WSUP | Water & Sanitation for the Urban Poor

An integrated approach to peri-urban sanitation and hygiene in Maputo

Working with city authorities to improve services and practices

Topic Brief | February 2018

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From the People of Japan

Cover image: Communal Sanitation Block in Chamanculo, Nlhamankulu district, Maputo.

Contents

Image: Assucena, 14, outside the unimproved toilet she shares with more than 30 other people from different families in Maputo.

1. Background: the programme in context

This Topic Brief documents the approach, outcomes and learning of an integrated sanitation and hygiene programme implemented in Maputo, Mozambique during the period 2013-2017. The programme was funded by the World Bank-managed Japanese Social Development Fund (JSDF), and implemented by WSUP and the Water and Sanitation Program (WSP) of the World Bank. The JSDF-funded programme aimed to pilot three complementary sets of activities—sanitation infrastructure, development of desludging services, and community-level sanitation and hygiene promotion and monitoring—for improved sanitation conditions and practices among the residents of 11 low-income communities with a combined population of 145,000 people, in Nlhamankulu district in Maputo.

The programme aimed to leverage established relationships between WSUP, WSP and the Maputo Municipal Council (CMM) to respond to the continuing need for improved sanitation services in Maputo's densely populated low-income neighbourhoods (known locally as 'bairros'[1]).

1.1 The urgent need for improved sanitation in Mozambique

WSUP's presence in Mozambique responds to an urgent need for improved basic services in the country. Mozambique is one of the poorest countries in the world, ranked 181 in the UN Human Development Index[2], with a Gross National Income (GNI) per capita of $590[3]; 46% of the population lives below the national poverty line.[4] High residual levels of poverty are coupled with an explosive rate of urbanisation: the overall population of Mozambique is expected to grow from 30 million in 2017 to reach 54 million by 2040[5], with the population of Mozambique's capital, Maputo, forecast to grow by 70,000 annually to reach 4.1 million in the same timeframe.[6]

[1] The term 'bairro' refers to a neighbourhood-level administrative division of the city.
[2] UNDP, 2016
[3] Accurate to 2015. Source: World Bank. Available at: https://wits.worldbank.org/CountryProfile/en/country/MOZ/startyear/LTST/endyear/LTST/indicator/NY-GNP-PCAP-CD. Accessed January 2018
[4] Accurate to 2015. Source: CIA World Factbook. Available at: https://www.cia.gov/library/publications/the-world-factbook/fields/2046.html. Accessed January 2018.
[5] Source: World Population Review. Available at http://worldpopulationreview.com/countries/mozambique-population/. Accessed January 2018.
[6] AIAS (2015) Sanitation and Drainage Master Plan for the Greater Maputo Metropolitan Area.

Nearly two thirds of Mozambique's urban population currently lack access to even basic improved sanitation facilities, contributing to frequent cholera outbreaks, widespread diarrhoeal disease and high child mortality. In 2016 alone, there were 1,008 recorded cases of cholera and 748,000 cases of diarrhoeal disease in Mozambique.[7] This situation is mirrored in an acute lack of improved sanitation in the low-income areas of Maputo, where 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.[8] An assessment of stool samples of children hospitalised in the Central Hospital of Maputo placed the prevalence of children carrying at least one pathogenic intestinal parasite at 16%.[9]

1.2 Political will on the increase

While access to improved sanitation remains relatively low in Mozambique, political commitment to sanitation appears to be on the rise. The issue of urban poverty is receiving increasing attention from the government, and the improvement of urban sanitation is an explicit goal in the country's poverty reduction strategy, as well as being the subject of an inter-ministerial initiative. CMM has been at the forefront of this attitudinal shift, and took the important decision to include sanitation improvement, after many years of neglect, in an ongoing programme of decentralisation to improve basic services in peri-urban areas. The JSDF programme aimed to strengthen this political momentum and CMM's increasing commitment to sanitation service provision in particular.

1.3 WSUP's role: developing partnerships to support local drivers of change

The JSDF-funded programme represented a continuation of WSUP's and WSP's longstanding partnership with CMM and other key actors in Maputo's water and sanitation sector. WSUP has been working in Mozambique since 2007, during which time its programme has supported a wide range of interventions including infrastructure construction, business development and capacity building, with a strong emphasis on driving sustainable water and sanitation improvements throughout the densely populated bairros of Maputo.

WSUP's approach in Mozambique has reflected the conviction that citywide sanitation service provision must be driven by local providers with the mandate to serve an entire city. This entails long-term (as opposed to programme-based) commitments, working side-by-side with local providers over time, and supporting them to develop services, build infrastructure and attract funding that will help them reach low-income communities. In Maputo, CMM is the institution with responsibility for urban planning and development, sanitation, drainage, solid waste management and environmental quality. Developing a trusted, formalised partnership between WSUP and CMM, strengthened by the sustained engagement of local communities and CBOs, has been fundamental in working together towards improving the sanitation situation for Maputo's residents.

The partnership to improve water and sanitation services in Maputo began in 2008 and was consolidated under the Tchemulane programme from 2009, which aimed to improve water and sanitation services in seven bairros in Maputo. CMM demonstrated its commitment to improved service provision in the bairros by providing a financial contribution to shared sanitation facilities, including through direct contributions towards capital costs, providing suitable land free of charge, and waiving charges for the planning process and approval. Building on the success of the Tchemulane programme, a Memorandum of Understanding (MoU) was agreed between WSUP and CMM in 2011 which set out the basis for long-term collaboration. Together with CMM's partnership with WSP, this agreement underpinned CMM's participation in the JSDF programme.

1.4 The bigger picture: supporting a functional urban sanitation sector in Maputo

The activities conducted under JSDF are part of wider efforts to strengthen the urban sanitation sector in Maputo. Key ongoing initiatives involving WSUP and other actors include the implementation of the Greater Maputo Sanitation and Drainage Masterplan; the continued

[7] National Institute of Statistics (2016).
[8] Nhampossa et al (2013).
[9] Fonseca et al (2014).

implementation of priority works to rehabilitate the Wastewater Treatment Plant at Infulene, and improve its operability; and creating capacity within CMM to regulate Faecal Sludge Management (FSM) services. Financial flows within the Maputo sanitation sector are expected to be greatly enhanced by the introduction of a sanitation tariff by CMM in partnership with CRA (the water and sanitation regulator) and FIPAG (the water asset holder), the implementation of which is planned for 2017 (see Section 6.2). WSUP's partnership with CMM has similarly evolved from an initial focus on shared sanitation service models to a broader set of activities aimed at strengthening the full sanitation chain and enhancing overall sector functionality.

1.5 JSDF: an integrated programming approach

The JSDF-funded programme was designed to promote an integrated approach to sanitation and hygiene, in order to respond effectively to the deficit in adequate sanitation facilities and services in the bairros. While 41% of households in Maputo rely on pit latrines, and 49% use septic tanks and pour-flush toilets (only 9% of households in Maputo are connected to a sewerage system), most toilets are not emptied safely: an analysis of faecal waste flows in Maputo shows that only 3% of the total faecal waste produced passes through the treatment plant, while more than 50% contaminates backyards, the drainage system and Maputo Bay.[10]

The issue of Faecal Sludge Management (FSM) is particularly acute in the city's older unplanned settlements, typified by Nlhamankulu, which is one of five Municipal Districts that comprise the mainland (urban) portion of Maputo city, and has a population of about 145,000 people distributed across 11 neighbourhoods. To develop a scalable intervention strategy, the JSDF-funded programme targeted the whole of Nlhamankulu District, comprising 1) the improvement of toilets in low-income rental compounds; 2) the development of sustainable private sector capacity to provide FSM services adapted to the physical and economic conditions in the bairros; and 3) building technical capacity in CMM's sanitation department, and promotion of improved sanitary practices at household level.

