

# Systems Reboot

Sanitation sector change in Maputo and Lusaka

Discussion Paper | November 2019





## Executive Summary

Using systems thinking principles, this report explores the development of on-site sanitation (OSS) in two capital cities over the last ten years – Lusaka, Zambia, and Maputo, Mozambique – and provides insights into how the WASH system can deliver better results for urban residents in both cities.

The analysis is grounded in discussions between institutional partners in the two cities, WSUP's experiences working in Lusaka and Maputo, and the growing body of systems thinking literature, particularly as it relates to water and sanitation.

The report aims to contribute practical examples of systems thinking principles applied to complex urban service delivery landscapes. Off-site sanitation and the nexus between on- and off-site are integral if sanitation is to be provided citywide. However, recent developments in on-site sanitation in Lusaka and Maputo make their OSS sectors particularly rich case studies. The key insights gained from the case studies are:

### **Begin by optimising one part of the system**

The size and complexity of urban sanitation systems can be overwhelming. Faced with this reality, actors should not feel compelled to address the system in its totality. Optimising one small part of the system can benefit the whole, by helping to overcome institutional inertia and catalysing movement in other parts of the system. This effect can be seen clearly in Maputo for example, where the provision of inclusive shared sanitation, beginning in 2009, increased municipality engagement with OSS; and where the piloting of FSM services promoted dialogue and revealed sectoral constraints which needed to be addressed. Initial, localised interventions of this type can highlight counterintuitive connections to other parts of the system; and provide actors with the flexibility to act, monitor and adapt in response to system feedback.

### **Embrace the power of process**

The Lusaka and Maputo experiences have in common a regulator committed to driving improvements in sanitation service delivery.

Although the regulatory instruments created are still to be fully implemented, the very process of their creation has been pivotal to advancing stakeholder coordination. In Maputo, the planned introduction of a sanitation tariff necessitated a process of reflection which laid bare the overlapping mandates between the regulator and municipality; in Lusaka, the publication of a regulatory framework for urban OSS and FSM in 2018 is a highly significant development, resulting from a process of detailed sector consultation. In a complicated system, each actor will have their own understanding of how the system functions, and sustained effort is required to prevent divergence. Stakeholder forums can sometimes be dismissed as a poor substitute for action, but in the context of effecting long-term systems change, the process of convening stakeholders to develop dialogue, enhance coordination and strengthen information flows is fundamental.

### **Design investments to address genuine systems constraints**

In the cities where WSUP works, inadequate financing is routinely cited as a core sector constraint. Large-scale development finance can be an immensely powerful driver of change: investments of this magnitude will unquestionably have a huge impact on the system, for better or worse, and must be leveraged to achieve positive change. Our systems analyses demonstrate that for this to happen, investments must i) be sustained over time; ii) respond to diverse and deep-lying system constraints, including weak absorptive capacity of institutions, and weak human resources; and iii) be designed with the end goal of improved services in mind, and with a clear causal chain to the end-customer.

### **Anticipate and factor in delays**

Delays are critical determinants of systems behaviour, and in the context of sanitation sector change, they must be accounted for. Failure to do so can result in abortive projects with the potential to set the sector back. The challenge faced by institutions in absorbing fundamental change should not be underestimated. An instinct to rush through reforms is understandable, given the very urgent need for sanitation improvements, but is ultimately counterproductive; sustainable systems change begins with acceptance that citywide transformation is a long-term process.

# Introduction

## Citywide sanitation

Rates of progress towards universal access to basic sanitation are too slow to meet the 2030 Sustainable Development Goal targets.<sup>1</sup> In one in seven countries globally, access to basic sanitation is decreasing. Even in cities, where access to safely managed sanitation is higher than in rural areas, gaps between the rich and the poor continue to be stark. In urban Mozambique, for example, basic sanitation coverage increased from 32-52% since 2000, but the gap between the richest and the poorest residents increased by 30 percentage points.<sup>2</sup>

Despite decades of significant investment and efforts by national and local governments, funders and non-governmental organisations, these sanitation service providers are not yet able to manage current demand – let alone able to adequately plan for a more urbanised future and cope with the unpredictable effects of climate change. The challenge goes far beyond a lack of (or unsuitable) infrastructure: underlying systemic issues hold the sector back and block millions of people from their basic human right to water and sanitation.

## A change of approach

The urban sanitation system consists of multiple systems: formal and informal, on-site and off-site, central and peripheral, all interacting with and impacting each other in countless ways. Urban residents that remain unconnected to a formal sanitation network, whether on-site or off-site, are an integral aspect of the city's sanitation system – regardless of whether they are accounted for in city masterplans or a utility's revenue base. Providing sustainable sanitation citywide by 2030 will require a mix of solutions tailored to different areas and populations.

This means that familiar resources like time, investment and expertise, and more esoteric elements such as stakeholder buy-in and willingness to trial new ways of delivering services, must be approached and applied differently – in a way that not only acknowledges the whole system but engages with its complexity and accounts for its unknowability.

## Thinking about systems

Systems thinking has been defined as: *“seeing and understanding systems as wholes, paying attention to the complex and dynamic interactions and interdependencies of its parts. Systems thinking is an alternative to reductionist approaches that focus on individual components of a system.”*<sup>3</sup>

Providing basic services in urban areas is complex and the step change required to reach national and international targets is substantial. Systems thinking is a way of breaking that complexity down into elements, assessing how those elements interconnect and reinforce each other (positively and negatively) and identifying leverage points. It's a tool for understanding complexity without becoming overwhelmed by it, and a tool that, if used effectively, can help make strategic decisions about where, how and for how long to intervene in a system.

Systems thinking is not a new discipline.<sup>4</sup> WASH practitioners are now engaging with its principles much more systematically, as part of a shift beyond providing taps and toilets and towards a self-sustaining sector that can respond to need as required.<sup>5</sup> Together with the wider WASH sector, WSUP is learning how to apply these principles in practice. Guided by its theory of change, WSUP had been working for several years in focus cities to create a ‘functional sector’.

<sup>1</sup> UNICEF and WHO (2017) Progress on household drinking water, sanitation and hygiene: 2017 update and SDG baseline. New York, USA. p14

<sup>2</sup> UNICEF and WHO (2019) Progress on household drinking water, sanitation and hygiene 2000-2017: Special focus on inequalities. New York, USA. p35

<sup>3</sup> Huston A & Moriarty P (2018) Building strong WASH systems for the SDGs: Understanding the WASH system and its building blocks. IRC Working Paper. IRC, The Hague, Netherlands. p4

<sup>4</sup> E.g. Meadows D (1999) Leverage Points: Places to intervene in a system. The Sustainability Institute [http://donellameadows.org/wp-content/userfiles/Leverage\\_Points.pdf](http://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf); Meadows D (2009) Thinking in systems: A primer. Earthscan, UK

<sup>5</sup> Coalitions like Agenda for Change, partnerships such as Sanitation and Water for All, organisations including IRC, USAID, Aguaconsult, to name just a few.

but lacked an overarching framework to bring together the many factors this involves; as an initial response, WSUP developed Sector Functionality Frameworks for urban water and sanitation.<sup>6</sup> The SFFs are diagnostic tools and a way of visualising elements of the system; but to date we have not explored the interconnections between these elements in depth.

Through the process of developing the Sector Functionality Frameworks, and through engagement with wider sector actors, it became increasingly clear that system thinking principles align with WSUP's understanding of and experiences in urban WASH. Building on the work of IRC and others, our contribution to this growing body of literature is to provide illustrative examples of how these principles can be applied at the city level. So: what does this look like in practice?

## Working with systems: Lusaka and Maputo

WSUP is an implementing organisation, and many of our initiatives have yet to achieve scale or fulfil their potential impact. Sanitation businesses can fail to grow past a certain point after external support reduces; policies enacted by institutional partners can fail to be implemented effectively. Projects can fail even where they respond to identified gaps and align with the strategic aims of institutional partners.

However, projects don't operate in a vacuum – for initiatives to contribute to a functional WASH sector, we need to account for the wider system in which they exist and the inhibitors to scale, the delays of information flows and wider constraints impacting on-site sanitation in the cities where WSUP works.

Figure 1: WSUP's Sector Functionality Framework for Sanitation.



## Workshopping systems thinking in two case study cities

As part of the research for this report, day-long workshops were held in both Lusaka and Maputo, attended by institutional partners and other non-governmental actors with first-hand knowledge and insight into their city's recent history of on-site and pro-poor sanitation. Stakeholder discussions were structured as follows:

**Activity 1: Constructing a shared vision.** What service should residents be receiving by 2030, and what aspirations do individual stakeholders have for the sector?

**Activity 2: Constructing a timeline, 2009-2019.** Where are we now and how did we get here? What were the key milestones? What enabling factors contributed to these milestones, and what constrained the sector from going further?

**Activity 3: Mapping milestones, enablers and constraints to the SFF baseline for each country.** What gaps or commonalities are there?

**Activity 4: Looking forward, 2019-2030.** What is the journey that we must now undertake? What needs to be in place for the on-site sanitation sector to be more functional by 2030?

**Activity 5: Identifying the major enablers for future sector development.** What are the priorities? What are the leverage points that might unlock further progress?

<sup>6</sup> See WSUP (2017) An evaluative framework for urban WASH sector functionality: Baseline assessment results from six countries.



Two such cities – Lusaka, Zambia and Maputo, Mozambique – have experienced positive change in their on-site sanitation (OSS) sector over the last decade. The case studies that follow outline the journey undertaken by the OSS sector in both cities, drawing on principles of systems thinking. Each case study contains an in-depth examination of one component of the urban sanitation system identified by stakeholders as being significant: a community-based, utility-managed faecal sludge management (FSM) service in Lusaka, and the planned introduction of a sanitation tariff in Maputo. The systems dynamics analyses include actors, stocks and flows, dependencies, balancing and reinforcing feedback loops, delays and constraints. Insights resulting from the analyses follow each diagram.<sup>7</sup>



**Image:** Samson Kanyanta, a pit-emptier at the Chazanga Water Trust, Lusaka

## Sanitation in Maputo and Lusaka: key data

Over the past decade the cities of Maputo and Lusaka have taken significant steps towards a more functional OSS sector; however, need remains high in both cities, which are only at the beginning of their journey towards citywide sanitation.

