

Logistics Management in Indonesia's Free Nutritious Meals Program: A Qualitative Case Study of Last-Mile Distribution Challenges

Logistic Management
in Free Nutritious
Meals Program

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ABSTRACT

The Free Nutritious Meals (*Makan Bergizi Gratis*/MBG) program is one of Indonesia's most ambitious social logistics undertakings, requiring government agencies to deliver perishable meals daily to millions of beneficiaries across a fragmented archipelago. While existing studies have examined the program's budgetary design and nutritional outcomes, comparatively little research has explored how logistics unfolds from the perspective of the people who operate it. This study employed a descriptive qualitative case study design focused on a Regional Implementing Unit in West Java, drawing on in-depth interviews with program coordinators, kitchen managers, couriers, and school-level beneficiary representatives, complemented by field observation and document review. Data were analyzed thematically following an established qualitative coding approach. Four interrelated themes emerged: fragmentation of last-mile distribution, vulnerability of the micro-cold chain, inaccuracy in demand signals, and variability among local suppliers. These themes converge on a shared condition, namely the absence of coordination and monitoring mechanisms linking kitchens, couriers, and beneficiaries. The findings suggest that simple, locally grounded route-planning and cold chain monitoring practices offer a more sustainable path toward efficiency than cost-cutting measures alone. As a single-site qualitative study, the findings are context-bound and point to the need for comparative research across Indonesia's diverse regional settings.

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INTRODUCTION

Logistics management is the often unseen engine that determines the success or failure of any large-scale public welfare operation. Indonesia's Free Nutritious Meals program, known nationally as *Makan Bergizi Gratis* (MBG), is an ambitious undertaking designed to address widespread malnutrition by providing daily, standardized meals to millions of beneficiaries across the country (Suprpto et al., 2025; Marzulina et al., 2025). The scale, speed, and precision required for this program elevate its logistical demands from routine distribution to a specialized field that scholars describe as social logistics, in which the objective is not profit but equitable and reliable service to vulnerable populations (Van Wassenhove, 2006). The central purpose of MBG is therefore dual: to guarantee a nutritional input and to do so in a financially sustainable manner (Kiftiyah et al., 2025; Agustini et al., 2025). Translating this national vision into daily, on-the-ground reality, however, is complicated by Indonesia's unique geography, where the logistical chain must run from centralized procurement centers to decentralized local kitchens and finally through a difficult last mile to schools, integrated service posts, and households (Melkonyan et al., 2020).

Four operational conditions make this chain especially fragile. Indonesia's uneven road quality and reliance on mixed transport modes make the last mile disproportionately costly relative to the value of the meals delivered, consistent with national data showing

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that logistics costs remain a persistent macroeconomic burden across the archipelago (Santoso et al., 2021; Poelman et al., 2020). Because the program depends on fresh ingredients and freshly prepared meals, any lapse in temperature control during transport or storage results in spoilage, a double loss that is both financial and nutritional (Firdaus et al., 2024; Veskovic, 2025). The government's strategy of involving numerous small local kitchens and vendors strengthens community economies but introduces variability in quality control, portion standardization, and the timely aggregation of meals for dispatch (Julieta, 2023). Many implementing units still lack integrated information systems, leaving coordinators with limited real-time visibility into inventory, delivery status, and actual consumption, which constrains their ability to intervene proactively when problems arise (Hari et al., 2026).

Existing research has begun to describe these pressures but has not examined them together, in depth, from the standpoint of the people who manage them daily. Suprpto et al. (2025) reviewed MBG's early policy implementation. They identified logistics as a recurring constraint, but their analysis remained at the level of national policy design rather than field-level execution. Kiftiyah et al. (2025) examined the program through the lens of social justice and political dynamics, offering little insight into how coordinators, kitchen managers, and couriers actually experience and manage operational strain. Widyasari et al. (2025) documented the program's health and local economic effects at the primary-school level but likewise stopped short of the logistical mechanics that determine whether those effects materialize. More recent site-specific studies have started to close this gap, Kaylla et al. (2026) documented a food distribution flow in Sarijadi that functioned relatively smoothly, while Serang et al. (2025) found systemic communication and coordination breakdowns in Bitung. These contrasting findings suggest MBG's logistical performance is highly context-dependent. Yet, neither study examined the full chain from procurement through the micro-cold chain to beneficiary handover, nor connected field-level themes to the broader humanitarian and last-mile logistics literature.

