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Municipal Solid Waste Management in Zambian Cities, 2018 to 2023: Pilots, Impacts and Lessons Through the TownLoop Framework

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Abstract

Between 2018 and 2023 Zambia put in place its first dedicated law for solid waste, the Solid Waste Regulation and Management Act No. 20 of 2018, and began turning it into working systems in its cities. This paper reviews that experience in Lusaka, in the Copperbelt cities of Ndola and Kitwe, and in a group of smaller provincial towns, using only evidence published before 2024. It reads the Zambian record through the TownLoop framework, a locally financed, closed loop resource recovery model built for small and secondary African cities. The fit is close, partly because Lusaka's Manja Pamodzi scheme is one of the cases from which TownLoop was drawn. A separate chapter compares how Ghana and Zambia put zoned private and community collection into practice, drawing on the documented experience of Accra and Tamale alongside Lusaka and Ndola. The evidence shows clear institutional progress in Zambia: a purpose built law, a dedicated Lusaka utility, collection zones served by community enterprises and franchise contractors, and a visible recycling chain. It also shows the weaknesses the framework predicts. Collection reached only about a third of the capital's waste, payment and verification were thin, the incentive still rewarded tonnage over coverage, the work was heavily donor funded, the organic half of the stream went to landfill rather than to compost, and the model spread slowly beyond Lusaka. The paper closes by turning TownLoop's mechanisms into recommendations for the next phase of reform.

1. Introduction

Zambia is urbanising quickly, and its towns have long struggled to handle the waste their growth produces. For decades the job of collection and disposal sat with local authorities working under general public health and local government law, with no single statute for solid waste. The results were visible in every large settlement: low collection coverage, dumping into drains and open ground, and dependence on a handful of disposal sites. In Lusaka daily generation was put at roughly 1,200 tonnes, against a collection capacity that reached only part of the city, so most peri-urban residents had no formal service at all [13].

The reform window studied here opened in a crisis. Cholera was declared in Lusaka in October 2017 and brought under control by mid 2018, leaving 5,935 reported cases and 114 deaths, most

of them in the crowded peri-urban compounds [16][17]. Public health officials named poor solid waste management, together with weak water supply and drainage, as a direct cause of the outbreak [15][18]. The epidemic gave urgency to reforms already in preparation, including a study of the state of waste management run through the Ministry of Local Government with the Millennium Challenge Account Zambia [4]. The outcome was the Solid Waste Regulation and Management Act No. 20 of 2018, a set of supporting instruments, and a new way of organising the sector.

This paper asks how that framework worked in practice across Zambian cities between 2018 and 2023, what pilots gave it effect, what impacts can be measured, and what lessons follow. To make sense of a scattered body of evidence it uses one analytical framework, TownLoop, a locally financed closed loop model built for small and secondary African cities [23][24]. TownLoop suits the task for two reasons. It was designed for the conditions Zambia's towns face, with thin budgets, organic heavy waste, and collection that fails the poorest first, rather than for large capitals. And it was distilled partly from Lusaka's own Manja Pamodzi scheme, so its categories map onto the Zambian record [24]. Section 2 sets out the framework, and the rest of the paper reads the Zambian and Ghanaian evidence through it. Every figure reported here comes from a source published before 2024.

2. The TownLoop Framework

TownLoop is a closed loop, locally financed resource recovery system for a single small city. Its stated goal is a clean and fully served town rather than a high recycling rate [23]. The framework begins from two facts about waste in an African town. The first is composition. The largest single fraction is wet organic material, often between half and three quarters by mass, which is heavy, rots fast, and is the part most easily treated nearby through composting. The second is the collection gap. Reliable collection reaches only some residents, and the share falls sharply in poorer and outlying areas, so it is the unserved poor whose waste ends up in drains and open ground [24]. From these facts TownLoop draws its central claim: the recurring reason community waste schemes fail is institutional, not technical. Collectors are paid late, service is poorly checked, work areas shift with politics, and payment tied to tonnage gives enterprises little reason to serve the poorest households [23].

On that diagnosis the framework builds an operating layer from parts each proven separately in the field. The town is split into micro-zones, each served by a paid community enterprise built where possible from the existing informal workforce. Households separate waste into two simple streams, wet and dry. The wet stream is composted at small sites near where it falls and sold to nearby farms. The dry stream goes to one shared aggregation hub for the whole town and on to buyers, which is the point at which a small town reaches the volume needed to sell on fair terms [24]. Figure 1 shows the loop.