Image: Washing hands outside improved toilet in Nlhamankulu district, Maputo.

The Topic Brief explores each of these components in turn and details the rationale, approach, results and learning. The document draws from an independent evaluation of the programme conducted in 2016.

[10] Hawkins and Muxímpua (2015).

2. Programme design

The programme adopted an integrated approach with three complementary sets of activities:

1. Sanitation infrastructure: the construction of shared user facilities and promotion of the construction or improvement of household facilities (i.e. the construction of Shared Latrines and Communal Sanitation Blocks);

2. Development of FSM services: supporting desludging service providers to deliver professional, hygienic services, ensuring that new and existing pit latrines are emptied and faecal waste is disposed of safely;

3. Community-level sanitation and hygiene promotion and monitoring: monitoring systems were included to provide continued downward pressure on community members to maintain adequate sanitation standards, and upward pressure on the authorities to provide the necessary complementary inputs.

In addition the programme had a pronounced focus on capacity building of multiple actors from the community to the institutional level, to be accomplished through direct knowledge transfer and skill building, but also through the implementation of activities alongside government officials at various levels. Key programme targets and outcomes are presented in Table 1.

2.1 Leveraging municipal governance structures to drive sanitation improvements

At the core of programme design was the use of the municipal (CMM) governance structures at three descending levels – district, bairro and block – as the main axis for driving improvements in sanitation. Small pilot studies had been conducted by WSP and WSUP in partnership with CMM prior to the programme, which introduced a monitoring process involving local community leaders at the lowest tier of the municipal administration, and indicated the potential efficacy of this approach for collecting information to improve sanitation planning: localised governance structures in Maputo were specifically designed to reach out to individual households, to provide basic local-level services and to monitor living conditions. The sanitation department of CMM had a critical but supporting role to play in providing technical expertise, extension workers and services beyond the neighbourhood level, such as faecal sludge transfer to treatment. The approach aimed to put the processes of toilet construction and maintenance and hygiene promotion and monitoring in the hands of communities, based on a dialogue that responded to their expressed needs.

Table 1: Key programme targets and outcomes.

Key Outcome	Target	Results
Component 1		
Construction of Community Sanitation Block (CSB)	50	50
Construction of Shared Latrines	250	400
Component 2		
Development of viable Faecal Sludge Management (FSM) enterprises	One enterprise per bairro	8 established with capacity to serve all 11 bairros. 6 are still operational, although at different levels of capacity
Component 3		
Training of bairro Block Leaders and Sanitation Activists in hygiene promotion methods and skills to enable household sanitation and hygiene monitoring	Conduct training and complete twice yearly (4 total) household surveys with consolidated reports available at the district level	Training completed. Two monitoring surveys conducted and associated reports completed. Monitoring surveys reported to include some hygiene promotion by Sanitation Activist and Block Leaders

3. Sanitation infrastructure

3.1 Rationale

Component 1 of the programme aimed to improve sanitation conditions for households in the bairros through the provision of Communal Sanitation Blocks (CSBs) and Shared Latrines. The focus on on-site sanitation reflected the absence and impracticality of providing sewerage in the target areas. Within the domain of on-site sanitation, the programmatic focus reflected the view of WSUP and WSP that while individual household toilets should always be the ideal, shared sanitation can be an effective solution - and in some cases the only solution - in densely populated low-income areas such as the bairros, where lack of space precludes individual household toilets. CMM also regard shared sanitation as a necessary part of the mix of sanitation service solutions in Maputo, reflected in their providing a financial contribution to the facilities.

Pour-flush facilities with septic tanks were favoured over basic household ventilated improved pit (VIP) latrines. This was based on the judgement that pour-flush facilities better responded to the needs of target communities, which in turn was informed by multiple considerations including: 1) increased availability of water for low-income households living in the target areas resulting from water network extension by the utility, AdeM, which has made pour-flush latrines more practical and more attractive to households looking to upgrade their facilities; 2) concerns that VIP latrines, although categorised as “improved”, are a dry solution if properly used - high levels of water access in the bairros created a risk that households would use water in the latrines, making the facilities unsafe, and continue a common practice of bathing near the latrine, which impacts on the water content of the sludge in VIP latrines and results in accumulation of polluted surface water; 3) WSUP’s view that burying sludge on-site, as remains common practice where pit latrines predominate in the bairros, is not acceptable in urban environments of high population density; and 4) the capacity of pour-flush latrines to efficiently eliminate odours.

Image: Communal Sanitation Block, Nlhamankulu District, Maputo.

The rationale for this component was further supported by a baseline study conducted in the target areas prior to the start of the programme: the study revealed at least 50 tenements housing more than six households each, using completely inadequate, unhygienic toilet and washing facilities, and several hundred tenements housing less than 6 households, all of which have equally unhygienic toilet and washing facilities. The study also indicated a lack of facilities sensitive to the specific needs of women, children and people with mobility impediments – as exemplified by the common lack of provisions for menstrual hygiene. By providing improved facilities backed by a financial contribution from CMM, this component clearly recognised the low-income status of households living in the target areas, and reflected the reality that many could not afford to shoulder the full cost of building an improved facility.

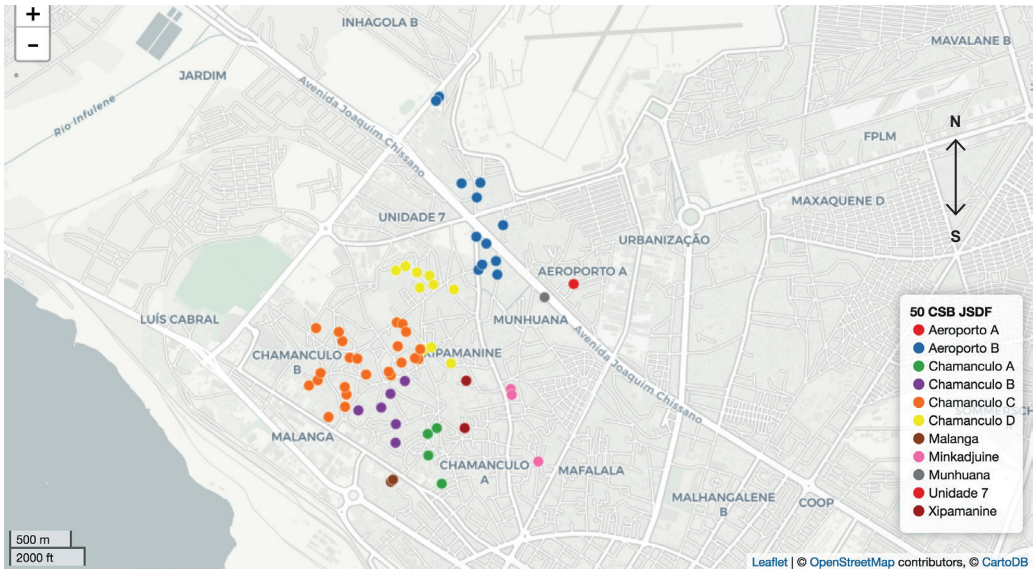
3.2 Approach

Communal Sanitation Blocks (CSBs) comprise toilets, a drained area to facilitate bathing, laundry stands, a shared water connection, an elevated water tank and a rainwater harvesting system to collect water for flushing. All CSBs include one compartment adapted for use by people with disabilities. WSUP has been supporting the provision of CSBs in Maputo since 2009, during which time 6 standard designs have been developed of increasing capacity: the 6 designs begin with a minimum capacity of 20-40 people and rise in 20-person increments to a maximum of 120-140 people. This has been complemented by at-scale provision of Shared Latrines - comprising one toilet, fitted for use by people with disabilities where required, and a soakaway installed in the concrete slab of the toilet compartment for bathing - with each facility serving between 15-20 people under the JSDF-funded programme (the selection process sets 3 families and 15 people as the minimum).