This gap matters because policy responses designed around national averages or purely financial metrics risk overlooking the operational, human, and organizational dynamics that actually determine whether a nutritious meal reaches a child on time, intact, and safe to eat. Addressing it requires a research approach capable of capturing lived operational experience in context rather than reducing it to aggregate indicators. This article therefore aims to explore, through a qualitative case study of a Regional Implementing Unit, how logistical actors across the MBG supply chain experience and manage the challenges of last-mile distribution, cold chain integrity, demand estimation, and supplier coordination, and what these experiences imply for strengthening the program's operational reliability.

LITERATURE REVIEW

Humanitarian and Social Logistics in Public Feeding Programs

Humanitarian logistics differs from commercial logistics in its guiding objective. (2006) argued that while commercial supply chains are organized around cost minimization under conditions of predictable demand, humanitarian and social logistics must instead administer scarce resources under uncertainty, with success measured by the timeliness, safety, and equity of what reaches vulnerable recipients rather than by unit cost alone (Van Wassenhove, 2006; Peters et al., 2021). This distinction is directly relevant to a nationally mandated meal program, where the "customer" is a child whose nutritional well-being depends on a chain of decisions made far upstream. Czinkota et al. (2021) similarly frame distribution management as a set of trade-offs between cost, coverage, and service reliability, trade-offs that intensify when the goods being distributed are perishable, and the recipients cannot simply be resupplied later.

Applying this lens to MBG, several Indonesian studies frame the program explicitly as a logistics and welfare challenge rather than a purely nutritional one. Kiftiyah et al. (2025) situate MBG within debates on social justice, arguing that the program's legitimacy depends on whether benefits are distributed equitably across regions with vastly different infrastructure. Suprpto et al. (2025) reach a related conclusion from a policy-

implementation perspective, noting that logistics and food safety remain unresolved constraints even as national coverage expands. This literature positions logistics not as a back-office function but as the operational core on which MBG's social legitimacy rests.

Last-Mile Distribution and Cold Chain Management for Perishable Aid

The last mile is consistently identified as the most fragile segment of any distribution chain that must reach dispersed, hard-to-access recipients. Melkonyan et al. (2020) and Silva et al. (2023) show that last-mile sustainability in local food networks depends heavily on vehicle utilization and route consolidation, since underloaded vehicles inflate the cost per unit delivered without improving service quality. A comparable conclusion in their cross-city comparison of meal delivery is that delivery reliability, not distance alone, determines whether meal programs meet their nutritional objectives (Poelman et al., 2020; Ye et al., 2026). These findings suggest that Indonesia's last-mile costs are unlikely to be resolved through infrastructure investment alone; operational practices such as scheduling and load consolidation matter just as much.

Perishability compounds this fragility. Firdaus et al. (2024) review current developments in food cold chain logistics and note that most documented failures occur not in long-haul transport but in the final, least-monitored segments closest to the point of consumption, precisely where MBG's local kitchens and couriers operate. Veskovic (2025) adds that even short lapses in temperature control can compromise both food safety and nutritional value, making cold chain integrity a matter of program credibility rather than a purely logistical detail. Together, these studies indicate that micro-level practices inside local kitchens and delivery vehicles deserve as much sustained scholarly attention as macro-level distribution planning, a balance the existing MBG literature has not yet struck.

Local Sourcing and Supplier Complexity in Community-Based Feeding Programs

Community-based feeding programs worldwide face a structural tension between empowering local suppliers and maintaining consistent quality. Bisht et al. (2020) describe how smallholder-based supply arrangements in India strengthen local livelihoods but require deliberate capacity-building, since smallholders often lack the standardized packaging, timing, and volume consistency that centralized procurement assumes. Simón-Royo et al. (2020) document a similar tension in Spain's public food procurement system, where local farmers' skepticism toward bureaucratic quality standards slowed the transition to agroecological sourcing even when policy intent was favorable. These cases show that supplier variability is not unique to Indonesia but is an expected feature of any program that deliberately privileges local sourcing over centralized supply.