What the framework presents as new is the integration, and in particular two governance mechanisms the earlier models lacked [23]. The first is a local clearing council, a small standing body that verifies recovered quantities and household coverage and settles payment to the enterprises on a fixed cycle from pooled local revenue. It borrows the logic of a financial clearing house, in which an independent body nets and settles obligations among many parties on a set schedule so that none has to trust another directly. It supplies the three things whose absence

weakened earlier schemes: timely and predictable payment, independent checking of service, and a clear route to settle disputes [23][24].

Figure 1. The TownLoop closed loop. Two household streams flow to local treatment and to a shared hub, while a clearing council verifies quantities and coverage and settles payment. Source: [23][24].

The second mechanism sets how much each enterprise is paid, and it is designed to make serving every household the choice that earns the most. In its simplest form the periodic payment to an enterprise is:

Payment = B × C × Q + s × V

Here B is a base payment per zone, C is the verified coverage rate, Q is a quality factor for clean separation and on-time service, V is the market value of recyclables and compost from the zone, and s is the share of that value passed to the enterprise [23][24]. Because coverage is the dominant term, an enterprise earns most by serving the last and poorest households, which reverses the tonnage incentive that left poor areas unserved elsewhere. Table 1 sets out the parts and what each is meant to do, and Figure 2 contrasts the two payment rules.

Term	Meaning	Intended behaviour
B	Base service payment per zone	Covers the fixed cost of running a zone so service is viable before any material is sold
C	Verified coverage rate, the share of registered households reliably served	The dominant income driver, so serving every household pays best

Term	Meaning	Intended behaviour
Q	Quality factor for separation cleanliness and schedule	Protects the compost and recyclable markets by rewarding clean, on-time work
s × V	Enterprise share of recovered material value	Keeps the pull of a per-unit reward without letting it override coverage

Table 1. Components of the coverage linked payment formula. Source: [23][24].

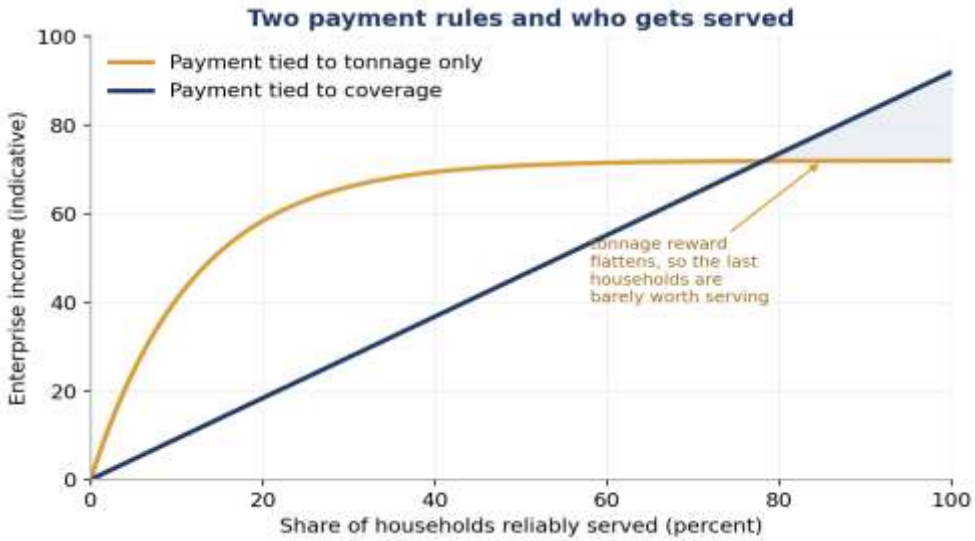

Figure 2. Two payment rules and who gets served. A tonnage reward rises fast and then flattens, so the last households are barely worth serving, while a coverage linked reward keeps rising to full coverage. Source: [23][24].

The pooled revenue the council settles from is local by design. It comes from an income graduated household fee that protects poorer residents, the sale of recyclables and compost, and a modest municipal contribution toward the coverage part of the service, which is a public good rather than a private transaction. The aim is to cross a threshold at which local sources cover operating cost, so that any outside money pays for setup rather than for day to day running [24]. These are the elements against which the Zambian evidence is read in the sections that follow.

3. Zambia's Policy and Legal Framework, 2018 to 2023

Three layers of law underpinned the Zambian framework. The Constitution of Zambia (Amendment) Act No. 2 of 2016 confirmed that service delivery such as waste management is a function of local authorities [6]. The Local Government Act No. 2 of 2019 restated and updated

councils' powers over public health and sanitation [6]. Between them sat the Solid Waste Regulation and Management Act No. 20 of 2018, the first statute given over entirely to the sector.