The decision on which facility to provide was informed by multiple factors including the number of households requiring an improved facility, the proximity of these households, and existing sanitation arrangements: for example, if a group of households already shared an unimproved toilet, this grouping was likely to be maintained when the improved facility was provided.
The provision of CSBs is particularly notable for the consultative approach underpinned by dialogue between the municipality, the district administration and participating communities. Figure 1 shows the geographical distribution of the CSBs provided under the programme. Key features of the implementation model are below:

- **Site selection** based on a set of 12 criteria formally agreed with CMM, including needs assessment; number of households served; availability of municipal land; and willingness of households to contribute to capital costs and manage the facility.
- **Financial contribution from the municipality**, which provides suitable land free of cost, waives charges for the planning process and approval, and contributes towards the capital costs.[11]
- **Accessibility for connection to the city water supply network** operated by the water utility, AdeM; provision of a water storage tank and tap stand.
- **Provision of ramps and separate compartments** adapted for use by people with disabilities.
- **Capacity building of the Sanitation Management Committee (SMC)** formed from the user households. Initial training of the SMCs was delivered with the participation of CMM and focused on correct facility usage, O&M and hygiene practices.

Figure 1: Target bairros and distribution of CSBs for the JSDF-funded programme (highlight from map of Maputo city).



[11] For more information on the financial model for CSBs, see WSUP (2017).

Women's participation in these committees is positively promoted.[12]

- **A formal delegated management agreement** between the SMC and the bairro (neighbourhood) administration for the facility - which is a public asset - including operating and maintaining the facility.

3.3 Outcomes and impacts

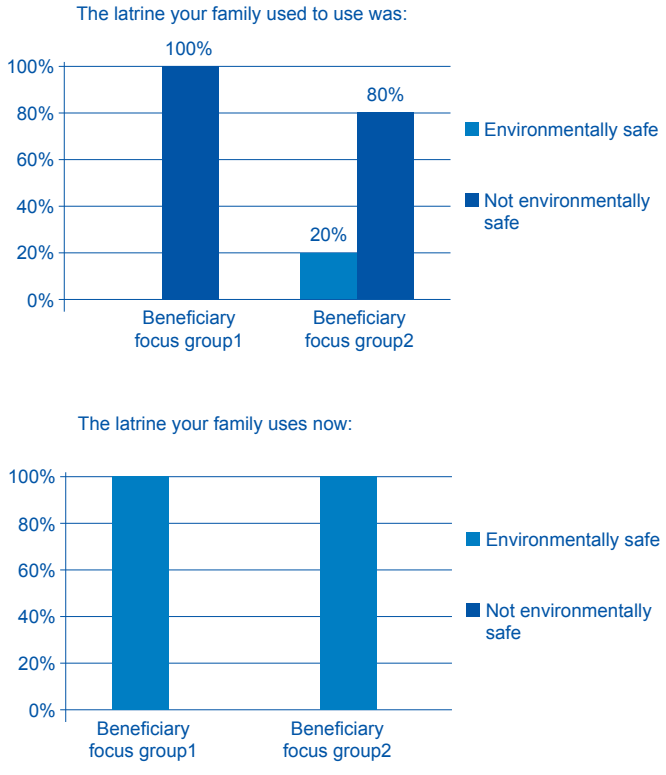
A total of 450 sanitation facilities were constructed in the period August 2014 – March 2016, covering the 11 wards of Nlhamankulu: 50 CSBs and 400 shared latrines. The quality of the sanitation facilities constructed by the programme was judged by the evaluator to be high, "both in terms of materials used, design and construction", which was borne out by feedback from users to the programme workshop held in mid-June 2017. The evaluation affirmed the importance of the consultative approach, noting the facilities were constructed with support from user contributions and "significant support and collaboration with municipal and district authorities, elected officials and community based organizations (CBOs) and the private construction sector". The facilities were found to have improved the conditions of 8,601 people (1,740 households) and their neighbours in the 11 densely populated bairros in Maputo; with the approach described as "providing a viable model for future replication"[13] on the basis of community-based management, the securing of user and CMM financial contributions and the high level of support for the model at all levels of municipal government.

The impacts of the improved latrines provided under JSDF have been positive and multiple. The majority of endline survey respondents indicated they were "happy" with their new facility across all metrics. This included cleanliness (focus group participants – FGD – participants spoke "glowingly" about their new latrines, with statements including "I could sleep in it" and "It's clean enough to eat in it"); distance from the home, with the average time taken to get to the latrine radically reduced from 3 minutes at baseline to 17 seconds at endline; and 24-hour access (all operational latrines were open 24 hours a day). Other reported benefits included increased dignity among households; and the new facilities inspiring families to make other improvements to their homes. Environmental and inclusion-specific benefits are detailed below.

3.3.1 Perceived positive impacts on the local environment

In WSUP's experience the benefits of improved sanitation in densely populated low-income areas extend beyond the household: impacts on the cleanliness and hygiene of the local environment are hugely significant for community health and wellbeing. Prior to the JSDF programme, many households in the target areas were using "traditional" latrines with unlined pits. Participants in focus group discussions held as part of the programme evaluation noted that higher quality latrines were important not only to the individual households who received a new facility, but also to their neighbours: as one participant noted, they no longer have conflict with their neighbour over the smell that their previous latrine produced, as well as waste flowing out of the pit into their neighbours' yard during the rainy season. The perceived positive environmental impact of the new facilities is evident in evaluation focus group discussion (FGD) results (see Figure 2).

Figure 2: Beneficiary FGD participant ratings of environmental safety of family's previous and current latrine.



[12] For more information on women's leadership roles in SMCs, see WSUP (2014).
[13] (Mattson, 2016).

3.3.2 Gender-specific sanitation needs effectively addressed

The toilets were found to have a pronounced positive impact for women living in the target areas. 100% of participants in female focus group discussions perceived the facilities provided enough privacy to meet their menstrual hygiene management (MHM) needs. Other diverse benefits emerged through discussions: the new facilities were safer for women to use at night, as they no longer had to worry about slipping on muddy ground on the way to the toilet, and had the ability to lock the door and have light in the latrine (the facilities did not include electricity, but some owners have since provided this, and some women also indicated that they could use their mobile phone flash lights to illuminate the latrine); one woman with a shared latrine close to her home indicated she can now attend to her baby while she goes to the bathroom and more safely attend to other household chores, such as cooking, made possible by the cleanliness and sanitation of the new facilities.

Endline survey results indicated a majority of women were “Happy” with sanitation facilities for MHM (see Table 2). One point for improvement in future replication of the model could be the provision of a separate container for MHM materials; however, focus group participants knew such materials should not be placed in the septic tank and placed them in the garbage, with no participant identifying this as a problem.

3.3.3 Improved access, privacy and dignity for people with disabilities

All of the CSBs were built to provide access to people with physical disabilities, with one stall having railing to support a person in the individual compartment. Designs for shared latrines included disabled access when there is a member of the household with a disability; however all are designed to be at or close to ground level. All focus group participants in the programme evaluation indicated that their latrines were now accessible to people with disabilities. The benefits of the new facilities were powerfully articulated by one focus group participant with a family member who was now able to use the latrine without assistance: previously the family member had to be held over the pit to use the facilities, but could now access the toilet independently with privacy and dignity.