Julietta (2023) extends this argument to informal food markets in Southeast Asia, showing that small, informally organized suppliers can meet demand reliably when aggregation and inspection routines are clearly defined, but struggle when responsibility for quality control is diffuse across multiple intermediaries. This finding is instructive for MBG, where thousands of local kitchens and vendors are expected to meet uniform nutritional and safety standards without a correspondingly uniform system for vetting, training, and supporting them. The implication is that supplier variability should not be read simply as a compliance failure on the part of individual vendors, but as a predictable outcome of scaling a decentralized sourcing model faster than the coordination infrastructure needed to sustain it.

Qualitative Case Study Approaches to Logistics Research

Because operational logistics problems are embedded in organizational routines and informal practices, they are often difficult to capture through purely quantitative indicators. Accordingly, Yin (2018) argues that case study designs are particularly suited to examining how and why contemporary phenomena unfold within real-world contexts, especially when the boundaries between a phenomenon and its context are not clearly defined, as in national programs implemented through thousands of semi-autonomous

local units. Likewise, Lim (2024) emphasizes that qualitative approaches enable researchers to capture the contextual depth and situational complexity of operational problems that aggregate quantitative data may obscure. This methodological rationale is further supported by studies of school meal logistics and food service management, where case study approaches have successfully identified coordination processes, operational bottlenecks, and context-specific implementation practices that cannot be adequately captured through aggregated performance indicators (Mahadevan et al., 2013; Setyaningtyas et al., 2022).

This methodological orientation is already emerging in MBG-specific research. Serang et al. (2025) used an instrumental case study with thematic analysis to evaluate logistics coordination in a single school in Bitung, while Kaylla et al. (2026) and Prasetyo et al. (2026) applied a descriptive qualitative case study to document the distribution flow of the MBG kitchen. Both studies relied on Braun and Clarke's (2006) thematic analysis procedure to move from raw interview and observation data to interpretable patterns, a methodological choice this study also follows. Where the present study differs is in scope: rather than examining a single school or a single kitchen, it follows the chain across coordinators, kitchen managers, couriers, and beneficiary-level actors within one Regional Implementing Unit, allowing themes to be traced across roles rather than within a single vantage point.

RESEARCH METHODS

This study used a descriptive qualitative case study design, appropriate for capturing the depth and situational complexity of an operational phenomenon that is difficult to reduce to aggregate indicators (Lim, 2024; Yin, 2018; Creswell & Poth, 2018). The case was bounded as a single Regional Implementing Unit of the MBG program in West Java, selected because it exhibits the fragmented infrastructure and mixed-transport last-mile conditions that make logistical strain most visible. Bounding the study to one unit follows Yin's (2018) logic that a case study should examine a contemporary phenomenon in depth within its real-world context, accepting a trade-off between contextual richness and statistical generalizability.

Primary data were collected through semi-structured in-depth interviews with informants purposively selected across three levels of the supply chain: strategic-level regional coordinators and procurement officials; operational-level kitchen managers and last-mile couriers; and beneficiary-level actors, namely teachers and Integrated Health Service Post (*Pos Pelayanan Terpadu*/Posyandu) operators responsible for meal handover. This cross-level sampling followed the logic of purposive, information-rich case selection (Patton, 2002) and mirrored the informant structure used in comparable MBG logistics research (Serang et al., 2025). Interviews were complemented by non-participant field observation of the meal journey from kitchen to delivery point, focusing on container type, vehicle condition, and elapsed transit time, and by review of program documents, including distribution schedules and internal coordination records, to provide contextual and historical grounding for what informants described.

Data were analyzed using Braun and Clarke's (2006) six-phase thematic analysis procedure: familiarization with the interview transcripts and field notes, generation of initial codes, searching for candidate themes, reviewing themes against the coded data, defining and naming final themes, and producing the thematic account presented in the following section. Coding proceeded iteratively, moving between transcripts and field notes so that patterns identified in interviews could be checked against what was directly observed in the field, a form of data triangulation intended to strengthen the validity of qualitative findings across multiple sources and methods (Vivek et al., 2023). Coded segments were organized and compared using the matrix-based display techniques described by Miles et al. (2014), which supported systematic comparison of how each theme appeared across informant roles.