Parliament passed the Act and dated it 26 December 2018, and a commencement order brought it into force in 2019 [1][2]. Its stated aims were to provide for the sustainable regulation and management of solid waste, to allow general and self-service waste services, to permit the incorporation of solid waste management companies and define their functions, to license waste service providers and operators, to govern the building and running of landfills and other disposal sites, and to set and approve tariffs [3]. The Act also required local authorities and waste companies to report to the ministries responsible for health, environment and water, and to tell the Zambia Environmental Management Agency about anything likely to pollute the environment [4]. Three principles guided the work: the polluter pays principle, the affordability principle, and the principle of full cost recovery [6]. As TownLoop's financing logic anticipates, full cost recovery and affordability pull against each other in low-income settlements, a tension that runs through the rest of this paper.

The Act did not stand alone. In November 2018 the government issued Statutory Instrument No. 65 of 2018, tightening controls on plastics [11]. During the cholera response the Ministry of Local Government had already issued Statutory Instrument No. 10 of 2018, amending the rules on street vending and nuisances, while the Ministry of Health used Statutory Instrument No. 79 of 2017 on infected areas [18][19]. The most consequential change the Act allowed was the creation of autonomous waste utilities. Section 7 kept the local authority's underlying mandate while opening a route to hand the function to a dedicated company [10]. Lusaka moved first, and its experience forms the core of the analysis.

4. Method and Scope

This is a desk based review that uses the TownLoop framework as its interpretive structure. It draws together primary legislation, government and council documents, independent donor evaluations, multilateral diagnostic reports and academic studies, and reads them against TownLoop's diagnosis and design [23][24]. The geographic scope is Lusaka as the flagship case, the Copperbelt cities of Ndola and Kitwe, and a set of smaller provincial centres, namely Livingstone, Chipata and Solwezi, which fall squarely in the small and secondary city tier the framework was built for. A separate chapter sets the Zambian record beside municipal practice in Ghana, using Accra and Tamale, so that two countries with similar models can be compared. The period is 2018 to 2023, with earlier material where it explains the starting point. In line with the brief, every data point cited was published before 2024, and later sources have been left out so the picture reflects what was known within the reform window. The main limitation is that municipal monitoring data in Zambia were uneven over the period, so coverage and tonnage figures should be read as indicative rather than exact.

5. Lusaka: the Flagship Case

Lusaka was both the centre of the 2017 to 2018 cholera outbreak and the proving ground for the new framework. Figure 3 shows the scale of the public health problem the reforms had to answer. The documented totals were 5,935 cases and 114 deaths, with cases climbing through December 2017 to a peak of more than two thousand by early January 2018, then falling to single digits by

the end of March [16][17][19]. The monthly shape is indicative, but the totals and the timing are the recorded figures.

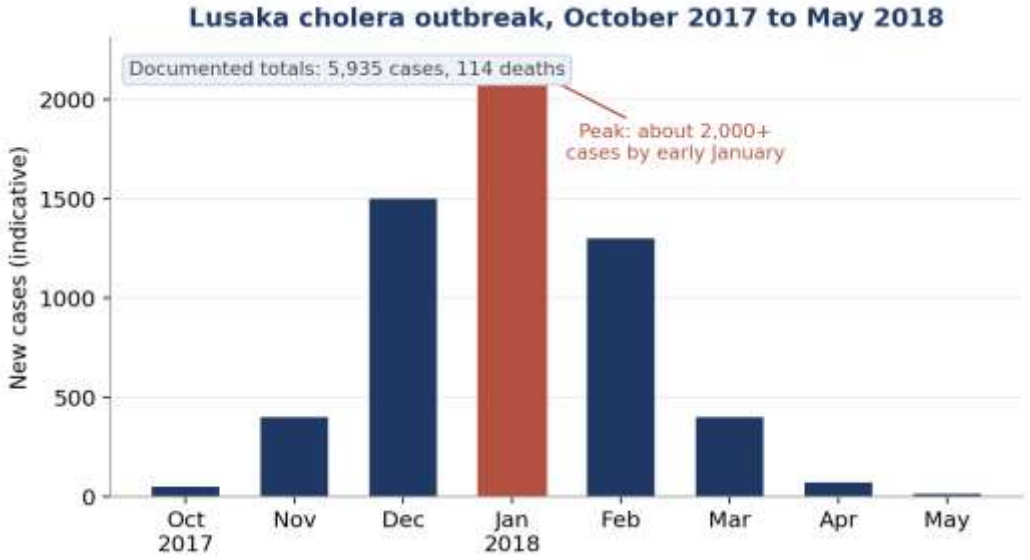

Figure 3. The Lusaka cholera outbreak, October 2017 to May 2018. Monthly distribution is indicative; the cumulative totals of 5,935 cases and 114 deaths are the documented figures. Source: [16][17][19].