### Maputo, Mozambique

- Mozambique is one of the poorest countries in the world, ranked 181 in the UN Human Development Index.<sup>8</sup>
- High residual levels of poverty are coupled with an explosive rate of urbanisation: the population of Maputo is forecast to grow by 70,000 annually to reach 4.1 million by 2040.<sup>9</sup>
- In Maputo, diarrhoea is estimated to be the third leading cause of death among children aged 0-14 years, accounting for at least 10% of all mortality.<sup>10</sup>
- 90% of households in Maputo rely on on-site sanitation (41% of households use pit latrines, and 49% use septic tanks and pour-flush toilets)<sup>11</sup>
- Only 3% of the total faecal waste produced in the city passes through the treatment plant, while more than 50% contaminates backyards, the drainage system and Maputo Bay<sup>12</sup>

### Lusaka:

- Zambia loses US \$194 million, equivalent to 1.3% of gross domestic product (GDP), every year due to poor sanitation, including \$167 million caused by deaths due to diarrhoea.<sup>13</sup>
- Nearly 3 million people live in Lusaka, which is projected to increase to 5 million by 2035. Around 70% of the population of the city of Lusaka live in a Peri-Urban Area (PUA).<sup>14</sup>
- The city is dependent on on-site sanitation systems; around 90% of residents use some form of on-site technology.
- Only 17% of faecal waste produced in the city is safely managed.<sup>15</sup>

<sup>7</sup> For an introduction to systems thinking concepts, see Meadows (2009).

<sup>8</sup> UNDP, 2016

<sup>9</sup> AIAS (2015) Sanitation and Drainage Master Plan for the Greater Maputo Metropolitan Area.

<sup>10</sup> Nhampossa, T, et al (2013) Health Care Utilization and Attitudes Survey in Cases of Moderate-to-Severe Diarrhea among Children Ages 0–59 Months in the District of Manhica. The American Journal of Tropical Medicine and Hygiene. 89 (1): 41-48.

<sup>11</sup> Hawkins P, Muximpua O (2015) Developing business models for faecal sludge management in Maputo. Water and Sanitation Program, World Bank Group.

<sup>12</sup> Hawkins P, Muximpua O (2015)

<sup>13</sup> WSUP Advisory (May 2018) Market Assessment Report: Consultancy for Faecal Sludge Management business development support to LWSC.

<sup>14</sup> Kappauf L, Heyer A, Makuwa T, Titova Y (2018) SFD Report Lusaka, Zambia, 2018. Produced by: GFA Consulting Group GmbH.

<sup>15</sup> Water and Sanitation Program (2012) Zambia loses ZMK946 billion annually due to poor sanitation.

## 2. CASE STUDY: Towards citywide on-site sanitation in Lusaka

### 2.1 Institutional arrangements for on-site sanitation in Lusaka

The Water Supply and Sanitation Act of 1997 mandates Commercial Utilities (CUs) to provide water and sanitation services. There are currently 11 CUs in Zambia; **Lusaka Water and Sanitation Company (LWSC)** was established by **Lusaka City Council (LCC)** and is the CU for the capital city and five other districts in Lusaka Province.

All CUs are regulated by **NWASCO (the National Water Supply and Sanitation Council)**, established by the Water Supply and Sanitation Act. The Public Health Act of 2006 requires Local Authorities such as LCC to monitor on-site sanitation, including the construction of on-site facilities. Under the Local Government Act, LCC can promulgate by-laws to control or govern activities that are in the public interest, including sanitation treatment and transport. The **Zambia Environmental Management Agency (ZEMA)** is mandated to regulate the quality of treated effluent and its potential re-use.

However, the Water Supply and Sanitation Act was commonly interpreted as requiring CUs to supply water and sanitation in urban and peri-urban areas only, and for years institutions focused on off-site sanitation at the expense of on-site. The on-site sanitation functions attributed to NWASCO, ZEMA and LCC are not fully delivered and, given the prior focus on off-site sanitation, there are significant grey areas regarding on-site sanitation policies, regulations, and guidelines. NWASCO has since recognised this oversight and recently developed a new regulatory framework for CUs to deliver rural services and on-site sanitation in urban areas.<sup>1</sup>

Under this new framework, initiated by the **Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP)**,

NWASCO would issue licenses to CUs for on-site and off-site services, who would in turn issue permits for FSM to private and community-based operators. ZEMA would also issue licenses for environmental protection under a similar process. LCC is currently developing a by-law to provide for the enforcement of the new OSS regulations in Lusaka, with technical support from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and in close collaboration with other sector stakeholders.

### 2.2 Constructing a shared vision

Prior to the 26th September 2019 workshop, key national and municipal stakeholders were brought together in 2018 to assess Zambia's water and sanitation situation according to WSUP's Sector Functionality Framework. Based on those discussions, several areas for improvement regarding sanitation emerged.<sup>2</sup>

For example, CUs, including LWSC, were acknowledged to have reasonable capacity for sewage network extension and maintenance; however, there is far less institutional knowledge about OSS and FSM (LWSC are viewed to be the strongest utility in this regard).<sup>3</sup> Regulatory provision for OSS is now much stronger than only a year ago, but there is a gap between what NWASCO is asking itself to do and the numbers of staff available to implement it. Current levels of dedicated funding for sanitation are insufficient to meet the detailed funding plans that exist for sanitation across Zambia and within Lusaka; budget allocation to WASH by the national government is similarly insufficient, and actual disbursement tends to be even lower, particularly for sanitation. While septic tanks and cesspool emptying has mainly been in the hands of the private sector to date, the private sector is not particularly engaged in either OSS or FSM, despite their crucial role being acknowledged in national strategies; however, LWSC have recently

<sup>1</sup> NWASCO (April 2018) Urban Onsite Sanitation and Faecal Sludge Management: Framework for Provision and Regulation in Zambia. Lusaka, Zambia.

<sup>2</sup> WSUP (2018) An evaluative framework for urban WASH sector functionality: Baseline assessment results from six countries. Topic Brief. London, UK.

<sup>3</sup> NWASCO (2018) Urban and peri-urban water supply and sanitation sector report, 2018. Lusaka, Zambia



divided the city into zones and are contracting different service providers to serve each zone.

Building on those areas and taking into account developments in on-site sanitation since 2018, stakeholders participating in this workshop

sought to construct a shared vision for on-site sanitation in Lusaka in 2030 (Figure 2), centred around residents – ideally, what would (and should) Lusaka residents expect regarding their sanitation in a decade's time? Using this as a starting point, participants were asked to adopt

Figure 2: Vision for on-site sanitation in Lusaka, 2030



the perspective of each major stakeholder in turn, and consider what that stakeholder would aspire to see: the mandate holder(s) (LWSC and LCC), the regulators (NWASCO, ZEMA and, to a lesser extent, the Water Resources Management Authority - WARMA), the policy makers (MWDSEP), and service providers (private mechanical operators, formal and informal manual pit emptiers).

**Regulatory effectiveness** emerges as a key interdependency: service providers want clear guidelines so they know what they need to provide and how, and they want those guidelines to be enforced so that every service provider is held to the same standard. This, in turn, requires the regulator to provide those guidelines and for the policy maker (in this case, LCC) to monitor activities and effectively enforce the Local Government and Public Health Acts, which govern sanitation-related activities such as proper transport and treatment of faecal sludge.

**Adequacy of financial flows**, including revenue from tariffs, is similarly dependent on collaboration between groups: NWASCO want to be able to exercise autonomy in raising the tariffs paid by users, but to do so they must be able to clearly communicate to politicians and customers why those increases are necessary. Service providers rely on those tariffs to build profitable businesses and would like to be included in the tariff setting process at an early stage. Customers, on the other hand, must be able to afford those tariffs, willing to pay them, and LWSC must have the capacity to collect and ring-fence any resulting revenue, as well as monitoring any expenditure and its efficacy.

The ability of service providers to both deliver FSM and to grow their businesses depends on **on-site sanitation support** in the shape of accessible and appropriate infrastructure, such

as transfer stations and treatment plants. In turn, that infrastructure must be designed or retrofitted to cope with population growth and the increased amount of sludge delivered by more operators emptying more latrines and septic tanks. LWSC manages the few sites that already exist in Lusaka, but it is hard to generate a business case for their expansion when they are currently not operating at their full capacity – partly because of poor maintenance, but also as an effect of the slow growth of the existing FSM businesses.

## 2.3 Where are we now and how did we get here

Institutional stakeholders identified what they considered to be the most significant milestones in the on-site sanitation sector in Lusaka over the last ten years, from 2009, as shown in Figure 3. However, sector change is never so linear: the interconnected accumulation of other events and supporting factors are presented in Figure 4 and detailed below.

**Sanitation Masterplan:** The Lusaka Sanitation Masterplan was developed in 2011 by the Government of Zambia with support from the Millennium Challenge Corporation.<sup>4</sup> It provides the basis of a strategy for complete sanitation coverage in Lusaka, both on-site and off-site, by 2035 through a consideration of the existing treatment capacity of the city and resulting gaps.

**Demonstration of FSM services in PUAs:** With support from WSUP, LWSC has delivered safe, affordable faecal sludge management services for low-income residents in Kanyama and Chazanga since 2013 and 2014 respectively. Community-run Water Trusts manage the services day-to-day, providing pit-emptying and transportation of sludge to LWSC-owned treatment plants. The FSM services are not yet

Figure 3: Consensus milestones identified by institutional stakeholders, 2009-2019



<sup>4</sup> Millennium Challenge Corporation, 'Zambia Compact' <https://www.mcc.gov/where-we-work/program/zambia-compact>



fully self-sufficient, as WSUP continues to provide the Water Trusts with marketing and community engagement, business development and technical support. Chazanga Water Trust is close to breaking even following tariff readjustments approved by LWSC in late 2018, but will need to make significant changes to its operating model if it is to be sustainable without external support.<sup>5</sup> This was LWSC's first foray into FSM and, while still an imperfect model, the Kanyama and Chazanga projects demonstrated to stakeholders the potential viability of decentralised FSM services in areas where sewer networks are unlikely to be constructed in the foreseeable future. Crucially, the projects have also highlighted what areas need to be strengthened regarding the capacity of the city's stakeholders to deliver on-site sanitation. Figure 6 provides a systems analysis of the stock of current customers of the FSM service in Chazanga.

#### **Lusaka Sanitation Programme, 2015-2021:**

LWSC is currently implementing the LSP, a major step towards actualising the city's Sanitation Masterplan. The existence of a clear Masterplan encouraged international donors such as the World Bank and the African Development Bank<sup>6</sup> to provide funding to LWSC, with which the utility will upgrade and expand existing sewer networks, develop on-site sanitation service provision in low-income areas (partly based on the experience with the FSM projects in Kanyama and Chazanga), and strengthen LWSC's capacity in on-site sanitation.<sup>7</sup> The overarching aim is to ensure the sustainability of the city's sanitation system beyond the LSP's projected end-date in 2021. For example, a specific unit dedicated to FSM was recently created within LWSC, representing a significant departure from LWSC's previous emphasis on off-site sanitation.