3.4 Challenges and insights

3.4.1 Identifying households and areas for new sanitation facilities takes time

Facets that should be considered strengths of the JSDF programme overall – the consultative approach involving a range of community actors, coupled with a rigorous site selection process – also presented implementation challenges. The programme evaluation reported that the process to identify households and areas for the new sanitation facilities was found to be a very time-intensive process by WSUP staff and participating CBOs. This rigorous engagement process was compounded by the task of finding

Table 2: Reported happiness levels with sanitation facilities for MHM (endline survey female respondents).

Container for disposal of MHM materials (N= 818)	Very Happy %	Happy %	Unhappy %	Very unhappy %	
	2.7	74	20.4	2.9	
Container for disposal of MHM materials SL compared to Single HH latrines (N= 818)	Toilet (N)	Very Happy%	Happy %	Unhappy %	Very unhappy %
	Shared (195)	3.1	65.1	27.7	4.1
	Single HH (623)	2.6	76.7	18.1	2.6
Comfort to use during menstruation (N=828)	Very Happy %	Happy %	Unhappy %	Very unhappy %	
	3.6	67.6	24.9	3.9	
Comfort to use during menstruation SL compared to Single HH (N=828)	Toilet (N)	Very Happy%	Happy %	Unhappy %	Very unhappy %
	Shared (195)	1.5	56.9	35.9	5.6
	Single HH (633)	4.3	70.9	21.5	3.3

households that met the programme's selection criteria who were also willing and able to pay the required contribution towards the sanitation facility (see 3.4.2). In WSUP's view, the acknowledgement of these challenges does not put into question the validity of a consultative approach – rather, it serves to emphasise that effective, sustainable provision of sanitation facilities requires time, patience and resource.

3.4.2 Demonstration is critical to catalysing user contributions to capital costs

To promote financial viability, household ownership, and overall sustainability of the facilities, the programme required households sharing the sanitation facility to co-fund the construction costs with 25% needing to be paid prior to WSUP committing to construct the facility. The target total contribution from users totalled MZN 300,000 (around US$ 4,800) across the 50 CSBs, representing a contribution of MZN 6,000 (around US$ 97) per CSB; and MZN 1,600,000 (around US$ 25,600), across the 400 shared latrines, representing MZN 4,000 (around US$ 64) per facility. By programme-end, users had contributed 82% and 99% of these targets respectively, with contributions finalised in September 2017.

Collecting the initial contribution was reported to be particularly challenging. However, as the programme implemented more facilities and households were able to see the facility design and overall quality, the evaluation noted that new households quickly "bought in" to the contribution requirement, as they were able to see what they were committing to. This trend was supported by sustained community mobilisation activities – conducted by WSUP, CBOs and local authorities throughout the programme duration – and accelerated in the final year of the programme as overall efficiency of the process for constructing shared latrines continued to increase. Despite the initial challenges with getting residents to agree to contributions and collecting payments, all focus group beneficiaries indicated that making payments in instalments made it possible for them to get a new sanitation facility. Even with contribution requirement, Block Leaders and Bairro Chiefs stated in focus group discussions that they are continuing to receive requests from residents for a WSUP-supported facility, considered by the evaluator to be another indication of the model's efficacy (Mattson, 2016)

Image: Improved Shared Latrine, Nlhamankulu District, Maputo.

4. Development of faecal sludge management services

4.1 Rationale

Component 2 of the JSDF programme aimed to develop the capacity of FSM service providers to deliver professional, hygienic services, with acceptable costs for low-income households. The rationale was to ensure that new and existing septic tanks and pit latrines are emptied and faecal waste transported and disposed of safely: programmes centred on the provision of improved sanitation facilities must include an appropriate focus on emptying, transport, treatment and disposal of waste to be financially and environmentally sustainable.

This component of the programme responded to a challenging baseline situation that urgently needed to be addressed. Historically, the provision of hygienic FSM services to Maputo's bairros has been almost non-existent: the baseline study confirmed an almost total lack of such services in the target areas, where it is generally difficult for vacuum tankers to gain access. This has left a gap in service provision to be filled by small-scale, informal service providers who empty pit latrines manually via unhygienic means, and fail to dispose of the waste safely, often burying sludge on the compound itself. As the price of these services is still relatively high for the low-income residents of the target areas, pit latrines may be abandoned when full and left to overflow during rains, posing huge health risks to the local population. Space is usually not available for new latrines, with the result that some households who previously had adequate sanitation are at risk of slipping back into the use of unimproved facilities or open defecation.

4.2 Approach

The programme aimed at addressing the gap in FSM services by supporting the establishment of eight new (FSM) operators. The operators were identified based on prior engagement with solid

Image: FSM operators, Nlhamankulu District, Maputo.

waste management services: all the operators were members of the waste management association AMMEPS – Mozambican Association of Micro-Enterprise Service Providers – and some of the workers involved had prior experience of emptying faecal sludge in the bairros. Programme activities in this area focused on capacity development support to the operators in the form of technical assistance; provision of technical equipment; ongoing monitoring and evaluation of FSM operator performance; and technical capacity development related to use of the equipment and sludge removal practices. Following challenges in the planned construction of transfer stations (see 4.4.1), three of the eight primary operators also functioned as secondary operators managing the transfer of sludge, and were equipped with a mobile transfer station with a six cubic metre cistern tank.

4.3 Outcomes and impacts

4.3.1 Increased availability of improved quality desludging services in Nlhamankhulu district

This component of the programme encountered challenges (see Section 4.4), but nonetheless achieved some success in developing new FSM businesses to address desludging needs. Of the eight businesses developed, six are still operating, though with varying degrees of

profitability. Five operators participated in a focus group discussion for the evaluation: all reported that they were still in business, with four indicating that they "somewhat agreed" that "they had adequate customers to keep their business operational" and one indicating more customers are needed. Although transport challenges threaten the long-term viability of some of the businesses, 100% of the FSM operators themselves said they were "very confident" their businesses would be in operation in 2018[14].

A strong impact of this component has been a tangible increase in the availability of improved quality desludging services in Nlhamankulu district. The operators are reported to provide environmentally safe desludging and sludge transfer and disposal processes, particularly compared to informal or independent household desludging practices used in the bairros. While many households are still using informal services, the evaluation noted the programme "offers an alternative and provides a potential catalyst, if sustained, to bring about increased utilization of improved desludging services".

In terms of level of satisfaction with FSM services in the target areas, 80% indicated they were either "Happy" or "Very happy" (see Table 3 below). This data referred to all pit emptying services, not only JSDF-funded FSM operator services.

Table 3: Endline survey respondent level of satisfaction for last pit/tank emptying service overall.