The central reform was the creation, in 2018, of the Lusaka Integrated Solid Waste Management Company, an autonomous utility incorporated under the Companies Act No. 10 of 2017 to take over service delivery from the Lusaka City Council after Act No. 20 of 2018 [10]. The Millennium Challenge Corporation and the Millennium Challenge Account Zambia, then running the 355 million United States dollar Lusaka Water Supply, Sanitation and Drainage Project, pushed hard to stand the company up and to keep it going after their compact ended, and the government funded a Millennium Project Completion Agency to continue the work [11].

The operating model maps closely onto TownLoop's micro-zone design. Lusaka was divided into twenty-four waste management districts. In the planned, conventional areas, sixteen private franchise contractors collected under contract. In the high-density peri-urban compounds, which larger trucks often cannot reach for want of access roads, community based enterprises did the primary collection with carts, wheelbarrows and small vehicles. That is the low capital, human powered logistics TownLoop calls for, drawn from the workforce it would build enterprises from [24]. Figure 4 shows how the pieces fit together.

The structure also grew. By 2022 there were about 111 community based enterprises working alongside the sixteen franchise contractors and some twenty-two recycling companies, and by mid 2023 the enterprises numbered about 132 [6][9]. Figure 5 shows the change.

Figure 4. How Lusaka divides waste collection across districts, franchise contractors, community enterprises, recyclers and the council. Source: [6][9][10].

Figure 5. Registered waste operators in Lusaka in 2022 and 2023. Source: [6][9].

For all that structure, coverage stayed low. The council and its contractors collected on the order of 35 percent of the waste generated by 2022, against an earlier baseline in which roughly 40 percent of residents had any access to collection at all [6][13]. The national target is to collect and transport 80 percent of waste by 2030 [10]. Figure 6 sets these figures side by side and shows the distance still to travel. The council also reported a problem that TownLoop predicts directly, that many residents simply declined to pay for the waste they generated, which eroded the revenue the franchise and enterprise model depends on [7].

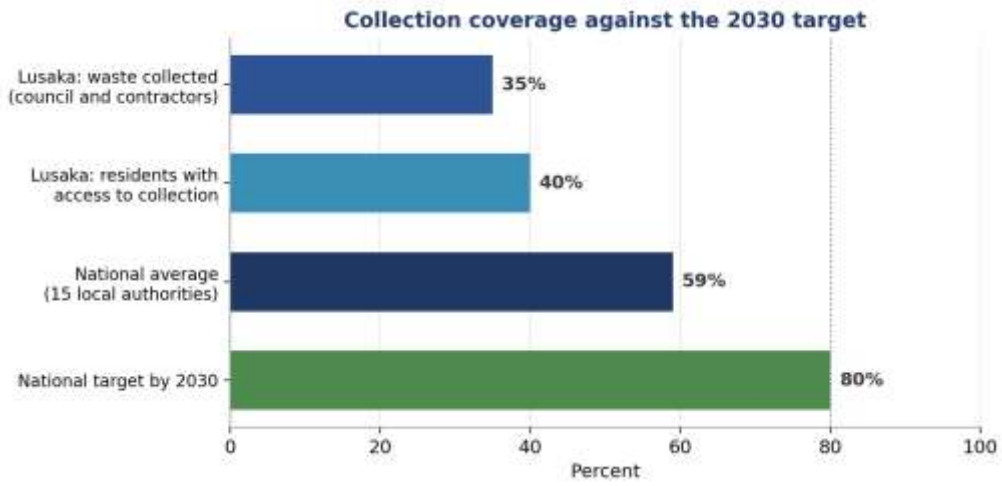

Figure 6. Collection coverage against the 2030 target. Source: [6][13][15][10].

Composition matters too. About half of Lusaka's stream is wet organic material, with the rest split among a large residual fraction and small shares of paper, plastic, glass and metal [13]. Figure 7 shows the breakdown. Almost all of this organic half was hauled to a single site rather than composted locally, which is the value TownLoop is designed to capture near where it falls.