**Formation of MWDSEP:** Previously, bodies with varying degrees of sanitation oversight were split across different ministries including the Ministries of Energy and Water, and Local Government and

Housing. Following the 2016 national elections, the President initiated a ministerial restructure to better align efforts with national development aims and the SDGs.<sup>8</sup> WASH sector stakeholders called for water and sanitation to be housed within a dedicated national body, resulting in the creation of a new Ministry of Water Development, Sanitation and Environmental Protection, responsible for national policies, programmes, strategies and guidelines in the water and environmental sectors. NWASCO, ZEMA and WARMA now sit within MWDSEP, liaising with the Zambia Bureau of Standards as required, to better respond to the Government of Zambia's push for cross-sector collaboration in the pursuit of national development goals and the protection of water resources.<sup>9</sup>

**Sanitation Summit:** The increased political attention paid to sanitation and groundwater protection – particularly sharpened in response to a serious outbreak of cholera in 2017-2018 – led to a national Sanitation Summit being held in 2018. Within the Summit's tight six week planning period, multiple partners financed and invested significant human resource to guarantee its success, most notably GIZ and UNICEF. Opened by the President of the Republic of Zambia, the Summit was the first of its kind, highlighting the political will that was building behind the scenes as the government sought to enhance multi-sector collaboration between stakeholders. It was during this event that the Zambia Open Defecation Free Strategy 2030 was launched.<sup>10</sup>

#### **Regulatory framework for on-site sanitation:**

NWASCO published a regulatory framework for urban OSS and FSM in 2018, the result of years of consultation and debate among national stakeholders – most notably GIZ – and pressure from external funders. The framework is in line with the national Vision 2030, the SDGs and the Sanitation Masterplan and, crucially, orients the sector in the same direction regarding on-site

<sup>5</sup> WSUP (May 2019) Strengthening the business model for FSM services in Lusaka: a tariff review process. Practice Note. London, UK

<sup>6</sup> African Development Bank Group (May 2015) Lusaka Sanitation Program: Environmental and Social Management Framework summary; Water Global Practice Africa Region (May 2015) Project Appraisal Document (PAD 1204) Lusaka Sanitation Project. World Bank Group, Washington DC.

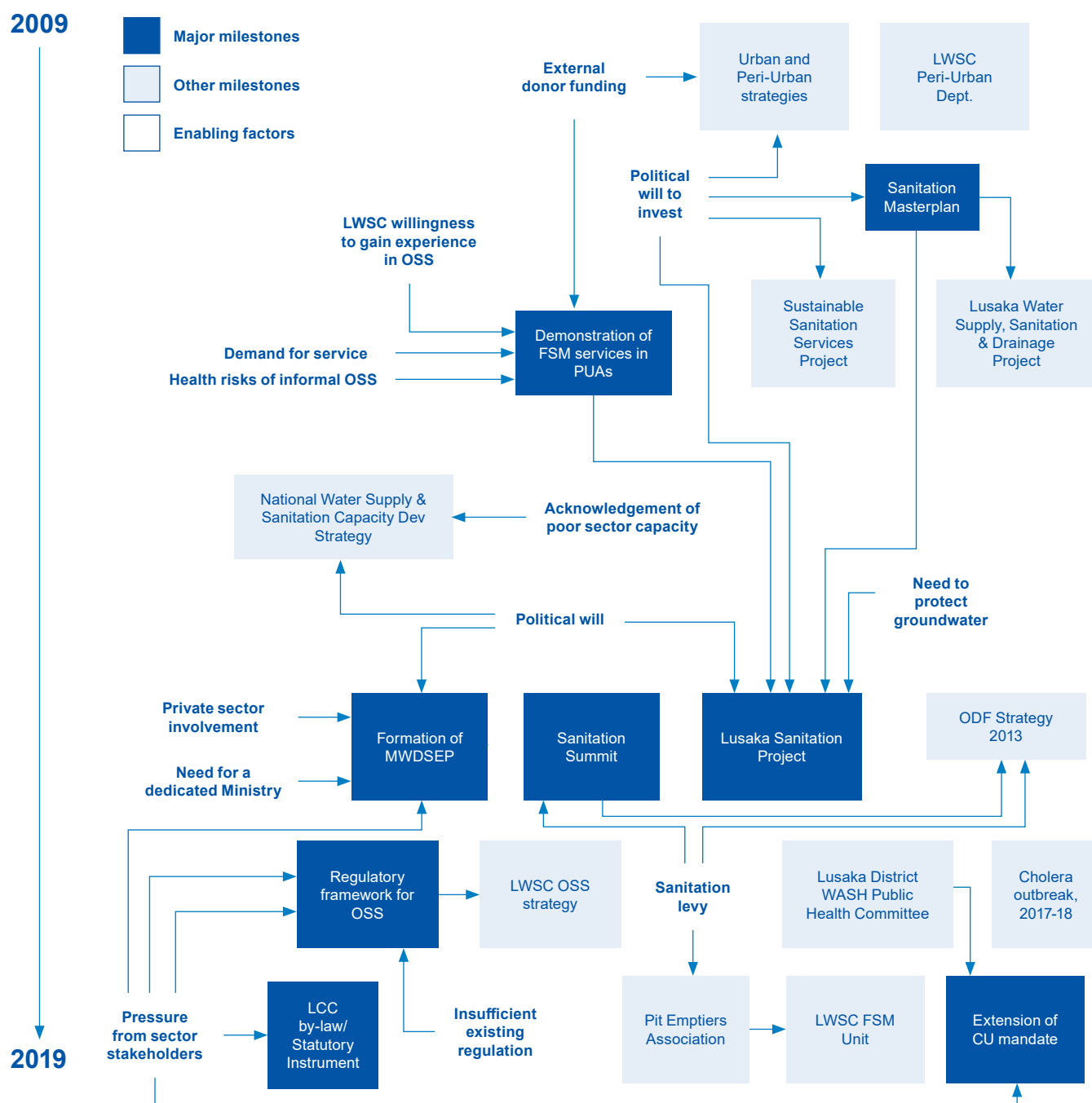
<sup>7</sup> WSUP (Feb 2018) Towards citywide sanitation in Lusaka: The next phase of non-sewered sanitation. Topic Brief. London, UK

<sup>8</sup> MWDSEP (June 2019) MWDSEP 2018-2021 Strategic Plan. Lusaka, Zambia

<sup>9</sup> NWASCO (2017) Urban and peri-urban water supply and sanitation sector report, 2017. Lusaka, Zambia

<sup>10</sup> SNV (December 2018) 'Zambia holds first-ever Sanitation Summit' <https://snv.org/update/zambia-holds-first-ever-sanitation-summit>

Figure 4: Map of all milestones and enabling factors



sanitation for the first time. The framework took around 3 years to complete, having to navigate internal bureaucracies and institutional reluctance to take on something as complex as on-site sanitation and FSM, in which very few stakeholders had experience.

**Extension of CU mandate:** For years, Commercial Utilities and NWASCO focused on delivering and regulating adequate water supply and sewerage, while OSS was overlooked. As a result of the new regulatory framework for OSS, all CUs in Zambia are to prioritise the part of their mandate that requires them to deliver rural

sanitation and on-site sanitation in urban areas. While the full implications of this are still being considered by the CUs, some have already changed their names to reflect the update and replace 'Sewerage' with 'Sanitation'. Although a positive development, CUs across Zambia will have to make significant modifications to how they operate in order to deliver on their much-increased mandate. Some CUs, including LWSC, may find this easier than others, given their existing customer and revenue base.



**LCC by-law/Statutory Instrument:** The new framework is just that – a framework. In response, LCC is developing an on-site sanitation by-law, based in part on the new standards for OSS, with three years of full-time technical support provided by GIZ. This is key; the by-law will put the new frameworks and guidelines into practice and provide for their enforcement in Lusaka. Simultaneously, MWDSEP is using the by-law as a basis for the development of a Statutory Instrument so other Local Authorities across the country can replicate LCC's by-law and adapt it according to context.

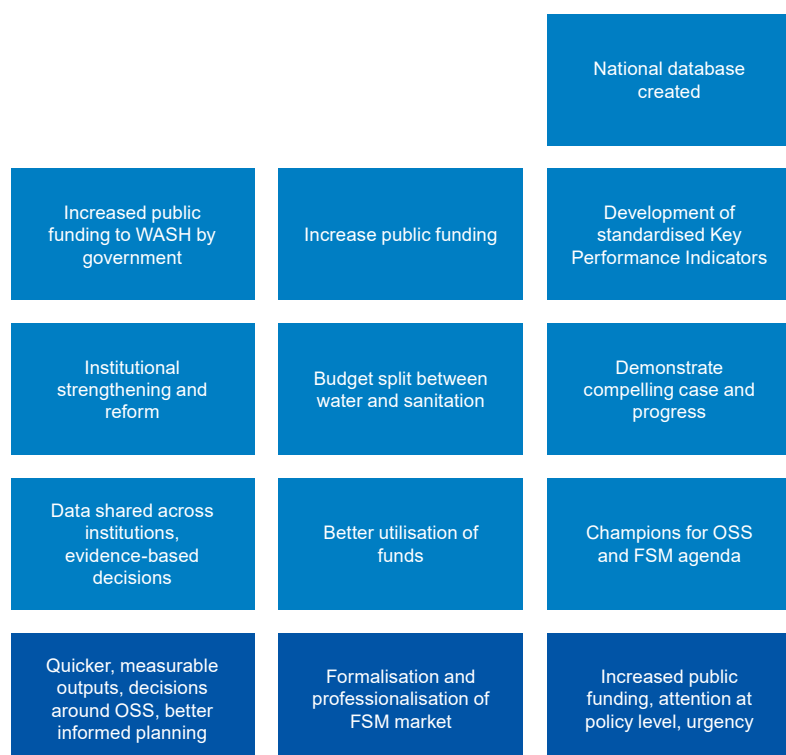
Including all the milestones and their enabling factors as identified by stakeholders is more reflective of reality: some milestones feed into each other, but are not the only contributing factor; some less tangible factors, like political will or a growing realisation of the health risks of informal OSS, are hard to pin down on a simple timeline, but develop gradually over time until they are forceful enough to make an impact.