Very Happy %	Happy %	Unhappy %	Very unhappy %
7.4	72.4	16.2	4.1

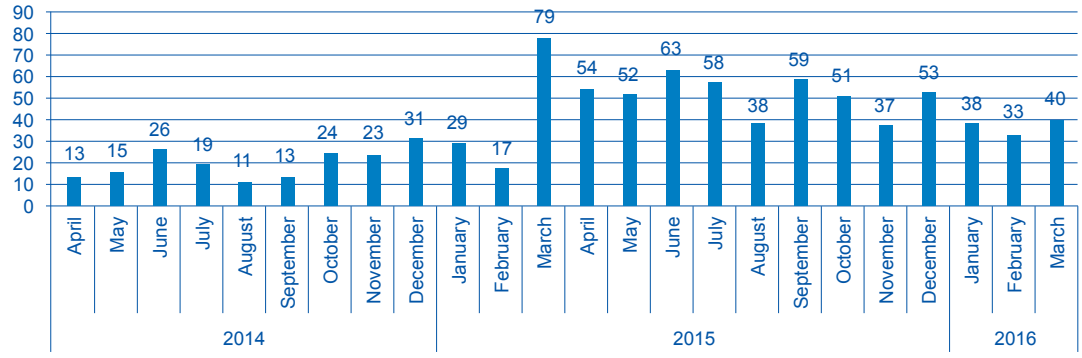
4.3.2 Stimulation of the market for FSM services

Programme data indicates there was a 40% increase in the number of emptying jobs completed in the target areas between 2014 and 2015 (see Figure 3), clearly implying the presence of a market for the FSM services that was stimulated by the programme. The majority of these services (73%) were for septic tanks; however, the data also indicated that more non-septic tank latrines were being desludged in 2015 and 2016 compared to the beginning of the programme.[15]

4.3.3 Technical capacity development of desludging operators

The programme was notably successful in equipping the FSM operators with the technical capacity to respond to given situations. During the evaluation process, all operators indicated they were very confident in their ability to operate the equipment provided to them, attributing this to training provided by WSUP. The operators knew how to repair the equipment provided; and how to find materials available to make necessary repairs to the equipment.

Figure 3: FSM services completed in target areas, April 2014 – March 2016.



FSM service (1 service = one household)
Total services = 876/Per Month, Average 2014 = 19.4, Average 2015 = 49.2, Average 2016 = 32
Overall average = 36.5

[14] Mattson, 2016.
[15] For more information on the market for FSM services in Maputo, see Hawkins and Muxímpua (2015).

4.4 Challenges and insights

This component responded to a real and urgent need for safe and reliable desludging services in the bairros. However, over the course of programme implementation it became clear this component had been ambitious in its goals - particularly when it came to original plans for building the faecal sludge transfer stations and developing viable businesses in the time span of only three years - and flexibility was required to introduce necessary modifications to the programme. Challenges were also posed by a significant and positive shift in levels of water supply and a resulting shift towards pour-flush toilets in Nlhamankulu District between programme design and implementation: WSP data indicated the prevalence of pour-flush latrines with septic tanks increased from 32% in 2011 to 64% in 2013. This rapid switch from pits to septic tanks meant that desludging operations had to remove greater volumes of a more watery sludge than was originally envisaged at programme design.[16] Programme activities in this area generated a number of insights to be kept in mind for future desludging programmes:

4.4.1 FSM infrastructure provision is critical but setbacks should be expected and planned for

A development which had consequences for the overall chain of sludge management was the annulment of programme plans to construct FSM transfer stations. Several factors contributed to this decision, including NIMBY ("Not in my back yard") syndrome: the planned construction of FSM transfer stations was a central part of the programme plan, due to the reduction in transport costs this would bring about, but was opposed by community members (WSUP had encountered similar resistance under a previous programme, which on that occasion culminated in vandalism of one facility while under construction).

In addition, calculations had indicated that because of the larger sludge volumes generated by the pour-flush facilities in Nlhamankulu District, these facilities would only reduce on costs if they were effectively treatment units;[17] while the relative proximity of the Nlhamankulu to the wastewater treatment plant at Infulene gave some desludging operators the misconception

Image: FSM operators, Nlhamankulu District, Maputo.

that it would be more cost-effective to dispose of sludge directly at the treatment plant.

Given the short timescales, the programme was forced to adapt quickly to these challenges by removing the transfer stations from the programme plan, procuring a mobile transfer station and creating primary and secondary FSM businesses. This contributed to operational challenges, requiring that primary operators rely on secondary operators to transfer their collected faecal sludge to the centralised treatment facility, and depriving operators of the opportunity to use discharge points near the peri-urban areas.

While a cost benefit analysis is required to draw firm conclusions, the programme evaluation argued that the provision of decentralised treatment units and/or transfer stations (as originally planned) would have enhanced accessibility and affordability of these facilities for primary collectors, which could in turn have reduced prices for the poorest households. This observation was validated by the primary operators themselves, who indicated that not having the means to transport the removed sludge was their biggest business constraint, as customers "give up on them because they can't wait until they [the FSM operators] have the capacity to respond". The Maputo Sanitation and Drainage Master Plan, approved by the Municipality in 2016, considers the construction of a network of faecal sludge transfer stations in Nlhamankulu District.

[16] Hawkins and Muxímpua (2015).
[17] Hawkins and Muxímpua (2015).

4.4.2 Multiple business model and regulatory reforms are required to enable services to reach the poorest households

A common challenge faced by WSUP in supporting desludging services is finding appropriate incentives to ensure businesses serve low-income households, as opposed to focusing on more profitable middle- or high-income customers (as noted, this was further complicated under the JSDF programme by the inability to construct decentralised transfer stations located near the bairros). The five FSM operators participating in focus group discussions estimated they only had emptied 73 to 86 traditional latrines among low-income households in the programme's target areas from 2015: if accurate this represents only approximately 15% of total services captured in programme reporting for that year. Of these services most were done by two of the businesses, with one doing none and two only doing three and five to six respectively. All key informants indicated that the programme would ideally have been more successful at creating businesses that meet the specific needs of low-income households. To do this a number of interrelated factors may have to be addressed:

Improved marketing and customer price information for formal FSM services

Incentives for FSM businesses to serve low-income areas will need to be accompanied by more effective marketing to further stimulate demand, coupled with an enhanced customer understanding of desludging costs for the range of latrine types and volume. The endline survey found that 57% (479 households) of respondents who had control over pit-emptying have never had their pit or tank emptied; when these respondents were asked when they expected their pit needed to be emptied the overall mean average was 23 months, with a range of 0 to 120 months, reinforcing that FSM services remain a relevant need in the programme target areas. However, close to half of respondents indicated they did not know how much they expect to pay for their next pit emptying service; with significant variance among the bairros ranging from 76% in Aeroporto B to a low of 40% in Chamanculo D and Malanga (see Table 4). Lack of awareness of desludging costs can be expected to contribute to failure to set aside savings for the investment. Historically this has been a significant issue in the bairros, with the vast majority of households (92%) in the endline survey reporting that they are not saving on a regular basis for future desludging services.

Table 4: percentage of respondents (N=277) who do not know what to expect to pay for next emptying.

Bairro (N)	Don't know
Aeroporto A (24)	41.7
Aeroporto B (21)	76.2
Chamanculo A (29)	55.2
Chamanculo B (34)	52.9
Chamanculo C (34)	67.6
Chamanculo D (30)	40.0
Mangala (20)	40.0
Minkadjuine (22)	59.1
Munhuana (18)	33.3
Unidade 7 (26)	65.4
Xipamanine (19)	47.4