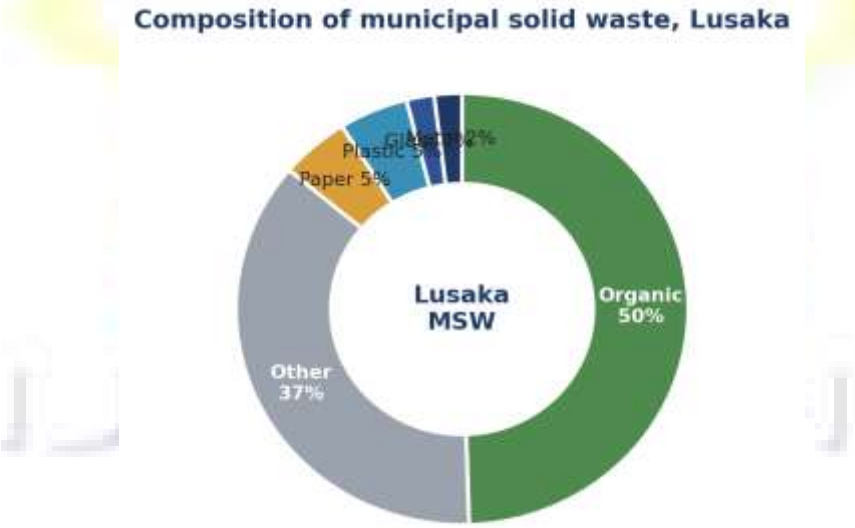

Figure 7. Composition of municipal solid waste in Lusaka. Source: [13].

Disposal rested on one site. The Chunga landfill on the northern edge of the city was the first and effectively the only engineered landfill in the country, built with a bottom liner, leachate collection and treatment, an enclosed embankment, a weighbridge and perimeter fencing [13]. About a thousand people made a living picking recyclable material from the site and the streets [13], the

very workforce TownLoop argues should be recognised, paid and given shared aggregation rather than pushed aside. The site deteriorated over the period as throughput rose and compaction equipment proved inadequate [15].

Two recycling pilots gave the framework a visible value chain, and each lines up with a TownLoop component. The larger was Manja Pamodzi, meaning hands together, launched in February 2015 by Zambian Breweries under the Innovation Grant Programme of the Millennium Challenge Account Zambia. The grant term ended in October 2018, though the scheme continued [12]. It ran an explicit chain of collectors, aggregators and processors, which is TownLoop's buy-back chain and aggregation tier. An independent evaluation, built on 427 collector surveys, 63 key informant interviews and 35 focus group discussions, found that collectors had gathered about 3,800 tonnes of recyclable material between 2015 and 2018, and that residents saw less waste in their neighbourhoods, fewer blocked drains and a lower cholera risk [12]. The same evaluation recorded the friction TownLoop attributes to a thin aggregator tier: trouble recruiting female aggregators, and processors receiving volumes too small and too irregular to run efficiently [12]. That Manja Pamodzi is one of the cases from which TownLoop was drawn makes the diagnosis fit especially well [24].

The second pilot was smaller. The Keepers Zambia Foundation ran a scheme in the Ng'ombe and Chipata compounds, funded at about 68,880 United States dollars and projected to reach 12,600 direct and 100,000 indirect beneficiaries and to create around a hundred jobs. It gave households two-colour bins to separate wet from dry waste, an early version of TownLoop's two-stream separation, with recyclables sold on and biodegradable material sent to Chunga [14]. Oversight of the wider grant programme was active enough that three of fourteen grants, worth a combined 727,499 United States dollars, were cancelled or suspended for non-compliance [13].

6. The Copperbelt and the Secondary Cities

Outside the capital the framework spread more slowly, and the Copperbelt shows the financing problem TownLoop is built to solve. Ndola, once Zambia's most industrial city, had enjoyed free municipal collection underwritten by a strong mining economy and company run systems. The decline of that economy after the privatisations of the early 1990s left the Ndola City Council without the revenue base for a universal service [21]. Even so, household studies found that about 80 percent of medium-density households were willing to pay for collection, and that food waste made up roughly 45 to 50 percent of the stream [21]. Figure 8 shows both findings. In TownLoop's reading the high organic share points straight at decentralised composting as the largest improvement available for the least money, while the willingness to pay is the latent base for an income graduated fee.

Kitwe, the other large Copperbelt city, faced the same mismatch between a service built for an industrial heyday and a town that no longer had the finances or the access roads for it. A national baseline that sampled fifteen local authorities found an average collection rate of about 59 percent, generation ranging from 100 to 10,000 tonnes per month, and an average of around 0.6 kilogrammes per person per day, and confirmed that Lusaka's Chunga was still the country's only engineered landfill and had badly deteriorated [15]. The human side was recorded by the UNDP Zambia Accelerator Lab, whose teams spent time with pickers at the Ndola and Lusaka dumpsites

and found them working long hours in smoke and dust, often without protective equipment, and asking residents to separate waste at source and to pay for collection [17]. Work with Manja Pamodzi had given some collectors training, protective gear and a guaranteed market, which shows how the value chain could reach northward [17].