## 2.4 Constraints and counterfactuals

Figure 4 illustrates some of the complexity surrounding the gradual progression of on-site sanitation over the last decade. However, it does not incorporate the blockages identified by stakeholders – the events or wider factors that may have impeded progress or outright prevented it. Stakeholders identified the following constraints as impacting the sector in Lusaka:

- **Political interference**
  - **Lack of visibility of WASH** resulting in insufficient budget dedicated by the national government to the sector
  - A continued **preference for off-site sanitation**
  - Until recently, **no appropriate legislation or standards for OSS or FSM** and poor enforcement of existing regulations
  - **Bureaucratic structures** that slow down implementation or stymie initiative
  - Limited **stakeholder capacity**
  - **Misappropriation of donor resources** (through poor co-ordination or worse)
  - **Inappropriate infrastructure** along the FSM chain, constraining scale-up of decentralised FSM
  - **Poor targeting of subsidies** which dampens willingness to pay for services and community buy-in
  - **Haphazard growth of informal settlements**, which has taken place outside of proper urban planning processes.
- Stakeholders also discussed what activities, if tackled earlier, could have helped address the issues that continue to hold back on-site sanitation in Lusaka. The suggested actions indicate what could act as points of leverage – focusing on these could unlock or lubricate several of the blockages holding the sector back:
- **Educating implementers and policy makers about OSS, thereby counteracting the continued prioritisation of off-site sanitation:**
    - Providing policy makers with information about OSS, particularly around the links between sanitation and health, perhaps with a cost-benefit analysis of the initial activities around OSS. This would have been particularly useful at higher levels of national politics, supporting WASH policymakers to make a compelling case for the government to increase the budget allocated to WASH
    - Providing systematic training in the national curriculum for engineers – this is now being pursued, but if prioritised earlier then the stock of OSS-literate engineers in CUs and other public bodies would be much higher, and OSS projects potentially pursued more vigorously
  - **Earlier introduction of regulations and standardisation:**
    - More proactive urban planning in the Peri-Urban Areas of Lusaka would have eased implementation and improved the speed and reach of sanitation interventions; arguably this would have saved money now being spent by international funders who are having to compensate households being disrupted by large-scale construction projects
    - The recent improvement in NWASCO regulation, their incorporation into an LCC by-law and the more formal integration of urban OSS into LWSC's mandate are all important steps,

Figure 5: Stepping stones for achieving shared vision for OSS in Lusaka, 2020-2030.



although each of the stakeholders were all already mandated to provide and enforce these services/regulations but had not done so prior to 2017.

## 2.6 What is the journey we must now undertake

The journey from 2020 to 2030 will likely be as complex and non-linear as that of the last ten years. This reality notwithstanding, discussing the intricacies of the changes in on-site sanitation in Lusaka over the last decade gave stakeholders a framework with which they could realistically assess how their collective vision for Lusaka could be achieved. Figure 4 shows the outputs of three group discussions about priorities for the coming decade.

The three sets of stepping stones are relatively well-aligned, reflecting earlier plenary discussions which generated consensus about what had driven on-site sanitation in Lusaka over the past ten years. Looking to the future, stakeholders collectively reiterated that public funding needs to increase, but also be spent more efficiently. Multiple groups emphasised the importance of improved access to data; while individual groups variously attached high importance to the professionalisation of FSM services; and perceived that increasing the capacity of Lusaka's sanitation institutions could

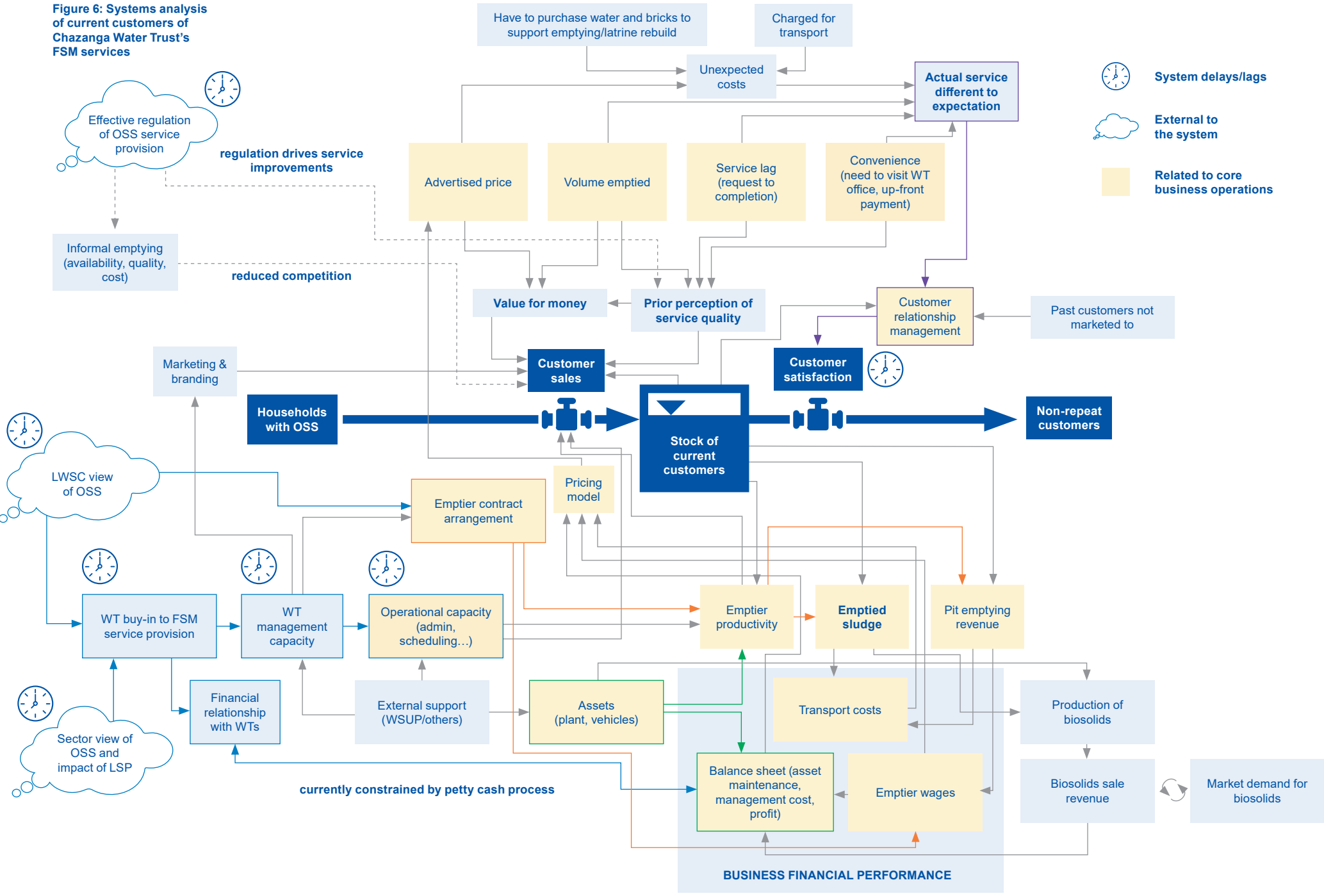
lead to better decisions and planning, and ultimately to improved service provision to residents. In relation to the potential future articulation of a "compelling case", discussions at the workshop highlighted that increased attention, funding and political will often follows a crisis or a perceived 'tipping point': the serious cholera outbreaks across Zambia and in Lusaka in 2017-18 were highlighted as an enabling factor for progress towards many of the major milestones outlined in Figure 3, for example.

## 2.7 Key insights from a systems analysis of sanitation in Lusaka

Figure 6 presents a retrospective model of the stock of current customers of the Chazanga emptying business (the central blue box). Flows increasing the stock of customers are new conversions from the pool of households reliant on OSS systems. Outflows decreasing this stock of customers are previous customers who, following initial emptying, would not choose to use the service again.

The upper portion of the diagram is focused on the customer journey, while the lower portion relates to the way the business operates. This model illustrates and supports several key points (colour-coded to the diagram):

Figure 6: Systems analysis of current customers of Chazanga Water Trust's FSM services





1. The **emptier contract arrangement** has a significant impact on both emptier productivity and business costs in the form of emptier wages. As it currently stands, 60% of pit emptying revenue goes towards pit emptier wages. A change in the contractual arrangement to a full-time fixed salary could significantly enhance business profitability,<sup>11</sup> in turn impacting the pricing model and the advertised price to customers.
2. The **sector view of OSS, Water Trust buy-in to FSM service provision, Water Trust management capacity and operational capacity to support service provision** all entail delays (meaning that they will each take time to build up) and are interconnected. Any changes to pit emptier management models, assets or service delivery arrangements will need to be supported by these wider factors, any of which could become a constraint on emptier management and overall business productivity.
  - a. To illustrate the above points: even though the Water Trust is open to transitioning emptiers from commission-based payments to fixed salaries, LWSC have so far been reluctant to support this, since demand for the service cannot be assured (demand is typically seasonal and other factors such as scheduled operation and maintenance of the treatment plant may inhibit sales). A change to fixed salaries would therefore introduce a larger financial liability, should emptying revenue decrease while salary costs remain fixed; currently LWSC's risk appetite related to pit emptying is not at a level where they are comfortable supporting such a change. This underlines the point that any changes in operational arrangements such as emptier contract arrangements need to proceed at the same pace as changes in broader buy-in to FSM from other actors.
3. **Optimising core business operations** (boxes coloured in yellow) to maximise outcomes and profit can be done without disturbing other parts of the system, and if successful can leverage positive impacts in other parts of the system. More efficient delivery of the service - coupled with a strong customer focus and customer relationship management - can improve customer numbers and revenue generation, which in turn can positively impact the financial relationship with the Water Trust. Enhanced performance of the pit emptying business would facilitate a reduced level of subsidy from the Water Trust, which can be expected to strengthen the Water Trust's long-term commitment to the service, and ultimately to increase its operational capacity for FSM, creating a reinforcing feedback loop.
4. The model highlights the need for strong **customer relationship management** – in particular, the need for clear and transparent communication of the service offer from the outset. If the service provided does not meet the expected standard – for example through being difficult to access in the first instance, delayed delivery of the service, or not emptying enough sludge – this will reduce customer satisfaction and lead to non-repeat customers.
5. **Asset investments by external parties** need to be very carefully considered given these create ongoing maintenance costs and management requirements for the business. If OpEx costs are not funded, crucially with clear management arrangements and responsibilities, these can create difficulties later on. An example of this is the truck provided to the business by WSUP, a significant asset which the business would not have been able to afford without external support. While the truck improved sludge transport efficiency and capability, this later had a disruptive effect when repairs were needed, as funds had to be sourced and the truck ultimately had to go to LWSC for repairs, which took three months – disrupting emptying operations.
6. The connection (**dotted grey line**) between regulation of informal service provision (thereby reducing competition to formal services) and increasing customer sales is very slim: for this to make a practical difference to the business, there would need to be an enormous and concentrated enforcement effort in order to identify and penalise informal emptiers.

<sup>11</sup> Walcott J (2019) Full project financial analysis: Strengthened Sanitation Services, Lusaka, Zambia. Report prepared for WSUP.





Image: Emptying a toilet in Maputo.  
Credit: Mario Macilau.