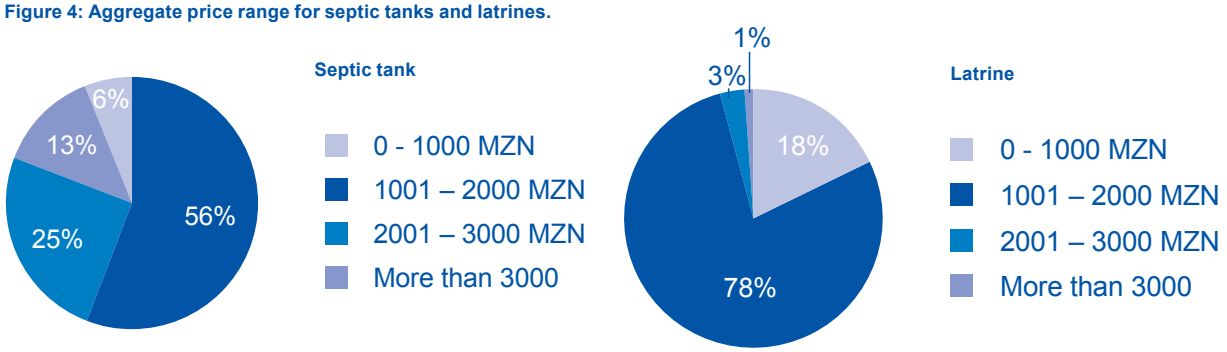
	Don't know
	46.2

Enhanced affordability of FSM services for low-income households

The estimated costs for desludging in the target areas range from approximately $30 to $60 for traditional/dry pit latrines and approximately $58 for 2,000 litre septic tanks (see Figure 4): the majority (78%) of those with a latrine and 56% with a septic tank were reported to pay between MZN 1,001 to 2,000 (US$ 18.40 to 36.81).[18] The endline survey did not ask whether respondents felt estimated costs were reasonable or affordable; however FSM operators and key informants indicated pricing is not affordable for most low-income households. To bring down the cost of service to make it more affordable to low-income households with traditional latrines, equipment modifications (to make them more efficient to remove faecal sludge from these latrines) and further subsidies will be required, emphasising the critical importance of enhanced financial flows under the planned sanitation tariff (see Section 6.2).

[18] Exchange rate: US$ 1: MZN 54.4, accurate to June 2016.

Figure 4: Aggregate price range for septic tanks and latrines.



Enhanced regulation of informal pit-emptying services

Ultimately a fundamental shift may be required to transform the market for FSM services in Maputo through improved regulation and enforcement of informal pit emptiers. These operators are currently reported to charge around MZN 800 for desludging a traditional pit latrine, significantly undercutting formal operators who transport waste to the centralised treatment plant. Faecal sludge removed by informal operators is typically disposed of in the vicinity of the emptied pit latrine, generating substantial public health risks which are compounded by high population density in the bairros. WSUP is currently working closely with CMM to promote the enforcement of sanctions against households and operators involved in these practices to create the conditions for formal FSM operators providing safe services to prosper (see Section 6.3): in a positive step forward, the Municipal Drainage and Sanitation Policy was signed into law in August 2017 and includes provision for such sanctions.

4.4.3 Business development support must be appropriately targeted; prior experience with FSM can be an advantage in the Maputo context

Key informants recognise the programme may have attempted to develop too many FSM businesses, even with a reduction to eight from the original proposed 11. Of the eight that started only six are in operation, with some of those to be being barely operational. It was also recognised that not all of the original businesses would be sustained, given typical new business failure rates overall. Averaging the total FSM services conducted over the two years (876) among the remaining six operators equates to an average of only 125 total services per operator, or an average of 5 per month and per operator. The evaluation concluded that while "the reported need for services appears to be high", there appears to be a "gap between the demand and how the demand is being met" (Mattson, 2016).

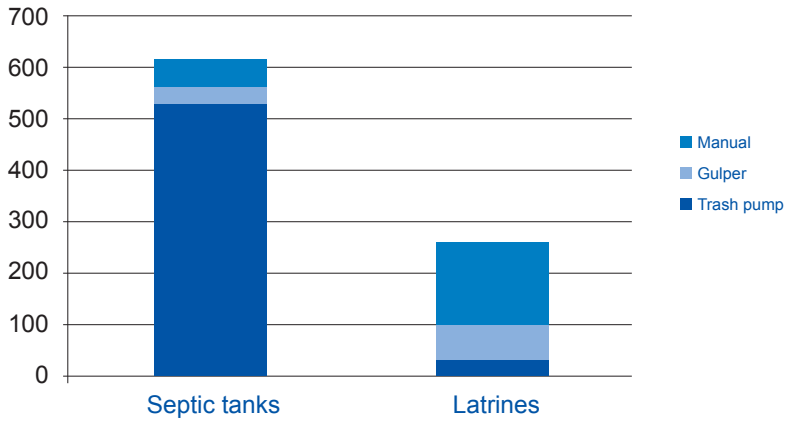
While there was limited information to assess the skills of the operators during the programme evaluation, it is significant that those FSM operators using workers from the communities with previous experience of manual desludging from traditional latrines were universally reported to be more successful than those with no previous experience. This was correlated both to their ability to remove faecal sludge from latrines as well as to their ability to market their services among the bairros.

Image: FSM business disposes of waste at the centralised treatment plant, Maputo.

4.4.4 Further toilet upgrade programmes are required to facilitate safe, affordable emptying

Providing emptying services to densely populated low-income areas requires specialised equipment. In the focus group discussions some of the FSM operators reported that the Gulper and trash pumps were not effective or efficient at removing waste from traditional dry pits in densely populated areas. Programme data also indicates varying degrees of equipment usage by the FSM operators, with the Gulpers reported to be used much less frequently than the trash pump (see Figure 5 below).

Figure 5: FSM desludging method by septic tank versus latrines (WSP).



In WSUP's view, technical solutions are required that can desludge without needing to break into a pit (i.e. trash pumps or Gulpers). The focus group observations around the challenges of emptying dry pits reflect the need to continue promoting pour-flush latrines in the bairros, to reduce the risk of households using water in dry solutions and contributing to flooding; and to facilitate ease of emptying using Gulpers or trash pumps which in turn will help to bring down costs. Another supporting measure would be to implement urban planning measures that promote open streets with lower population density, allowing FSM operators to bring equipment close to households.

5. Community-level sanitation and hygiene promotion and monitoring

5.1 Rationale

Component 3 of the JSDF programme aimed to develop and support community-level sanitation and hygiene promotion and monitoring activities through the involvement of all local authorities at the bairro level. The rationale was to provide continued downward pressure on community members to maintain adequate sanitation standards; and upward pressure on local authorities to provide the necessary complementary inputs. In addition, the component had a strong capacity development focus that aimed to equip relevant levels of municipal government with the tools, knowledge and skills to sustain improved monitoring of sanitation and hygiene in the bairros beyond the lifespan of the programme.

5.2 Approach

The programme delivered workshops with stakeholders and institutions to build capacity and establish monitoring systems, followed by surveys conducted two months apart in June and August 2015 by Sanitation Activists hired by WSUP and Block Leaders. The completed surveys encompassed the majority of residents across the 11 bairros: the sample size for each survey exceeded 24,000 households and 135,000 residents, against a 2007 Census population of 31,000 households and 155,000 residents. As noted in the programme evaluation, this appears to have been “among the first attempts to survey all households in the district at the same time by local leaders specific to water and sanitation conditions in the 11 bairros”. CMM were closely involved in the development and implementation of monitoring surveys and associated processes, although this led to delays resulting in modifications to the original plan to conduct four surveys over the course of the programme (see Section 5.4.2).

Image: Focus group discussion conducted as part of the programme evaluation, Nlhamankulu District, Maputo.

Sanitation promotion activities focused on encouraging households to improve the type of sanitation facilities they use (see Section 3), and specifically to move from latrines that pose environmental hazards to improved sanitation facilities. This was the primary focus of community-level activities under the programme, over and above hygiene promotion activities, which were undertaken by local CBOs and CMM extension workers with monitoring and follow-up by the grass-roots CMM structures.