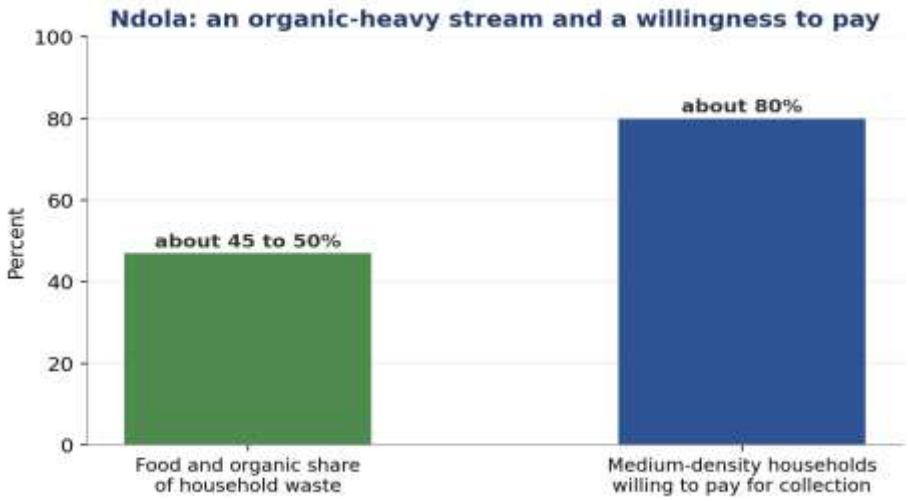

Figure 8. Ndola has an organic heavy waste stream and a stated willingness to pay for collection. Source: [21].

The smaller provincial centres are TownLoop's natural target tier, and they began the period with the least capacity and the least documentation. A multi-city scoping study had surveyed six cities, Lusaka, Livingstone, Chipata, Ndola, Kitwe and Solwezi, to characterise their waste streams and to find openings for small enterprises, private investment and public private partnerships in recycling and re-use [22]. The recurring finding was that only a small share of waste reached any controlled facility, that source separation was almost absent, and that what recovery happened was driven by informal pickers and a few private operators serving better-off households [15][22]. For these towns the Act of 2018 set a destination, with licensed providers, approved tariffs and engineered disposal, that stayed largely on paper within the window, since none had set up a dedicated utility on the Lusaka model by 2023.

7. Municipal Practice Across Ghana and Zambia

Zambia is not alone in turning to private and community operators working assigned areas, and the adoption of this model across municipalities in Ghana and Zambia is instructive because both countries met the same problems. Ghana's experience, in Accra and Tamale, is documented in enough detail to serve as a precedent, and it sits at the heart of the field record from which TownLoop was built [24].

7.1 Accra and the franchise that strained

From the late 1990s the Accra metropolitan authorities contracted private firms and assigned them collection zones, in the expectation that competition and local enterprise would widen coverage [29]. Early assessments were encouraging. Private collection could match or beat public service quality in the zones where it operated [29], and private involvement expanded the city's capacity [24]. Over the following years, though, the franchised zonal arrangement underperformed and in places collapsed. The documented reasons are consistent across studies. Cost recovery broke down because user fees were hard to collect, above all in low-income zones, and payments to contractors were irregular and late. Monitoring was weak, so shortfalls in service went unverified, and contractors had little reason to serve unprofitable households. Zones were allocated and changed in ways open to political interference, which removed the stability enterprises needed to invest. The net effect was regressive: profitable high-income zones were served while poor zones were neglected, and the burden of uncollected waste fell on those least able to bear it [25][26][27][28]. Figure 9 shows the failure path that follows when a model built for a large city is transplanted without these safeguards, and notes that the Accra and Lusaka franchise models share the same stress points.

Figure 9. The predictable failure path of truck based collection moved into small towns, and the stress points shared by the Accra and Lusaka franchise models. Source: [24][25][26].

7.2 Tamale and the conditions for household separation

Work in the Tamale metropolis in northern Ghana looked at both what the waste stream holds and what would make households separate it. Characterisation confirmed the regional pattern of a dominant organic fraction and a modest recyclable one [30][31]. Studies of household behaviour found that participation in separation responds strongly to simple, tangible incentives, in particular free or subsidised separation bins and the assurance that collection will actually arrive [28]. The lesson is that separation is feasible in a small Ghanaian city when the scheme is kept simple and the promised collection comes, and that the binding constraint is reliability and convenience rather than willingness in principle.