## 3 CASE STUDY: Towards citywide on-site sanitation in Maputo

### 3.1 Institutional arrangements for on-site sanitation in Maputo

Sanitation in Mozambique is under the overall authority of the **Ministry of Public Works, Housing, and Water Resources (MOPHRH)**, within which **DNAAS** (Direcção Nacional de Abastecimento de Água e Saneamento) acts as the lead policy agency for both urban and rural water supply and sanitation. DNAAS operates a delegated management framework with **AIAS** (Administração de Infraestruturas de Água e Saneamento), the national agency responsible for managing investments in water supply for small towns, and for sewerage and drainage infrastructure in all urban settlements in Mozambique.

Sanitation service provision is a municipal responsibility, as defined in the 1997 Local Government framework laws and associated regulations. Key sector policies and strategies, including the National Urban Water and Sanitation Strategy (Estratégia Nacional de Água e Saneamento Urbano, ENASU) (2011-2025) charge municipal councils with instituting a comprehensive approach to managing all elements of the sanitation service chain. In Maputo, this makes **Conselho Municipal de Maputo (CMM)** the mandate holder for sanitation. Historically, the focus of municipal sanitation efforts in Mozambique has been on solid waste management and the maintenance of sewerage networks located in downtown areas of major cities<sup>12</sup>; however in relation to OSS services, CMM has taken important steps in supporting the provision of improved shared sanitation facilities, and in facilitating private sector involvement with faecal sludge management services in particular. The Water Regulatory Council, CRA which was transformed in February 2019 by Government decree to Water Regulatory Authority Public Institute (**Autoridade Reguladora de Água, AURA IP**) is responsible for overseeing and regulating all public and private entities that provide urban water and sanitation services.



**Image:** Aerial view of Maputo. **Credit:** Terra Ferma

### 3.2 Constructing a shared vision

Figure 7 presents a shared vision for on-site sanitation in Maputo in 2030, centred around residents. The vision was developed by major stakeholders engaged in sanitation in Maputo, reflecting the aspirations of each stakeholder in turn: the mandate holder (CMM), the regulator (AURA), policy makers (represented by DNAAS), the asset holder (AIAS), and private sector service providers.

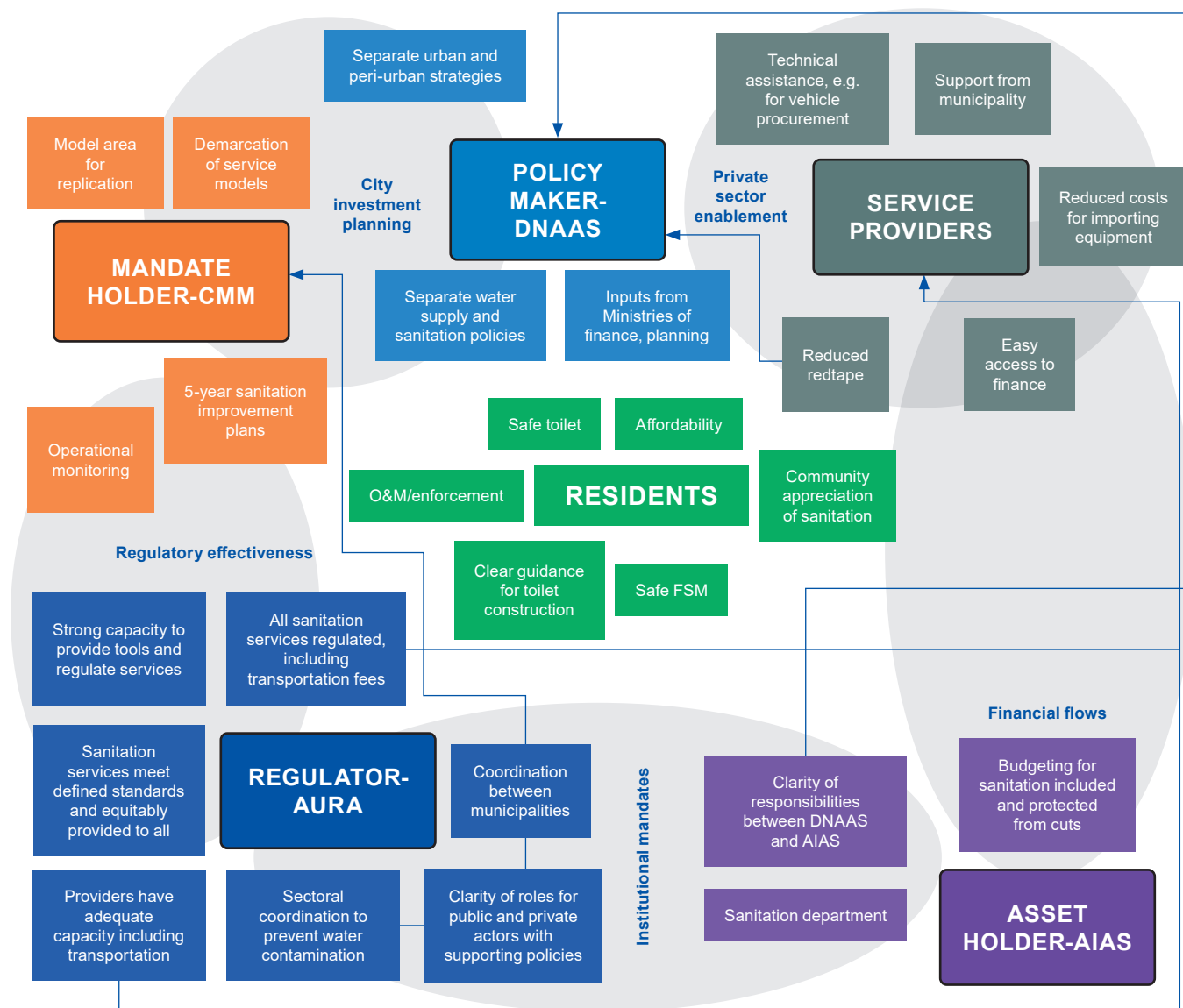
The vision was developed by workshop participants and does not represent a formal expression of institutional aims; nonetheless, the output is instructive in highlighting some of the key constraints and interdependencies that characterise the sector in Maputo. First among these is lack of clarity on **institutional mandates** for sanitation. The roles for DNAAS and AIAS are not clear, as both can plan and manage investments for sanitation; in addition, AIAS does not have the financial autonomy required to establish a revenue stream and recover its investments<sup>13</sup>. **Financial flows** for urban sanitation in Mozambique as a whole are woefully underdeveloped: a recent assessment found consensus among stakeholders that

<sup>12</sup> World Bank (2019) Public Appraisal Document – Mozambique Urban Sanitation Project.

<sup>13</sup> World Bank (2019)



Figure 7: Universal sanitation coverage in 2030: stakeholder vision



current levels of investment from all sources are far below the levels required to meet service targets, citing factors including a lack of available service models, limited household willingness to pay, low government prioritisation, and the recent financial crisis<sup>14</sup>, all of which can be expected to impact on institutional budgets for sanitation.

The vision clearly demonstrates interdependencies between **regulatory effectiveness**, policy and **private sector enablement**. Although the Water Policy and Urban Water and Sanitation Strategy include provisions to encourage the participation of the private sector in sanitation, little has actually been done to incentivise this engagement.<sup>15</sup> Stronger involvement of the formal private sector providers will depend on the development and

enforcement of defined standards, access to finance, reduced barriers to entry, and diverse forms of public-private collaboration, including through technical assistance, smart subsidies and non-financial support.

**City investment planning** also emerges as a priority area for engagement, particularly for the municipality. Stakeholders emphasised the need for clear demarcation of sanitation service models between urban and peri-urban areas; and advocated for the development and testing of an integrated approach to sanitation infrastructure, drainage and sewerage in one area of the city, to serve as a clear model for replication.

<sup>14</sup> Oxford Policy Management (2017) Evaluation of Urban WASH Sector Functionality – Mozambique 2017 Baseline Report. Report prepared for WSUP.

<sup>15</sup> Oxford Policy Management (2017)

### 3.3 Where are we now and how did we get here

Figure 8 presents six developments viewed by institutional stakeholders to be particularly significant for the development of on-site sanitation in Maputo over the past ten years. Discussions during the workshop and with key informants revealed diverse interconnections between these and other milestones, summarised in Figure 9 and detailed below.

**Creation of AIAS:** AIAS was established in 2009 as part of the expansion of the Delegated Management Framework for Urban Water Supply, with a mandate to promote autonomous and financially sustainable management of sanitation systems. The creation of a new asset holder for sanitation reflected acknowledgement at the governmental level of a basic asymmetry in the WASH sector, with water far ahead of sanitation in terms of political and financial support;<sup>16</sup> and was precipitated by Millennium Challenge Corporation. As with other institutions engaged in sanitation in Mozambique, AIAS continues to face significant capacity and finance-related challenges; however, its creation was acknowledged as a necessary step in the context of the national sanitation sector at that time, and it has since played an important role in administering urban sanitation projects.

**Demonstration of communal and shared sanitation:** In 2009 WSUP began trialling an inclusive communal sanitation model for low-income households living in low-income communities of the city - known locally as the *bairros* - based on a consultative approach and underpinned by a partnership between CMM, the district administration and participating communities<sup>17</sup>. The model represented the first

such intervention in Maputo; it was viewed by stakeholders to be significant in raising community-level awareness of the need for improved sanitation in the *bairros*, and for enhancing CMM commitment to on-site sanitation service provision through a demonstration approach. Initially developed with funding from USAID through the Africa Cities for the Future Programme, and from the Australian Government, the model was scaled-up under the World Bank-managed Japanese Social Development Fund (JSDF) project in Maputo from 2013–7. WSUP's shared and communal sanitation programme has supported the implementation of 90 Communal Sanitation Blocks (CSBs) and 864 shared toilets in low-income areas of Maputo since inception in 2009, providing improved sanitation access to an estimated 18,262 people.

**Piloting of FSM services:** Beginning in 2013, the World Bank-managed Japanese Social Development Fund (JSDF) supported the establishment of eight new FSM operators to provide faecal waste emptying services in the *bairros*, building on earlier support provided by WSUP to a private FSM service, UGSM.<sup>18</sup> The JSDF pilot succeeded in stimulating the market for FSM services in the target areas, but also encountered significant setbacks - notably the annulment of plans to construct FSM transfer stations, primarily because of objections from community members. The programme evaluation argued the provision of such infrastructure would have enhanced accessibility and affordability of on-site facilities, which could in turn have reduced prices for the poorest households.<sup>19</sup> As a result of this learning, the pilot had a dual impact in i) demonstrating that privately-managed FSM services had a role to play in the *bairros*; and ii) spotlighting the necessity for improved treatment

Figure 8: Consensus milestones identified by institutional stakeholders, 2009 – 2019.



<sup>16</sup> Oxford Policy Management (2017)

<sup>17</sup> See WSUP (2014) A gender-inclusive approach in practice: communal sanitation.

<sup>18</sup> See WSUP (2013) Getting to Scale in Urban Sanitation.

