs can stage “transition pairings” that show how brief LPG finishing replaces charcoal smoke notes, or how simmer-hold functions achieve bean softness without scorching.

Such choreography reframes stacking from cultural inertia to a temporary, technique-bridging phase. Over time, as cooks master appliance-specific pathways to sensory endpoints, the justification for keeping charcoal for “real meals” weakens. This behaviorally informed approach complements broader insights that acquisition alone rarely yields exclusivity; the behavioural work of technique transfer is decisive (Lewis & Pattanayak, 2012). Finally, monitoring should include dish-level taste tests with elder adjudicators, documenting when LPG/electric variants achieve “ceremonial accept” status. Where gaps persist, facilitators iterate protocols, adjusting soak times, heat ramps, or finishing steps until sensory equivalence is robust. In short, culinary co-design treats taste as a tunable design parameter and positions frontline staff as “texture troubleshooters”, closing the last mile between modern devices and socially legitimate meals (Vigolo *et al.*, 2018; Lewis & Pattanayak, 2012).

Reliability Guarantees (Time)

Time reliability must be marketed and delivered alongside health and climate benefits because households optimise for day-level predictability, not only for speed. While rice cookers and LPG reduce active attention and compress cooking windows, those gains are fragile when cylinder depletion, outage risk, or rumour-driven tariff anxiety looms. Utilities and vendors should therefore bundle devices with reliability guarantees: cylinder-swap networks with stated maximum wait times; predictive refill reminders tied to household payday cycles and measured burn rates; micro-depots within walking distance that extend evening hours; and outage-aware meal planning messages that recommend resilient menus when grid instability is likely. Messaging should make explicit a simple promise, “meals on time, every day”, and report performance publicly.

Program monitoring ought to privilege “on-time meal completion without contingencies” as a core indicator: the proportion of dinners completed on modern devices without reverting to charcoal. This time-anchored proxy translates micro-efficiency into social reliability and is immediately interpretable by households. When on-time completion dips, root-cause diagnostics should distinguish supply-chain failures (late deliveries, stockouts), affordability shocks (cash timing relative to refill need), or information gaps (uncertainty about remaining fuel). Service redesign can then target the binding constraint, e.g., introducing partial-payment top-ups, offering loaner cylinders during repairs, or automating low-balance alerts via WhatsApp. These adjustments align with BCC findings that cost salience and heterogeneous reach shape behaviour, while adding the temporal dimension through which savings only “count” if dependable (Evans *et al.*, 2018).

Vendors can embed reliability into warranties and SLAs: guaranteed 48-hour repair windows, regulator replacements within 24 hours, and transparent escalation channels. For electric cooking, utilities can pilot “cooking

windows” with prioritised feeders at peak dinner times in dense neighbourhoods, coupled with outage notifications and recipe swaps that minimise failure risk. Random spot checks should validate delivery times and stock positions at depots. Evaluations should report both mean minutes saved and variance in mealtime punctuality across weeks, because variability, not simply averages, drives reputational risk for primary cooks. Ultimately, reliability guarantees convert abstract benefits into everyday cadence, stabilising trust and reducing rational hedging through charcoal (Evans *et al.*, 2018; Jeuland & Pattanayak, 2012).

Whole-Household BCC (Trust)

Behaviour change communication must target the full decision network inside households, men (financing authority), women (operators and risk managers), and adolescents (future norm carriers), because adoption failures often arise from unaddressed asymmetries in who pays, who operates, and who worries. In our sites, when men heard credible male voices, local technicians, workplace briefings, or respected radio hosts address leak fears, regulator standards, and true running costs, safety concerns eased and refill financing stabilised. Parallel sessions for women emphasised hands-on safety routines (soapy-water leak tests, hose replacement intervals), device troubleshooting for texture outcomes, and escalation pathways for service faults. Adolescents engaged through school clubs and short video formats became effective intra-household translators, coaching elders on settings and sharing quick fixes gleaned from peers.