7.3 What the two countries share

Lusaka's arrangement, with sixteen franchise contractors and about 132 community based enterprises across twenty-four districts, belongs to the same family as Accra's zoned franchise [6][9]. The Zambian record shows the same pressure points Accra did: residents declining to pay [7], and verification that is thin [13]. Ndola's eroded financing echoes Accra's broken cost recovery [21][25], while Ndola's 80 percent willingness to pay echoes the latent willingness Tamale found once collection is reliable [21][28]. The shared lesson is plain. Zoned private and community collection can widen coverage, but it holds only where payment is reliable, service is verified, and zone assignment is stable. Where those conditions are missing it slides back toward open dumping. That is the precise diagnosis TownLoop builds on, and it is why the framework adds a clearing council and a coverage linked payment rule rather than more trucks. Table 2 sets the two countries side by side.

Dimension	Ghana (Accra and Tamale)	Zambia (Lusaka and Ndola)
Model adopted	Private firms contracted to zones in Accra from the late 1990s; source-separation incentives trialled in Tamale	Franchise contractors in planned areas and community enterprises in peri-urban areas under a Lusaka utility from 2018
What worked	Private collection matched or beat public quality in served zones; simple incentives raised household separation	Clear zones, a dedicated utility, and a visible recycling chain through Manja Pamodzi
Where it strained	Fees hard to collect, late payment, weak monitoring, politically unstable zoning, poor zones neglected	Widespread non-payment, thin verification, low coverage in peri-urban compounds
Organic stream	Dominant organic fraction confirmed in Tamale	About half of Lusaka and 45 to 50 percent of Ndola waste is organic, largely landfilled
Willingness to pay	Latent, conditional on reliable collection	About 80 percent of medium-density households in Ndola willing to pay
Shared lesson	Zoning needs reliable payment, real verification and stable assignment	The same, which is what the clearing council and coverage rule provide

Table 2. Municipal practice in Ghana and Zambia compared. Sources: [6][7][9][21][24][25][26][27][28][30][31].

8. Reading Zambia Through TownLoop

Set against the framework, the Zambian record divides cleanly into the parts that were built and the parts that were left undone. Lusaka built the operating layer, with micro-zones, paid community enterprises, an emerging value chain and an engineered landfill. It did not build the two governance mechanisms TownLoop treats as decisive, the clearing council and the coverage linked payment rule, and it left the organic majority in the ground. Table 3 maps each TownLoop element to the Zambian evidence and to the implication that follows.

TownLoop element	Zambian evidence, 2018 to 2023	Implication
Micro-zones served by paid community enterprises	24 districts; about 132 enterprises in peri-urban areas plus 16 franchise contractors [6][9]	The structure exists but lacks the governance to make it durable
Two-stream household separation	Keepers two-bin pilot; separation otherwise almost absent [14][15]	Shown to work but never scaled across the city
Decentralised composting of the organic majority	Organics about 50 percent of Lusaka and 45 to 50 percent of Ndola waste, sent to landfill [13][21]	The single largest unrealised gain
Single shared aggregation hub	Manja Pamodzi aggregator tier; sorting stations and Chunga sorting [12]	A thin aggregator tier, just as the framework predicts
Local clearing council	Widespread non-payment; weak enforcement and verification [7][13]	The missing mechanism and a leading cause of fragility
Coverage linked payment	Collection about 35 percent in Lusaka; peri-urban poor served last [6][13]	Incentives still reward value, not coverage
Local financing to a break-even point	Donor seeded by the Millennium Challenge programmes; cost recovery against affordability unresolved [6][11]	Durability depends on making this transition

TownLoop element	Zambian evidence, 2018 to 2023	Implication
Integration of the informal sector	About a thousand pickers at Chunga, many without protective equipment [13][17]	Recognise, pay and aggregate rather than displace

Table 3. TownLoop elements mapped to the Zambian evidence. Sources as cited in the table.

9. Documented Impacts

9.1 Institutional and regulatory

The clearest impact was institutional. Zambia moved from having no dedicated waste statute to having one, with a licensing regime, a route to approve tariffs, and, in Lusaka, a purpose built utility to carry a function that had sat awkwardly inside a multi-mandate council [1][10]. The zoning of Lusaka into defined districts with assigned collectors replaced a patchwork in which unregistered operators dumped waste wherever was convenient, often at night [13]. Zambia built the micro-zone layer and part of the financing layer, but not the verification and settlement layer the framework treats as central.

9.2 Service coverage

Coverage rose but stayed low. In Lusaka the council with its contractors collected about 35 percent of the waste generated by 2022, against an earlier baseline of roughly 40 percent of residents with any access [6][13]. The national average across fifteen sampled local authorities was about 59 percent, a figure lifted by better served conventional areas and hiding very low coverage in the compounds [15]. The gap to the 80 percent target for 2030 is the gap the coverage linked payment rule is built to close [10][24].