<sup>19</sup> Mattson, K (2016) Final Evaluation of the Water & Sanitation for the Urban Poor JSDF Funded Maputo Peri-Urban Sanitation Project. Report prepared for WSUP.

infrastructure to support the viability of these services, which would later be reflected in the Maputo Sanitation and Drainage Masterplan, and more recently under the World Bank-led Mozambique Urban Sanitation Project.

**Sanitation tariff:** Led by AURA IP, work began in 2013 to introduce a sanitation tariff - in the form of a surcharge on water bills - to help address the financing gap for sanitation. Development of the tariff was founded in recognition of the lack of a sustainable financing mechanism for on-site and off-site sanitation: the demonstration of shared and communal sanitation had strengthened awareness of the urgent need to address sanitation in the bairros, and the tariff was known to have been introduced successfully in other countries. The concept of the tariff had an influential champion in CRA, who established the Maputo Sanitation Platform led by CMM and AIAS and comprising key institutional partners, World Bank, and WSUP, where the potential introduction of the tariff was discussed; CMM were also supportive of the proposal.

The process of developing the tariff has itself been of huge value, apart from the financial flows that will ultimately result, requiring detailed discussions around institutional mandates for sanitation. WSUP supported CRA with financial analysis to help set the tariff at a level that would be equitable, politically acceptable and high enough to generate sufficient revenues for CMM to implement large-scale service improvements; the development of a regulatory framework, including the definition of eligible services, including both off-site and on-site; and the development of Key Performance Indicators (KPIs) for CMM to report against. Research focused on learning from the sanitation surcharge experience in Quelimane and Beira, conducted by Hidrozono and commissioned by WSUP, was also influential, providing a basis for discussions around the regulatory framework and laying bare the overlapping mandates between CRA and CMM that needed to be addressed. Another important step is the development of the billing mechanism through which revenues will be collected, requiring a separate agreement between AURA and Water Supply Infrastructure and Asset Investment Agency (Fundo de Investimento de Infraestrutura e Património de Abastecimento de Água, FIPAG).

Figure 11 provides a systems analysis of financial flows arising from the planned introduction of the tariff in Maputo. This has been delayed because of several factors, including finalisation of eligible services and the regulatory framework; and lack of institutional capacity, for example in creating dedicated accounts for transparent tracking of funds. The tariff was approved by the Municipal Council in December 2016 and was publicised in the National Journal of Law the following August; however, it is still to be implemented.

#### **Maputo Sanitation and Drainage Masterplan:**

Beginning in 2014 and published in 2016 by AIAS, a Sanitation and Drainage Masterplan was developed for the Greater Maputo Metropolitan Area. The Masterplan was held by stakeholders to be a significant step forward, in part because it provided a framework that would later guide planned investments under the Mozambique Urban Sanitation Project. Informed by emerging learning from the FSM service pilot, Volume Six of the Masterplan is dedicated to FSM and includes reference to four treatment plants and 28 transfer stations.<sup>20</sup>

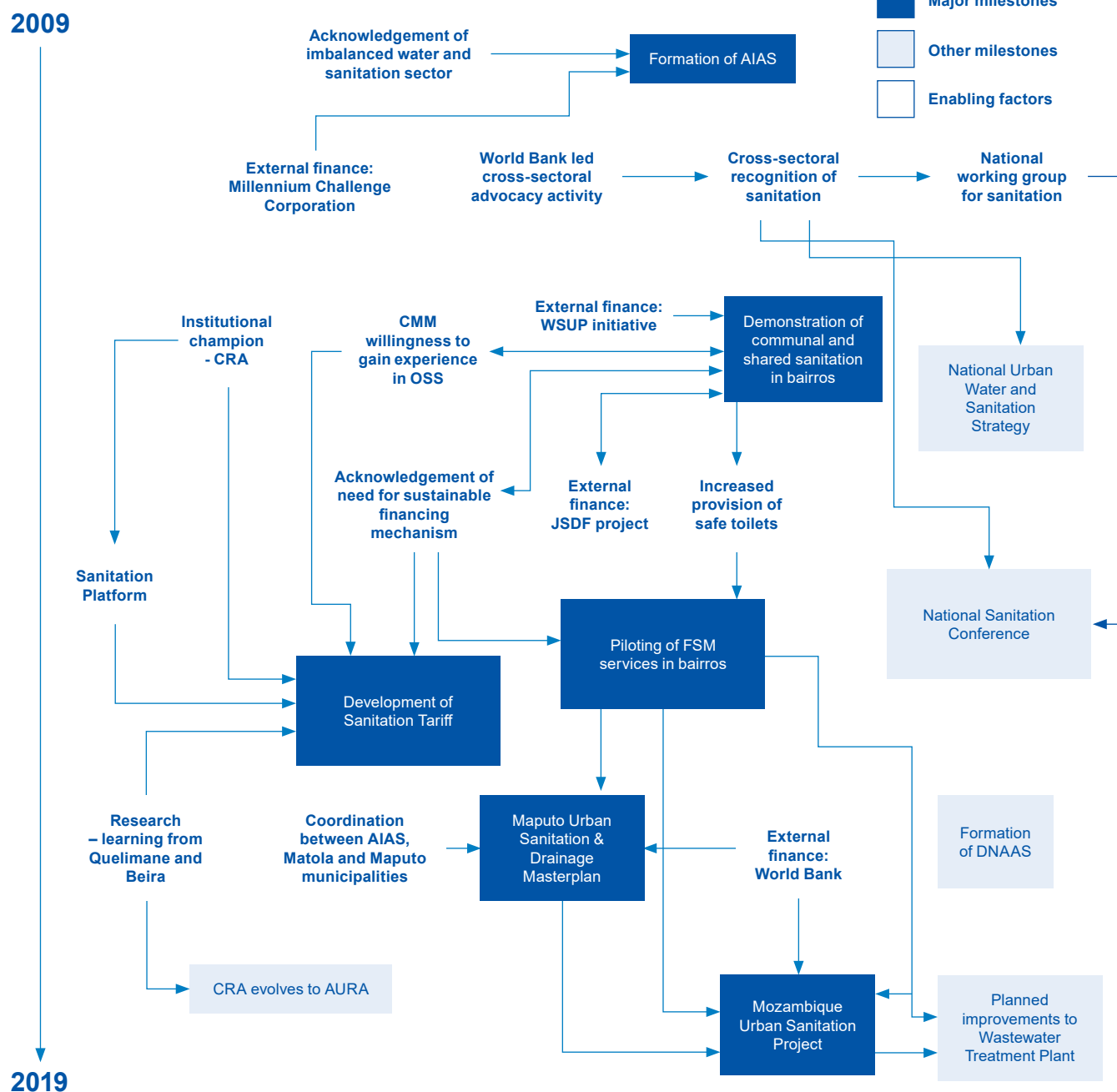
#### **Mozambique Urban Sanitation Project:**

Running from 2019–2024, the Mozambique Urban Sanitation Project is the first in a series of planned World Bank projects to support major urban sanitation investments in three priority Mozambican cities – Maputo, Quelimane and Tete. In addition to investments in the rehabilitation and upgrading of sewers, two pumping stations and nearly 13,000 existing sewer connections, a key component of the investment in Maputo is planned improvements to the Wastewater Treatment Plant at Infulene, which will be upgraded to include a sludge treatment facility for waste from on-site sanitation facilities, thereby providing an inclusive facility for citywide waste treatment. Importantly, the project also includes performance-based grants to finance service improvement activities in Maputo (see 3.6); and technical assistance to support national institutional strengthening and management, the latter encompassing i) the review and harmonization of the legal and institutional framework, including the review of the Water Law and Water Policy to clarify roles and responsibilities between the central agencies and the municipal entities for sanitation investment planning, implementation, and service delivery; ii) regulatory tools for urban sanitation service delivery; iii) key preparatory studies for

<sup>20</sup> AIAS (2015)



Figure 9: Map of all milestones and enabling factors



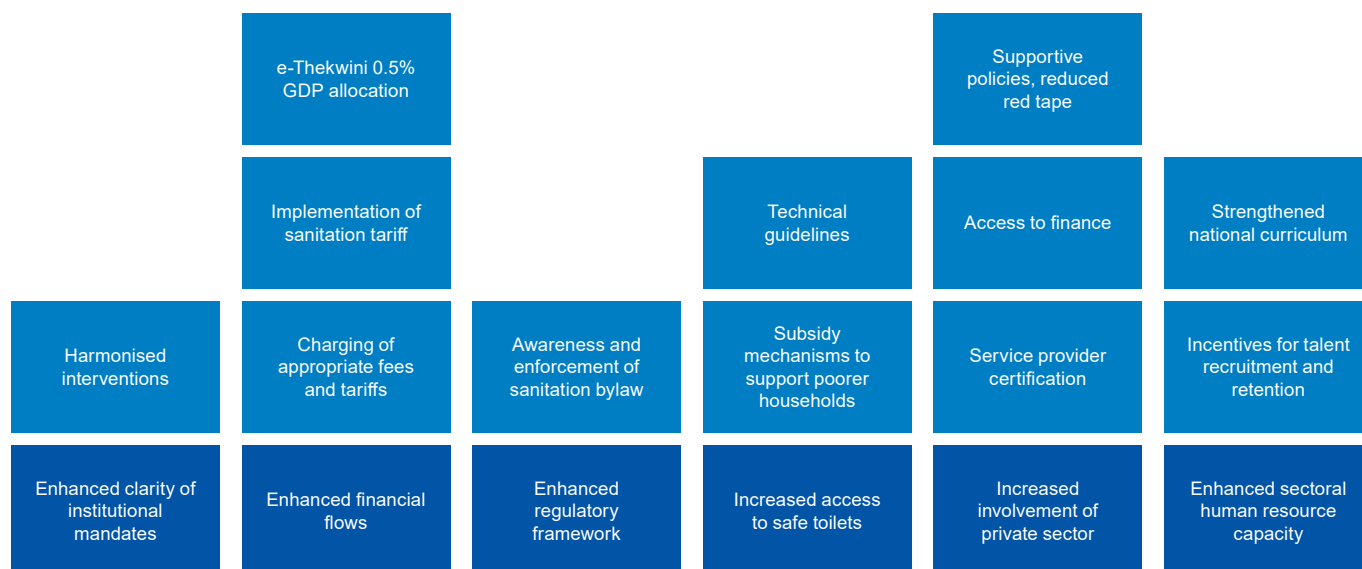
the next generation of sanitation investments; and iv) development of institutional and financing arrangements for sanitation at the municipal level.<sup>21</sup>

In addition to the six consensus milestones, a number of other developments were viewed by institutional stakeholders as being significant over the past decade. They included the **National Urban Sanitation Conference**, held in Maputo in May 2014, co-sponsored by World Bank and Unicef, and with the backing of the Ministry of Public Works. The conference represented an outcome of sustained cross-sectoral advocacy activity aimed at raising the profile of urban and

rural sanitation. The **formation of DNAAS** in 2016 formally expanded the purview of the national water directorate to include sharper focus on sanitation. The recent **evolution in the regulator's mandate** – reflected in the change of title from CRA to AURA – was also held to be significant: as of February 2019 the regulator was granted additional powers relating to the setting of service delivery standards, while its mandate was extended to include all public water and sanitation services, where previously limited to services provided through delegated management; and to include FSM services, where previously limited to conventional sanitation systems.