Multi-channel BCC should be tracked for intra-household reach, correcting a persistent blind spot in evaluation that aggregates “exposure” without confirming that each role holder received role-appropriate content (Evans *et al.*, 2018; Lindgren, 2020). Baseline mapping can identify the “household safety triad”, payer, operator, and community validator, and tailor messages accordingly. For example, payers receive TCO calculators and testimonials from male peers; operators receive dish-specific texture guides and fault-response checklists; validators (e.g., a neighbour or church elder) receive simple inspection scripts to legitimise safe practice publicly. Message sequencing matters: deliver the financing case shortly before payday, safety routines immediately after installation, and texture mastery modules in the first two weeks when abandonment risk is highest.

Credibility hinges on messengers and format. Evidence suggests socially proximate proof outperforms mass generalities (Lindgren, 2020; Evans *et al.*, 2018). Accordingly, programs should institutionalise peer-led micro-demonstrations, vendor-backed WhatsApp groups moderated by certified technicians, and workplace “toolbox talks” that normalise male engagement with safety consumables (hoses, regulators). Monitoring must include within-household comprehension checks (e.g., short quizzes or demonstrations) and “closure indicators” verifying that a payer can articulate regulator replacement

schedules or that an operator can perform a leak test unprompted. By making each role's competency visible, BCC reduces rumour-driven anxiety and the budgetary hesitancy that sustains charcoal as an insurance option. In short, whole-household BCC reframes adoption from a single-user training problem to a distributed trust problem: only when all decision nodes are addressed does exclusivity become a stable equilibrium (Evans *et al.*, 2018; Lindgren, 2020; Lewis & Pattanayak, 2012).

Invest in After-Sales Ecologies (Trust)

Technician training, micro-credit for safe devices, and stable policy signals jointly reduce abandonment risk by transforming isolated sales into durable service relationships. In our sites, vendors who offered WhatsApp ordering, transparent price boards, regulator checks at delivery, and 48-hour repair windows retained customers through tariff noise and periodic outages. These practices anchor trust in tangible encounters, answered calls, punctual swaps, and verified fittings, rather than in abstract appeals. Investment must therefore prioritise the invisible infrastructure of maintenance: accredited technician networks with refresher certification, minimum spare-parts inventories at neighbourhood depots, and dispatch systems that track response times and first-visit resolution.

Finance intertwines with service. Microcredit products should bundle devices with safety consumables (quality hoses, regulators, and leak-test kits) and include lifecycle costs in repayment schedules to prevent deferred maintenance. Policy stability, predictable VAT/excise regimes, clear standards for regulators and hoses, and transparent tariff trajectories reduce rumour volatility that otherwise propagates into precautionary stocking of charcoal. Where technicians are scarce, abandonment risk rises alongside capacity and finance constraints observed at the system level (Pereira *et al.*, 2025). Targeted subsidies for training and tooling can jump-start local service density, while vendor accreditation tied to service SLAs ensures that public incentives translate into household-level reliability.

Digital touchpoints extend service reach. Vendor-hosted WhatsApp groups can push refill reminders, outage advisories, and safety prompts; simple ticketing bots can triage repair requests and surface common faults for proactive guidance. Public dashboards at depots listing current refill prices, stock levels, and average response times create transparency that disciplines service quality. Routine "safety sabbaths" after church or market days, where technicians perform group leak tests and regulator checks, both reduce unit costs and normalise safe practice. Evaluation should include service metrics (response time distributions, repeat-fault rates), trust outcomes (operator confidence scales), and behavioural endpoints (exclusive use without contingency stoves). By investing in after-sales ecologies, programs convert system-level capacity into household-level confidence, tightening the causal link between policy inputs and everyday cooking choices

(Pereira *et al.*, 2025; Evans *et al.*, 2018; Lindgren, 2020; Ruiz-Mercado & Masera, 2015).