9.3 Public health

The public health case was borne out. The 2017 to 2018 outbreak, with its 5,935 cases and 114 deaths concentrated in poorly served compounds, was tied in part to poor waste management and blocked drainage [16][18]. It is hard to separate the effect of waste reforms from the water, vaccination and surveillance work that ran alongside them, but residents in Manja Pamodzi areas reported less waste, fewer blocked drains and a lower cholera risk, which is the neighbourhood effect the clean and fully served objective targets [12].

9.4 Livelihoods and the green economy

The stress on private and community delivery created paid work in the settlements where unemployment was highest, and it formalised activity that had been informal [6]. Manja Pamodzi built a tiered chain that gave collectors training, protective equipment and a market, and the Keepers pilot alone projected about a hundred jobs [14][17]. These gains sat next to the continuing precarity of the roughly one thousand pickers at Chunga, many without protective equipment,

which shows that the informal-sector integration the framework calls for was begun but not finished [13][17].

9.5 Environmental

The environmental record was mixed. About 3,800 tonnes of recyclable material were diverted through Manja Pamodzi between 2015 and 2018, and sorting stations were set up in several compounds and at Chunga [6][12]. Against that, reliance on one deteriorating engineered landfill meant most waste outside Lusaka, and a share within it, still reached unlined dumpsites or was burned and buried at source [13][15], and the organic half of the stream that could have been composted was largely landfilled, forgoing both the soil product and the avoided emissions.

10. Lessons

Six lessons follow, each matching a feature the framework predicts.

The failures were institutional, not technical. The binding weaknesses were unreliable payment, weak verification and unstable zoning rather than any want of technology, and Lusaka's non-payment and weak enforcement are the local form of that pattern [7][13][23].

Coverage, not tonnage, should drive payment. Collecting about a third of the capital's waste, with the peri-urban poor served last, mirrors the regressive outcome a value based incentive produces, and a coverage linked rule is the correction [6][13][24].

A clearing council is the missing piece. Zambia built micro-zones in the form of enterprises and franchise districts, but no independent body to verify service and settle payment on a fixed cycle, which the framework identifies as decisive [13][23].

The organic majority is an unused asset. With organics near half the stream in Lusaka and 45 to 50 percent in Ndola, hauled to a single straining landfill, decentralised composting is the largest improvement available for the least cost [13][21][24].

Durability needs local financing. The most successful pilots were donor seeded by the Millennium Challenge programmes, and their survival depends on crossing the local break-even point, reconciling cost recovery with affordability through income graduated fees [11][12][24].

Replication should scale as a network. The utility model worked in Lusaka but had not reached Ndola, Kitwe, Livingstone or Solwezi by 2023, and the framework's hub and spoke network layer offers a route to extend it across the secondary-city tier [22][24].

11. Conclusion and Recommendations

Between 2018 and 2023 Zambia gave itself a coherent law and institutions for solid waste, and in Lusaka it gave them a working form: an autonomous utility, a zoned franchise and enterprise model, a recycling chain and an engineered landfill. Read through TownLoop, this is real progress on the operating layer, but progress that stops short of the two governance mechanisms the framework treats as decisive. Collection still reached only about a third of Lusaka's waste, the provinces had barely moved beyond council collection and informal recovery, financing stayed

donor dependent, the organic half of the stream went to landfill rather than to compost, and safe disposal rested on a single straining site. The comparison with Ghana shows that these are not Zambian peculiarities but the standard failure points of zoned collection wherever it is adopted without the right safeguards.

Three recommendations follow from the framework. First, install the missing governance layer, pairing an independent clearing council that verifies coverage and settles payment on a fixed cycle with a coverage linked payment rule, so that serving every household, including the peri-urban poor, becomes the choice that earns the most for enterprises and contractors. Second, capture the organic majority through decentralised composting sited near the compounds and sold to peri-urban farms, which relieves Chunga and turns the largest waste problem into a local product. Third, move toward local financial sustainability through income graduated service fees and pooled recyclable sales, and replicate the model as a network across the Copperbelt and the secondary cities rather than as a string of isolated efforts. If the next phase builds the governance and financing layers onto the operating layer created in this one, the target of collecting and transporting 80 percent of waste by 2030 can move from aspiration toward reach.

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This paper takes the TownLoop framework as its analytical lens, and the author acknowledges that framework as the foundation of the analysis that follows. TownLoop is a closed loop, locally financed, coverage linked resource recovery model for small and secondary African cities. It was developed by Kwame Brako Denteh of the Ghana Institute of Management and Public Administration in Accra, and it is set out in his 2017 concept note and in the fuller paper, Keeping the Town Clean and the Value Local [23][24]. Its account of why community waste schemes fail, and its two governance mechanisms, a local clearing council and a coverage linked payment formula, give this paper the structure through which the Zambian evidence is read.

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