5.3 Outcomes and impacts

5.3.1 Enhanced availability of data on the sanitation conditions in Nlhamankulu District for application by municipal government

The implementation of the two surveys has resulted in the availability of information about the water and sanitation conditions and hygiene practices in Nlhamankulu District that was not previously available, achieving the overall aim of the survey process. All of the municipal-level key informants interviewed as part of the evaluation - Block Leaders, CMM, the Municipal Councillor, and the District Infrastructure Administrator - indicated that the data collected is useful both for understanding current conditions and as a resource for future planning efforts. Significantly, the data was reported to have already been used

to inform the development of draft proposed municipal sanitation policies and plans. Block Leaders and Bairro Chiefs also stated that the survey increased their personal awareness of the conditions in their own areas of responsibility, and provided them with an avenue to follow-up on individual household sanitation conditions that were identified in the surveys. A majority of key informants felt that CMM had the capacity to oversee the implementation of future surveys and even the ability to replicate in other areas. The District Infrastructure Administrator expressed particular interest in seeing the process replicated in other bairros; while CMM staff mentioned that Block Leaders are now able to identify "positive and negative" latrines, which has reportedly contributed to competition between block leaders specific to improved sanitation facilities in their respective blocks.

In focus group discussions with Block Leaders and Water and Sanitation Committee members, participants thought the monitoring survey was particularly effective at increasing their awareness of the sanitation conditions in their blocks. CMM's official support for the survey was perceived to lend important legitimacy, and was influential in convincing otherwise reluctant households to allow enumerators to inspect their latrines. The same respondents perceived that the monitoring led to some households taking immediate action to improve their latrines as someone was "looking at their latrines" and would be coming back to "check on them". They also reported that some households did not understand prior to the survey that their latrine was a public health or environmental health problem; and that their own knowledge about the risks of poor sanitation improved greatly as a result of the training they received through the programme.

5.3.2 Enhanced knowledge of the link between handwashing and health, but yet to fully translate into behaviour change

The majority of Sanitation Activists and Block Leaders indicated that the programme was effective at increasing residents' knowledge of the link between handwashing with soap (HWWS) and health (Figure 6). However, the same respondents felt that the programme had less of an impact on actually changing people's HWWS behaviour (Figure 7). When explored further, participants felt that they had effectively informed residents of the link between HWWS and health and its importance, and they had retained this knowledge; however they did not feel that passing on this knowledge was sufficient to change the behaviour. This insight corresponds to WSUP's wider experience that achieving long-term, sustainable behaviour change can be extremely challenging and that messages need to be continually reinforced (see 5.4.1).

Figure 6: Effectiveness of programme at increasing residents' knowledge between handwashing and health, rated by Sanitation Activists (SAN), Block Leaders and Water and Sanitation Committee members (BL/WC).

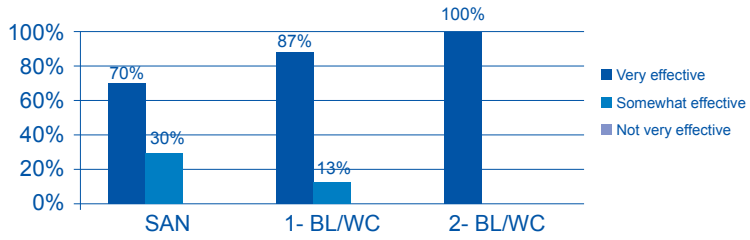
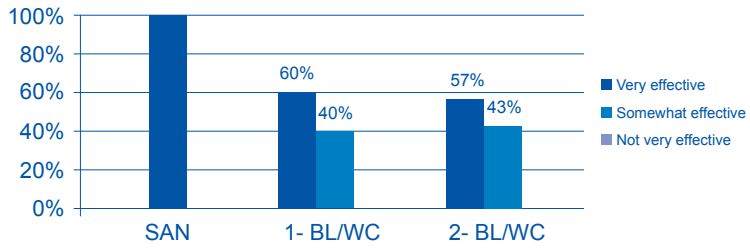


Figure 7: Effectiveness of programme at changing people's HWWS behaviour, rated by Sanitation Activists (SAN), Block Leaders and Water and Sanitation Committee members (BL/WC).



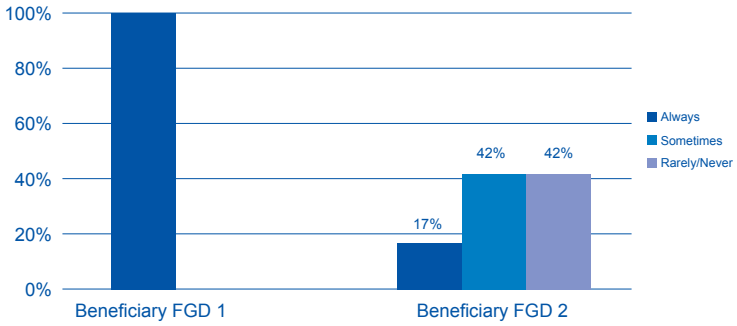
Notwithstanding the positive perceptions of community stakeholders, endline survey results were not encouraging with respect to knowledge of the need to wash hands after defecation. Only 31% of respondents identified this as a critical time for handwashing, by comparison with washing at mealtimes, which was identified by nearly 90% of respondents (Table 5).

Table 5: Times when hands should be washed as identified by endline survey respondents (N = 1104).

Time	Percent identified
Meal (b)	87.8
Meal (a)	33.7
Defecation (a)	31.0
Feeding baby/child (b)	4.3
Using toilet (a)	84.6
Cleaning baby/child faeces (a)	6.4
Prayer (b)	0.4
Upon waking	6.1
Touching animals (a)	0.5

(a) = after, (b) = before

Figure 8: Availability of soap at latrines used by focus group discussion (FGD) participants.



5.4 Challenges and insights

5.4.1 Reinforcement of behaviour change messaging is required to promote availability of soap at hand washing facilities

While access to soap was not identified to be a problem in the bairros, having it available at or near the latrine to support hand washing at critical times was identified in the programme evaluation as an "enabling environment barrier". The sanitation activists indicated that it was rare to see soap at household latrines when they were conducting their monitoring surveys; and observation of some of the Communal Sanitation Blocks and shared latrines found similar results, with some having soap available and others not, as well as soap placed out of the reach of children. In household surveys, over 50% of respondents showed a place that did not include soap. There was considerable variability in the responses or respondents who showed places that had soap, from a high of 64% in Minkadjuine to a low of 28% in Chamanculo D. Figure 8 also reflects significant variance in this area, this time for self-reported availability of soap at latrines. While access to clean water remains a significant barrier for some households, the vast majority of survey respondents indicated they had access to water enable handwashing with soap "not always, but mostly" (50%) or "always" (46%).

In the context of the programmatic challenges encountered, these results are perhaps not surprising. Research in hygiene promotion has established that for behaviour change to occur, messages need to be reinforced over time, and are often more effective when combined with other programmatic activities. In the JSDF programme, the primary emphasis was providing knowledge to households about the need for improved sanitation. The forced reduction in the number of survey cycles under the programme (caused by delays resulting from CMM's high level of involvement and municipal and national elections – see 5.4.2) was acknowledged by implementing partners to impact significantly on the potential to bring about actual hygiene behaviour change during the lifespan of the programme. WSUP acknowledges the importance of reinforcing hygiene messages and promotes this in Maputo through repeat cycles of behaviour change activities in primary schools and their surrounding communities in the bairros.

5.4.2 Embedding monitoring processes within local government structures requires flexible programme timelines and sustained technical support

The initial aims for this component were compromised by the downscaling from four to two surveys, ultimately conducted only a month apart, two years into the programme. The delays were a result of securing full CMM involvement in the development and implementation of the survey and associated processes, which left the programme vulnerable to external political events, notably municipal elections in November 2013 and national elections in October 2014 which required the engagement of local leaders. In April 2014, following WSUP's submittal of a

complete description of the programme, CMM agreed to participate and lead the process; however as a result of the elections, kick-off for the process where CMM informed the community partners about the survey did not occur until February 2015. In WSUP's view, the high level of buy-in from CMM to the survey process – and CMM's apparent commitment to replicating the process in other districts of Maputo – justifies the time taken to embed the survey process with local stakeholders and place the programme on a more sustainable footing. However, it is also an illustration of the reality that urban WASH programmes involving local government partners require flexibility of approach.