Measure What Matters

Clean-cooking evaluations should move beyond device counts and brief trial windows toward longitudinal designs that capture sustained and, where feasible, exclusive use over ≥ 12 months, integrating mixed methods such as time-use diaries, periodic taste panels, and unobtrusive usage monitoring (temperature loggers, smart plugs, stove-use monitors) (Troncoso *et al.*, 2013). We propose operationalising a T³ construct, Taste, Time, Trust, to align measurement with the mechanisms that actually sustain or erode exclusivity. For taste (sensory equivalence), programs should track dish-level acceptance by recognised adjudicators (e.g., elder relatives) using pass/fail or Likert scores for texture, grain separation, and aroma across canonical dishes; record the number of iterations required to achieve "ceremonial accept" status; and document device-specific techniques (e.g., brief LPG sears) that bridge sensory gaps (Lewis & Pattanayak, 2012; Vigolo *et al.*, 2018). For Time (on-time reliability), monitoring should capture the proportion of meals completed on modern devices without contingencies, the variance of mealtime punctuality week to week, and linkage to supply and infrastructure data (refill deliveries, outage incidence), with reporting of both average minutes saved and reliability variance, since unpredictability, rather than mean savings, drives hedging behavior (Evans *et al.*, 2018; Jeuland & Pattanayak, 2012). For Trust (service and safety competence), systems should track after-sales response times, first-visit fix rates, adherence to regulator/hose replacement schedules, and within-household competency checks (payer knowledge of replacement intervals; operator ability to perform leak tests), complemented by perception scales for vendor transparency and ease of escalation, then linked to behavioural endpoints such as reduced charcoal stocking. Evaluation designs should, where possible, use staggered rollouts or stepped-wedge trials to enable causal inference without compromising equity. Minimum reporting standards ought to include 12–18-month attrition curves, coded reasons for slippage mapped to T³ domains, and cost per "on-time exclusive dinner" achieved, supplemented by qualitative follow-ups that surface hidden constraints and recipe workarounds which can feed back into culinary co-design and service redesign cycles. Publishing open indicator definitions, instrument templates, and data dictionaries will materially improve cross-site comparability and cumulative learning, addressing persistent weaknesses in clean-cooking evidence syntheses (Troncoso *et al.*, 2013; Lindgren, 2020; Kar & Zerriffi, 2018). In short, measuring what matters, sensory equivalence, temporal reliability, and service-enabled trust, realigns program incentives with the lived criteria households use to judge whether modern cooking can fully replace legacy fuels, thereby improving both internal validity and external relevance of impact claims.

CONCLUSION

This study's insights are conditioned by the seasonality and outage regimes observed between January and July 2025; shifting rainfall patterns, fuel availability, and tariff adjustments across other months may reconfigure stacking rationales and the relative salience of Taste, Time, and Trust (T³). Although cooking diaries enrich temporal granularity, they rely on self-report and may be vulnerable to recall and desirability biases; likewise, researcher presence during observed sessions could have nudged device choice or performance, despite reflexive field protocols. These constraints underscore the need for triangulation with objective usage data and for replication across seasonal cycles and urban morphologies. Even with these caveats, the findings hold clear programmatic implications: Kigali kitchens demonstrate that clean-cooking transitions become durable only when sensory expectations, temporal reliability, and service ecologies align in everyday practice. Households are not resisting modernity; they are safeguarding social credibility at the table, protecting tight daily schedules, and managing safety under infrastructural uncertainty. By centering practice proximities, the T³ framework renders adoption failures diagnosable and remediable: culinary co-design lowers the sensory threshold; reliability guarantees convert time savings into dependable routines; and whole-household behavior change communication, coupled with responsive after-sales ecosystems, reproduces trust. Future work should test T³ thresholds across additional dishes and seasons, integrate stove-use monitors to pair narrative with high-resolution telemetry, and link household-level T³ scores to program outcomes (exclusive-use persistence, health/time savings) and vendor performance (refill lead-times, repair responsiveness). Comparative studies across East African cities can establish external validity and policy salience, identifying context-specific levers while preserving a shared diagnostic core. Programs that measure and manage to these dimensions can move beyond ownership counts to the metric that matters, sustained, exclusive clean-cooking practice, with tangible benefits for health, climate, and gender equity.

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