<sup>21</sup> World Bank (2019)

Figure 10: Stepping stones for achieving shared vision for OSS in Maputo, 2020-2030.



### 3.4 Constraints

As part of their reflections on the journey undertaken by the sector over the past ten years, stakeholders were invited to discuss constraints that have held the sector back, and what might have been done differently. Stakeholders identified the following constraints:

- **Inadequate financial flows** (see 3.2)
- **Lack of clarity on institutional mandates (see 3.2)** – the Water Policy needs revision to clarify mandates for sanitation
- **Lack of coordination between institutions** – for example in relation to urban and rural sanitation. Progress has made in this area, with urban sanitation now given greater attention, including by DNAAS.
- **Inadequate technical and human resource capacity** of key institutions. Municipal capacity was identified as a critical constraint in view of large-scale rural to urban migration, encompassing management processes, operations and financial management
- **Inadequate enabling environment for private sector engagement** (see 3.2). Stakeholders reflected that private sector involvement requires clear rules for engagement and strong regulation, to provide assurance to the private sector that investment risk is manageable. Over the past ten years this has not been present in Maputo – overlapping mandates have reduced the capacity of AURA to clarify set the parameters of private sector involvement. The recent evolution of AURA's mandate was seen as a positive development in this regard.

### 3.5 What is the journey we must now undertake

The journey from 2020 to 2030 will likely be as complex and non-linear as that of the last ten years. This reality notwithstanding, reviewing changes in on-site sanitation in Maputo over the last decade gave stakeholders a framework with which to assess how their collective vision for Maputo could realistically be achieved. Figure 10 shows the results of group discussions about priorities for the coming decade.

Consistent with previous analyses, inadequate sector financing and unclear institutional mandates were widely acknowledged by stakeholders as the foremost constraints to be addressed. In addition the discussion revealed the following as priority steps to be taken in the Maputo context:

- **Implementation of the sanitation tariff:** Although revenues generated from the sanitation tariff will not be sufficient for the necessary capital investments to upgrade and extend the sewerage system and OSS infrastructures in Maputo, introduction of the tariff is widely considered an important first step towards bridging the financing gap, by generating a tax base that can support subsidised FSM services for low-income customers (see 3.6).
- **Enhanced training and incentives to attract and retain a skilled sanitation workforce:** The need was identified for institutions engaged in sanitation in Maputo and nationally to address capacity gaps through improved training, incentives, staff productivity and talent retention. The issue of

weak capacity transcends sanitation and constitutes a national issue in Mozambique; however it is clearly seen to be impacting the sanitation sector, with stakeholders citing the emigration of talented staff to neighbouring countries as holding the sector back.

### 3.6 Key insights from a systems analysis of sanitation in Maputo

Figure 11 presents an analysis of the sanitation system in Maputo, assessed from the perspective of financial flows arising from the planned sanitation tariff. The system, which encompasses the full range of stakeholders and actors in the system ranging from customers to politicians, is assessed from the perspective of accumulating a surplus after paying for the cost of services, administrative costs, profit and wastage.

Our system hypothesis is that: a functioning system would leverage revenues, government transfers and other sources of income to cover all costs and generate a surplus which would form a sinking fund for investment and replacement.

Our case study of Maputo illustrates the critical importance of (i) clarifying institutional mandates between AURA, CMM, AIAS and DNAAS; (ii) overcoming institutional inertia and (iii) building appropriate capacity in the institutions responsible for sanitation and for the regulation of sanitation. As would be expected, the systems model illustrates that these depend upon political will and leadership, enabling legislation and policy and adequate financing. Our stakeholder workshop also underlined the challenges of sourcing trained, skilled personnel to staff the sanitation units within institutions. Key findings resulting from the analysis are presented below:

#### **Timing is critical: system delays should be carefully considered in planning actions**

The analysis underlines that we need to better account for the time required for change to happen (which in some cases can be years), both in programming and sequencing activities. These delays are not just because of interdependencies and system complexity; organisational change is inherently difficult and time-consuming for any organisation or institution.

Not taking systems delays into account can result in abortive or even counter-productive developments that can set the sector back. For example, the regulator AURA needs to reorient itself to regulate publicly managed services and FSM systems, to build internal competence and capacity to regulate sanitation, and to develop models and analytical tools to set tariffs and regulate the service. This requires a shift in mindset and management focus, internal reorganisation and hiring, budgetary allocation for new staff and an investment in developing the new regulatory tools. The municipality CMM will likewise have to undergo significant changes in order to execute services financed through revenues generated by the tariff, and to introduce dedicated accounting and transparent tracking of funds. Even if a decision is made on the date for introduction of the tariff, the simple fact of an annual budgeting cycle can introduce a delay of up to a year in taking the first step.

Because of the urgent need, development projects can set out to effect immediate improvements in sanitation services. This can lead to customers and service providers being engaged before the system is able to deliver the enabling tariff and regulatory regime, in turn resulting in disappointed customers, failed business ventures and loss of political and institutional commitment. Such premature actions can set back the sector by years as the public and service providers lose trust in the promise of improved sanitation.

In 2016, WSUP published a Practice Note reporting on an action research project that commenced in 2013, entitled 'Increasing municipal finance for sanitation: towards a sanitation tariff in Maputo', quoted below:

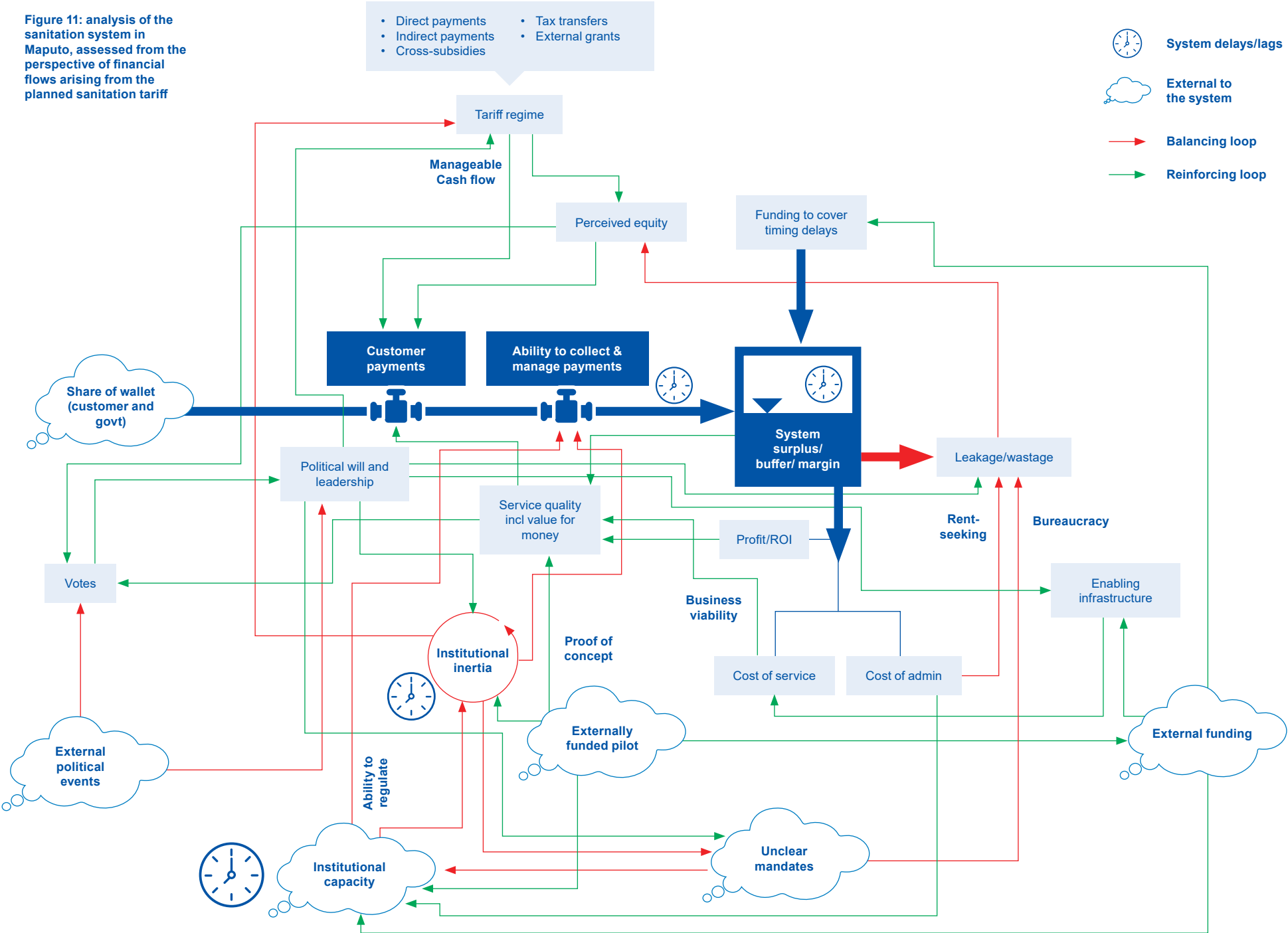
*"Consultations around one of the specific advocacy goals – enacting the new sanitation tariff – have advanced significantly, but continue to be impacted by a high-level debate about the respective jurisdictions of local government and nationally managed authorities including the water and sanitation services regulator.*

*Notwithstanding the wider economic and political issues currently affecting Mozambique, WSUP is optimistic that progress will be made towards implementation of the tariff over the next year; this would represent a huge step forward in strengthening the enabling environment for at-scale sanitation service provision in Maputo".<sup>22</sup>*

<sup>22</sup> See WSUP (2016) Increasing municipal finance for sanitation: towards a sanitation tariff in Maputo.



Figure 11: analysis of the sanitation system in Maputo, assessed from the perspective of financial flows arising from the planned sanitation tariff



In 2019, the sanitation tariff has still not been introduced. Much progress has been made, but factors both external to the sector (for example, economic conditions and political change) and internal to the sector (for example, inertia experienced in clarifying and allocating institutional mandates) have held progress back.