Notwithstanding the significant progress made, challenges remain in ensuring the monitoring survey is replicated without WSUP or other outside support, and we are potentially yet to reach that point. Most key informants interviewed as part of the evaluation felt that CMM had the capacity to oversee the implementation of future surveys, and even the ability to replicate in other areas. However, a number of potential challenges were identified relating to replication by Block Leaders, including low literacy levels among some Block Leaders which inhibited their ability to conduct some of the surveys, and reports that some Block Leaders felt they should be compensated to do the surveys in the future. In discussions with Block Leaders, none brought up personal compensation for future survey work; they did state however that they would need resources to pay for materials and supplies as well as support to do the analysis. The evaluation concludes that "more technical assistance and support would be needed, at least in the short term, to replicate the same survey in the 11 bairros with potentially additional support for new areas".

Image: Training workshop for Communal Sanitation Block Management Committee, Nlhamankulu District, Maputo.

6. Opportunities and next steps

WSUP has an established, long-term presence in Maputo and is committed to continuing its partnership with CMM to improve sanitation services in low-income areas. The JSDF programme has clarified a number of opportunities and potential next steps to capitalise on the improvements already made in Nlhamankulu District by strengthening citywide service provision, detailed below.

6.1 CMM-led replication and scale-up of the model for shared latrines and Communal Sanitation Blocks

While WSUP will always advocate for the provision of individual household toilets where feasible, experience under the JSDF programme further demonstrated the viability of Communal Sanitation Blocks and shared latrines as sanitation solutions appropriate to the densely populated low-income areas of Maputo. The implementation model for these facilities – key features of which include the engagement of local leaders in the identification of needs, assistance from local community-based organizations (CBO), household and municipal contributions to capital costs, communal responsibility for ongoing operation and maintenance, and use of formal contracts in the construction of facilities - provides a replicable model that can be implemented by CMM using available public procurement processes. The model has now been tested and proven in multiple programmatic contexts.

Two outcomes from the JSDF programme bode particularly well for future replication and scale-up. First, the impact of demonstrating high-quality latrines in catalysing household sanitation investment became ever more pronounced in the target areas as the programme advanced: households were willing to invest in high-quality latrines once they saw what their money would buy. Second, the programme evaluation noted the impact of the sanitation infrastructure models in consolidating an attitudinal shift among municipal staff, who have

Image: Household in Nlhamankulu District, Maputo.

strengthened their understanding of available latrine options and become “advocates for change”. By stimulating both household and municipal engagement with improved sanitation, the programme has laid the groundwork to increase demand for improved latrines among low-income households, and provided evidence of growing support by the government, which has indicated a strong interest in making long-term investments in sanitation conditions among poor households in both the targeted bairros and beyond Nlhamankulu District.

6.2 Implementation of the planned sanitation tariff

The programme has highlighted the need for enhanced public or municipal investment to ensure sanitation services reach the poorest households. While the programme succeeded in establishing FSM operators with the skills and (to varying degrees) the equipment to meet the needs of households in densely populated areas willing and able to pay the cost per service, it is evident that ongoing subsidies, cross-subsidies and/or incentives for serving the poor are imperative, at least in the short to medium term. In the long term, a gradual progression towards public sewer systems is a possibility now being discussed under the Maputo Sanitation Masterplan, discussions which the evaluation noted JSDF programme activities had

"significantly influenced". Also under discussion are interim solutions whereby major primary wastewater pipes are extended to the periphery of the bairros, with progressive extension of secondary pipe connections with the involvement of the communities. However, such plans will not be realised for a long time, if at all; the JSDF programme testified to the continued urgent need for improved FSM delivery models in the bairros for which improved sanitation infrastructure is an essential step - most notably decentralised transfer stations, which could not be implemented as planned under the programme.

The implementation of the planned sanitation tariff would go some way towards addressing the financing gap. WSUP has been working closely with the CMM and the regulator CRA over a period of years to pave the way for the tariff to be introduced. Support in this area has included a detailed financial analysis to help CRA set the tariff at a level that is equitable, politically acceptable and high enough to generate sufficient revenues for CMM (the executing agency) to implement large-scale service improvements; support in developing the regulatory framework, including the definition of eligible services; and support to CRA in developing the Key Performance Indicators (KPIs) which CMM will report against.

The tariff would take the form of a surcharge on water bills. Discussions are ongoing between CMM and the asset holder FIPAG to develop a MoU that will facilitate the application of the surcharge to water bills produced by the water utility, AdeM. The tariff has been approved by the municipality and is now awaiting publication in the National Journal of Laws; as such, the tariff is no longer a theoretical possibility, but a very real prospect with the potential to significantly impact the urban sanitation sector in Maputo.

6.3 Enhanced regulation of informal pit-emptying services

WSUP is currently working with CMM to develop an enhanced model for FSM services to be funded by the sanitation tariff. Under the model, CMM will own primary equipment including vacuum tankers, which will be operated by private FSM operators through performance-based contracts. Critically, the model would incentivise these operators to serve low-income households, by only authorising them to work in specific (predominantly low-income) districts. These measures will need to be accompanied by improved regulation and enforcement relating to informal pit-emptying services, to change behaviours, prevent price undercutting of formal FSM operators and curtail environmentally harmful waste disposal practices. The municipal policy is clear that CMM has responsibility for enforcement against informal operators, but this must be preceded by the development of replacement services to prevent a total gap in FSM service provision in the bairros.

6.4 Reinforcement, replication and scale-up of community-led sanitation and hygiene promotion

A key contribution of the programme has been increased capacity and engagement in sanitation from leaders at all levels of the municipal government. A prominent example cited in the programme evaluation is the experience of David Câ ngua, CMM Administrator with no previous knowledge of WSUP work and limited knowledge of the district needs in terms of sanitation. Through the course of programme implementation, sustained engagement with WSUP was cited as transforming Mr Câ ngua into a champion for sanitation in the District, with a clear vision of local needs and understanding of available solutions to increase levels of service.

This understanding was enhanced by the programme's attempt to embed monitoring processes within local government structures, including the tools and skills to manage large-scale household surveys to assess and promote sanitation standards and hygiene practices. CMM has seen the value of enhanced availability of data on sanitation conditions in the bairros and is positioned to replicate the approach with targeted support. The programme has also affirmed the importance of sustaining sanitation and hygiene promotion activities in Nlhamankulu District over time – relating to both ongoing maintenance and cleanliness of shared and communal toilets, and to hand washing with soap - to ensure improved knowledge translates into actual behaviour change.

References

AIAS (2015) Sanitation and Drainage Master Plan for the Greater Maputo Metropolitan Area.

Fonseca, A.M, et al (2014) Intestinal parasites in children hospitalized at the Central Hospital in Maputo, Mozambique. The Journal of Infection in Developing Countries. 8 (6): 786-789.

Hawkins, P, Muxímpua, O (2015) Developing business models for fecal sludge management in Maputo. Water and Sanitation Program, World Bank Group.

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

National Institute of Statistics (2016) Statistical Yearbook 2016 – Mozambique.

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 Manhiça. The American Journal of Tropical Medicine and Hygiene. 89 (1): 41-48.

WSUP (2014) A gender-inclusive approach in practice: communal sanitation.

WSUP (2017) Balancing financial viability and user affordability: an assessment of six WASH service delivery models.

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