Trustworthiness was addressed following Lincoln and Guba's (1985) criteria of credibility, dependability, confirmability, and transferability. Credibility was supported

through triangulation across interview, observation, and document sources; dependability through a documented audit trail of coding decisions; and confirmability through reflexive attention to the researcher's own assumptions during analysis. Because the study is bounded to a single implementing unit, transferability is treated as analytic rather than statistical: the themes are offered as patterns that later research can test for resonance in other regional contexts rather than as findings assumed to generalize automatically across Indonesia's diverse geography.

RESULTS

Fragmentation of Last-Mile Distribution

Across interviews with couriers and kitchen managers, the final five to ten kilometers of the delivery chain emerged as the point where cost, time, and reliability pressures converge most sharply. Vehicles serving this segment routinely operate below their rated capacity, since delivery routes are planned informally around driver familiarity with an area rather than around a structured schedule that consolidates nearby stops. This pattern is consistent with Melkonyan et al.'s (2020) observation that last-mile sustainability in local food networks depends less on the availability of vehicles than on how deliberately those vehicles are loaded and routed.

Coordinators described the last mile as the segment they could least directly supervise, since it depends on informal transport arrangements and non-standard vehicle types that fall outside the program's formal procurement channels. This lack of direct oversight echoes a broader pattern in last-mile delivery literature, where visibility tends to decline precisely as goods move closer to their final recipient (Masorgo et al., 2024; Zosu et al., 2024). The result observed in this case was not a single point of failure but an accumulation of small, uncoordinated decisions, each individually minor, that together inflated the effective cost per meal delivered.

Kitchen managers also linked last-mile fragmentation to broader planning rigidity. Because delivery schedules are set centrally without input from the couriers who actually navigate local road conditions, informants described routes that looked efficient on paper but proved difficult to execute during peak traffic hours or after rain. Melkonyan et al. (2020) similarly note that sustainable last-mile design requires incorporating local operational knowledge rather than treating routing as a purely technical optimization problem. In this case, the absence of a feedback channel between couriers and central planners appeared to be as significant a constraint as the physical road infrastructure itself.

Taken together, these accounts suggest that last-mile fragmentation in this Regional Implementing Unit is less a matter of insufficient vehicles than of insufficient coordination structure around the vehicles that already exist. This distinction matters because, as Czinkota et al. (2021) note, distribution performance is ultimately shaped by how coordination trade-offs are managed rather than by asset availability alone, a framing with direct implications for how the program's technological and organizational responses should be designed.

Vulnerability of the Micro-Cold Chain

The second theme concerned what informants described as the most fragile link in the entire chain: the short but uncontrolled window between a meal leaving the kitchen and reaching the point of consumption. Local kitchens generally lack standardized insulated containers, and couriers frequently make several stops before completing a route, extending the time meals spend outside any temperature-controlled environment. This finding is consistent with Firdaus et al.'s (2024) observation that cold chain failures in food distribution systems tend to concentrate in the final, least-monitored segments closest to the consumer rather than in long-distance transport.

Kitchen managers reported relying on informal cues, such as touching packaging or estimating elapsed time, to judge whether a batch of meals remained safe, rather than on any standardized measurement. Veskovc (2025) cautions that even brief, undetected lapses in temperature control can compromise both food safety and nutritional value,

which suggests that the absence of objective monitoring in this case is a credibility risk for the program, not merely an efficiency concern. Because these judgments were made informally and inconsistently across kitchens, the reliability of meal quality appeared to depend heavily on the vigilance of individual staff rather than on a systemic safeguard.

Observation of the meal journey corroborated these accounts: vehicles used for last-mile delivery were rarely purpose-built for temperature control, and transit times varied considerably depending on route length and traffic. This variability aligns with broader cold chain logistics literature showing that infrastructure gaps in developing-country contexts are most acute at the micro level, inside individual vehicles and storage points, rather than at the level of national supply chain design (Firdaus et al., 2024; Suprayitno, 2025).

The cumulative picture is one in which micro-cold chain vulnerability functions as a direct extension of the last-mile fragmentation described above: the same informal, undercoordinated delivery arrangements that inflate cost also erode the conditions needed to keep meals safe. This convergence supports Veskovíc's (2025) broader argument that cold chain integrity should be treated as a single, continuous operational property rather than a series of separately managed steps.