The World Bank's Mozambique Urban Sanitation Project includes performance-based grants to finance service improvement activities in Maputo. These grants will be linked to achievement of a minimum set of indicators (institutional, operational and financial) on a performance scorecard agreed between each participating municipality and DNAAS. The grant will consist of two parts: (i) a fixed part linked to achievement of certain institutional prerequisites (such as establishment of a ring-fenced municipal sanitation department, approval of the sanitation service improvement plan and introduction of a sanitation fee) during the first two years of the project, and (ii) a variable part linked to actual sanitation revenues collected by the municipality throughout the project period.<sup>23</sup> This component of the project will accelerate institutional change; however, it also means that a further two years may elapse before the necessary institutional arrangements and sanitation tariff are in place in Maputo.

### **A broader influencing agenda should be considered in the design, implementation and monitoring of the planned pilot project**

WSUP plans to develop a service model to form the basis of a public-private partnership (PPP) pilot for FSM services in Maputo, to be implemented by CMM at significant scale over the next two years, using revenue from the sanitation tariff. WSUP's earlier experience with the pilot of communal sanitation blocks in Maputo, which led to adoption of the model, enthusiastic acceptance among the public and local politicians and the mobilisation of financial contributions from CMM, has demonstrated the value of successful pilots in achieving systems change.

The systems analysis enables us to approach the next pilot in a more nuanced way, both in terms of i) defining the stakeholders we seek to influence, which in turn will inform a stakeholder management plan; and ii) defining the way we will

monitor and evaluate the impact of the pilot. The pilot will also reflect learnings from previous WSUP and World Bank experience, which identified service affordability for low-income customers as a fundamental constraint. It will be critical that the pilot addresses the service gap that exists for low-income customers in Maputo, and achieves greater equity, by deploying revenues from the tariff to subsidise the service. Our analysis suggests the PPP pilot has the potential to:

- Demonstrate an improved and affordable emptying service to customers, which in turn will create acceptance of scheduled pit emptying and increased commitment to payment of regular sanitation tariffs
- Help overcome institutional inertia on the basis that a tangible service area and contracting arrangement will need to be put in place
- Contribute to building the capacity of CMM to undertake a PPP, and of private providers, who will be assured of a revenue stream to build up their businesses
- Build political will and commitment through demonstration of improved service delivery, greater equity and improved environmental conditions, which in turn will support policy development, institutional change and support to the tariff regime
- Provide valuable learning for potential future replication, including subsequent World Bank investments in Maputo

### **Sanitation service improvement should be an explicit goal of infrastructure investments**

Our systems analysis indicates that sanitation service improvements are central to systems change, with the potential to drive customer willingness to pay, political will, service provider development and the introduction of tariffs. Among other measures, the World Bank's Mozambique Urban Sanitation Project will finance the rehabilitation of the Infulene wastewater treatment plant, including capacity to manage faecal sludge. This major investment in faecal sludge treatment capacity - concentrated in a single treatment works at the western boundary of the city - is an important and welcome step; however, it will be insufficient unless backed-up by further investment.

<sup>23</sup> World Bank (2019)

Experience from a number of WSUP cities indicates that investment programmes should include an explicit focus on improving sanitation services, for example by improving logistics through the introduction of distributed transfer stations, which will reduce journey times for faecal sludge emptying, improve business productivity and viability of service provider business models and contribute to lower sanitation charges.

The Maputo Sanitation and Drainage Masterplan provides the blueprint to which future investments in Maputo should be aligned: the Masterplan acknowledges the need for massively enhanced infrastructure to support citywide FSM service provision in the form of 3 additional treatment sites and 28 transfer stations. At present, lack of financial investment remains the single most critical constraint to the sector in Maputo; however, sustained investments have the potential to be the catalyst for change, by triggering political will, overcoming institutional inertia and mobilising public awareness.

### **Breaking the cycle of poor service provision requires bridging finance to manage delays in revenue collection**

By considering delays in the system, the analysis highlights an important shortcoming arising from the delay between provision of services and the collection of adequate revenue and receipts. Delays in revenue generation may be due to:

- The time between the introduction of a customer charging regime and the actual receipt of revenues, which is a function not only of the customers readiness to pay but also the institutional capacity to identify, bill and collect from customers (in the case of the sanitation tariff, revenues will be collected via water bills processed by the utility AdeM - Águas da Região de Maputo)
- Experience in Maputo has already shown that there can be a gap of many years between agreeing the concept of a tariff, actually introducing the tariff and then collecting tariffs across the city. The problem is worsened if service levels are not seen to be improving, since neither the public nor politicians are keen to pay for a service that is not yet delivered. Performance-based grants included under the Mozambique Urban Sanitation Project could act as one



**Image:** Communal sanitation block, Maputo

mechanism for incentivising delivery.

- At the very least, government transfers are a function of annual budgeting cycles and therefore may not come on stream for several years. They are also prone to uncertainty since they are a function of political priorities and the economic performance of the country.

Conversely, the analysis demonstrates that service improvements are necessary to unlock revenues from all sources: some form of bridging finance is essential to cover the costs of service improvement while revenue builds up and eventually generates surplus that can fund future development of sanitation services and cater for shocks to the system.

## Concluding insights

In this section we synthesise key insights arising from stakeholder discussions of OSS sector developments in Maputo and Lusaka over the past ten years; and from systems analyses relating to the FSM service in Lusaka and the planned sanitation tariff in Maputo.

### Begin by optimising one part of the system

The size and complexity of urban sanitation systems can be overwhelming. Faced with this reality, actors should not feel compelled to address the system in its totality. Experience from Lusaka and Maputo shows that optimising one small part of the system can benefit the whole, by helping to overcome institutional inertia and catalysing movement in other parts of the system. This principle is reflected in WSUP's theory of change, which recognises the importance of "demonstration" as a means of creating buy-in from key institutional actors, achieved by evidencing what is possible in the context of service provision to low-income areas.

This effect can be seen clearly in Maputo, where the provision of inclusive shared sanitation, beginning in 2009, increased municipality engagement with on-site sanitation; and where the piloting of FSM services under the JSDF project promoted dialogue and highlighted sectoral constraints, including lack of adequate centralised and decentralised treatment infrastructure, which needed to be addressed. Similarly in Lusaka, the demonstration of FSM services in Kanyama and Chazanga were a significant development, demonstrating the potential viability of decentralised services while highlighting capacity gaps.

Our systems analysis of the FSM service in Lusaka suggested that optimising core business operations to maximise outcomes and profit could be tackled independently of the wider system, but if successful, could generate a positive and reinforcing feedback loop of

business performance, Water Trust buy-in, resource allocation and FSM operational capacity. Initial and localised interventions of this type can highlight connections to other parts of the system which may not have been obvious; and provide actors with the flexibility to act, monitor and adapt in response to system feedback.

### Embrace the power of process

Any urban sanitation system will have multiple institutional actors involved. For the system to function effectively, these actors must be coordinated, and individually cognisant of their roles. Our visioning exercise demonstrated the many interdependencies that exist between stakeholders in Lusaka and Maputo, as elsewhere. The process of stakeholder-led analysis that followed focused on the identification of key sector milestones; however, discussions also revealed the intrinsic value of the processes leading to these outputs.

The development of regulatory frameworks to support on-site sanitation, which has taken place in different forms in the two cities, provides a tangible example of the power of process. In Maputo, the planned sanitation tariff is still to be introduced, but was widely held to be a significant sectoral development of the past ten years. This is because the value of the tariff goes beyond the revenues it will generate; its planned introduction has already laid bare the overlapping mandates which existed between the regulator and municipality, and necessitated a process of reflection on the respective roles of these institutions in supporting sanitation service provision. In Lusaka, the publication of a regulatory framework for urban OSS and FSM in 2018 was the culmination of a process of detailed consultation, led by NWASCO and involving a wide range of sector stakeholders; resulting from the framework, Commercial Utilities in Zambia are now required to pay close attention to on-site sanitation in urban areas.

The experiences of Lusaka and Maputo have in common a regulator committed to driving



improvements in sanitation service delivery; although the regulatory instruments created to support these improvements are still to be fully implemented, the very process of their creation has been pivotal to advancing stakeholder coordination.

The importance of process is bound up in the reality that meaningful change takes time: examples are replete from Lusaka and Maputo of key milestones resulting from long-term influencing activities and technical support provided by GIZ, World Bank and other external actors. In a complicated system, each actor will have their own understanding of how the system functions, and sustained effort is required to prevent a damaging level of divergence. Stakeholder forums can sometimes be dismissed as a poor substitute for action, but in the context of effecting long-term systems change, the process of convening stakeholders to develop dialogue, enhance coordination and strengthen information flows is fundamental.

## **Design investments to address genuine system constraints**

In the cities where WSUP works, inadequate financing is routinely cited as a core sector constraint. Households cannot afford to pay the full cost of sanitation services, and government transfers are nowhere near enough to bridge the financing gap. In such contexts, large-scale development finance can be an immensely powerful driver of change. In both Lusaka and Maputo, IFIs have committed large-scale finance, through the Lusaka Sanitation Project (LSP) and the Mozambique Urban Sanitation Project respectively (the latter supporting investments in three cities). Stakeholders in both our focus cities cited the large-scale investments as key sectoral milestones: investments of this magnitude will unquestionably have a huge impact on the system, for better or worse. It is vital that the power of these investments to catalyse positive systems change is fully leveraged.

Our systems analyses demonstrate that for this to happen, investments must i) be sustained over

time; ii) respond to diverse and deep-lying system constraints, including weak absorptive capacity of institutions, and weak human resources; and iii) be designed with the end goal of improved services in mind, and with a clear causal chain to the end-customer. In Maputo for example, the planned investment in centralised faecal sludge treatment capacity must be backed-up by future investments in decentralised transfer stations in order to realise its full potential, as stipulated in the Maputo Sanitation and Drainage Plan; this could enable emptiers to reduce journey times, improve business productivity and viability, and ultimately to pass on cost savings to low-income households.

## **Anticipate and factor in delays**

Urban sanitation systems are composed of institutions, and institutions are composed of people. In WSUP's experience, institutional change is inherently difficult and time-consuming. Delays are critical determinants of systems behaviour, and in the context of sanitation sector change, they must be accounted for. Failure to do so can result in abortive projects with the potential to set the sector back.

The challenge faced by institutions in absorbing fundamental change should not be underestimated. Our systems analysis for Maputo outlined the reorientation required by the regulator and municipality in supporting the introduction of the planned sanitation tariff, which has in itself been significantly delayed, having encountered a variety of political, economic and capacity-related constraints. Similarly in Lusaka, the transition now being undertaken by the utility in coordinating a citywide market for FSM services will take years to fully effect. An instinct to rush through reforms is understandable, given the very urgent need for sanitation improvements, but is ultimately counterproductive; sustainable systems change begins with acceptance that citywide transformation is a long-term process.

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