Inaccuracy in Demand Signals

The third theme centered on a recurring mismatch between how many meals a kitchen prepares and how many beneficiaries are actually present on a given day. Coordinators described meal volumes being planned against static beneficiary census data rather than real-time attendance figures, producing a pattern of alternating surplus and shortage that kitchen managers said they had learned to expect rather than solve. This pattern reflects a broader challenge documented in food distribution research, where forecasting based on outdated or static data tends to generate systematic overproduction, waste, and occasional stockouts simultaneously (Poelman et al., 2020).

Kitchen managers linked this mismatch to a communication gap between schools and kitchens: attendance fluctuations, whether due to school events, illness, or local holidays, were rarely communicated to kitchens in time to adjust preparation volumes. Coordinators, in turn, described limited visibility into which schools were experiencing unusual fluctuations, since reporting from the field was neither standardized nor frequent. Julieta's (2023) study of informal food markets similarly found that demand-side information gaps, rather than supply shortages, were often the primary driver of mismatched provisioning in decentralized food systems.

Beneficiary-level informants, including teachers responsible for meal handover, described the practical consequences of these mismatches: on surplus days, uneaten meals had to be handled outside the planned distribution flow, while on shortage days, some students received partial portions or none at all. These accounts suggest that demand signal inaccuracy is experienced unevenly across the chain, with the operational burden of correcting for it falling disproportionately on frontline actors closest to the beneficiary, consistent with Melkonyan et al.'s (2020) observation that last-mile actors typically absorb the consequences of planning gaps generated further upstream.

Variability Among Local Suppliers

The fourth theme concerned inconsistency in quality, packaging, and timing among the numerous small kitchens and vendors that supply the program locally. Kitchen managers and coordinators described considerable variation in how strictly individual suppliers followed portioning and hygiene guidance, variation that increased the time needed to inspect and aggregate meals before dispatch. This pattern mirrors findings from homegrown school feeding programs elsewhere, where integrating smallholder or small-vendor suppliers strengthens local economies but requires deliberate capacity-building to achieve consistent quality (Bisht et al., 2020).

Several informants attributed this variability not to unwillingness on the part of suppliers but to the absence of a clear, consistently applied vetting and training protocol.

Simón-Rojo et al. (2020) documented a comparable dynamic in a public procurement system that prioritized local sourcing, where farmers' uneven familiarity with formal quality standards slowed the transition toward more consistent supply even when program intent supported local producers. In the present case, informants described quality control as something each kitchen negotiated individually with its own suppliers, rather than something governed by a shared, program-wide standard.

Coordinators noted that this variability had downstream effects on dispatch timing: kitchens working with less consistent suppliers needed more time for inspection and correction before meals could be released for distribution, which in turn compressed the time available for last-mile delivery. This finding reinforces the interconnection observed across all four themes in this study: supplier variability, demand signal inaccuracy, cold chain vulnerability, and last-mile fragmentation are not independent problems but linked expressions of a single underlying condition. Read alongside Batista et al.'s (2023) and Masruroh and Pratama's (2026) arguments that social sustainability in logistics systems depends on coordination across, not merely within, individual supply chain nodes, this suggests that MBG's operational challenges are best addressed as a connected system rather than as four separate problems.

DISCUSSION

The four themes identified in this study point toward a single interpretive conclusion: the operational strain observed in this Regional Implementing Unit stems primarily from a coordination gap rather than from geography or resource scarcity alone. This reading aligns with Van Wassenhove's (2006) and Charles et al. (2016) argument that humanitarian and social logistics succeed or fail based on how well organizations manage information and coordination under uncertainty, not on how many resources they command. A program built on thousands of small, semi-autonomous kitchens and informal transport arrangements cannot substitute capital for coordination the way commercial logistics often can; its performance depends on how well decentralized actors are connected. Framed as a root-cause question rather than a symptom-by-symptom one, the four themes trace back to this same gap, a diagnostic logic consistent with root-cause approaches used elsewhere in operations research (Sakdiyah et al., 2022).

This interpretation both extends and complicates recent MBG-specific research. Kaylla et al. (2026) found that a single kitchen in Sarijadi achieved a relatively effective and efficient distribution flow, attributing this success to short delivery distances and structured internal coordination. Serang et al. (2025), studying a different site in Bitung, found the opposite: systemic disruption rooted in fragmented coordination and reactive communication among stakeholders. The findings of the present study sit between these two accounts and help explain the contrast. Where Sarijadi appears to have developed workable informal coordination routines, the Regional Implementing Unit examined here had not, suggesting that MBG's logistical performance is not determined by the program's design alone but by whether individual units have, often informally, developed their own coordination practices. This is consistent with Melkonyan et al.'s (2020) broader observation that last-mile sustainability depends on how deliberately local actors organize routine practice, not on infrastructure investment alone.

The finding that micro-cold chain vulnerability is inseparable from last-mile fragmentation reinforces Firdaus et al.'s (2024) argument that cold chain failures concentrate in the least-monitored, most decentralized segments of a supply chain. It also nuances Veskovic's (2025) caution about spoilage risk: in this case, the risk was less a matter of missing technology than of missing routine, since even simple standardized containers and handover checklists were absent. This suggests that before pursuing sensor-based monitoring, MBG's implementing units may benefit more immediately from standardizing the low-technology practices that other cold chain literature treats as foundational.

The demand signal and supplier variability themes echo patterns documented well beyond Indonesia. Julieta's (2023) study of informal food markets found that demand-

side information gaps, not supply shortages, most often drove provisioning mismatches, a pattern this study's informants described almost identically in the context of static beneficiary census data. Bisht et al.'s (2020) and Simón-Royo et al.'s (2020) research on smallholder and local-farmer procurement likewise shows that supplier variability is a predictable, manageable feature of decentralized sourcing rather than evidence that local sourcing is the wrong strategy. Read together, this literature suggests MBG's implementation challenges are familiar features of any program that chooses equity and local empowerment over centralized, standardized supply, a trade-off Kiftiyah et al. (2025) frame as central to the program's social justice rationale.

Taken as a whole, these findings suggest that efficiency in MBG should be understood less as a cost-cutting target and more as a coordination achievement, consistent with Batista et al.'s (2023) framing of social sustainability in logistics as a property of relationships between actors rather than of any single node, and with Sen's (1999) broader argument that development outcomes should be judged by the real freedoms and capabilities they secure for people rather than by expenditure alone. Practically, this points toward interventions that strengthen feedback loops between kitchens, couriers, coordinators, and schools, such as shared scheduling and standardized handover checklists, before capital-intensive technologies are introduced. Because this study is bounded to one implementing unit, these interpretations should be read as analytically transferable patterns rather than claims proven to hold everywhere MBG operates.

CONCLUSION

This study set out to explore how logistical actors within a Regional Implementing Unit of Indonesia's Free Nutritious Meals program experience and manage the challenges of last-mile distribution, cold chain integrity, demand estimation, and supplier coordination. The findings show that these four challenges are not separate operational problems but interconnected expressions of a single underlying condition: the absence of coordination and feedback mechanisms linking kitchens, couriers, coordinators, and beneficiaries. Fragmented last-mile routing erodes cold chain integrity, static demand data produces recurring surplus and shortage, and inconsistent supplier vetting compresses the time available for safe, timely dispatch.

The practical implication is that improving MBG's operational reliability does not necessarily require large capital investment in advanced technology. It requires, first, standardizing the coordination routines, such as shared scheduling, handover checklists, and simple feedback channels between schools and kitchens, that this case found to be informal or absent. Only once such routines are established does more sophisticated route-planning or monitoring technology become a meaningful next step rather than a solution imposed on an uncoordinated system. Policymakers overseeing MBG's expansion should therefore prioritize building the coordination infrastructure connecting decentralized actors before assuming that efficiency gains will follow automatically from scale or from technology alone.

This study has clear limitations. As a single-site qualitative case study, its findings describe patterns that were meaningful and coherent within this Regional Implementing Unit but cannot be assumed to generalize automatically to Indonesia's many other implementing units, which vary considerably in infrastructure, geography, and local governance capacity. The findings also rely on informants' own accounts and the researcher's field observations, which, despite triangulation, remain interpretive rather than exhaustive.

Future research should pursue comparative qualitative case studies across contrasting geographical profiles, such as urban, remote island, and mountainous regions, to test whether the coordination-centered explanation offered here holds across contexts. Follow-up studies could also examine specific low-cost coordination interventions, such as shared scheduling tools, once implementing units have had the opportunity to adopt them, to assess whether such interventions measurably improve the reliability of last-mile delivery and cold chain integrity.

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