

10 Key messages about WASH costs and service levels in Mozambique





To access documents from WASHCost go to <http://www.washcost.info/page/147>

For questions about documents or information from WASHCost Mozambique, please contact Julia Zita at the National Directorate of Water (DNA) in Maputo
email: julia.washcost@gmail.com
Links in this document are interactive. Click to access.



Contents

Foreword	4
Key finding 1	Families carry the main cost of sanitation	6
Key finding 2	Only 1 in 14 of the rural population achieves adequate sanitation	8
Key finding 3	Emptying pit latrines in peri-urban areas is a challenge for the near future	10
Key finding 4	Only 1 person in 20 in rural Mozambique receives an basic adequate water service.....	12
Key finding 5	Borehole construction costs stabilised in 2012	14
Key finding 6	Piped water services cost almost 8 times more than services based on boreholes and handpumps	16
Key finding 7	Capital maintenance is essential for boreholes —and they are worth it	18
Key finding 8	Supporting communities to maintain WASH services costs just over US\$ 1 per person per annum	20
Key finding 9	The very poor have the lowest service levels	22
Key finding 10	Expenditure on annual recurrent costs needs to double.....	24

All data in this document produced by WASHCost Mozambique or WASHCost internationally.
Photos by WASHCost Mozambique except for Jeske Verhoeven (Page 2) and Peter McIntyre (Pages 4 and 27).
This document was produced for WASHCost Mozambique by Peter McIntyre.

Foreword



André Uandela,
Country Director
WASHCost Mozambique

Between 2008 and 2012 the WASHCost project collected and analysed the costs of providing services for drinking water, sanitation and the promotion of hygiene in rural and peri-urban area in four countries: Burkina Faso, India (Andhra Pradesh), Ghana and Mozambique.

WASHCost Mozambique, in collaboration with The National Directorate of Water (DNA) and the National Information System for Water and Sanitation (SINAS), has published information on contract costs, expenditure and service levels at central, provincial, district and community level, and shared publications with partners in the WASH sector and governmental partners working in planning and finance.

This publication summarises in bullet points some of the main messages that have emerged from this innovative project. One of the insights has been the need to link expenditure to the (low) service levels that exist today in rural and peri-urban areas. This evidence base can guide those who bring WASH services to communities. Enabling the sector to face up to the realities of service delivery by monitoring service levels and costs is a first step towards improvement.

The data presented here highlights the need to cover annual recurrent costs such as the cost of maintaining assets so they continue to function (capital maintenance) and to support communities and service providers (direct support). These cost categories are critical to understanding the challenges of financing the total cost of WASH services.

Mozambique is a poor country and comparative data with other WASHCost countries makes its achievements look modest. However, it is not where you start from, but where you are going that counts. The project has worked closely with the National Directorate of Water and it is evident that their commitment and increased understanding is already changing the figures.

The project has come to a close, but the ideas and approaches have been introduced into the sector and are being further embedded by training professionals working in the sector. The aim is sustainable services in every district in the country. Please use this data as a motivator and a baseline for the future, and continue to collect and analyse data that will help the water, sanitation and hygiene (WASH) sector to transform the lives of people.

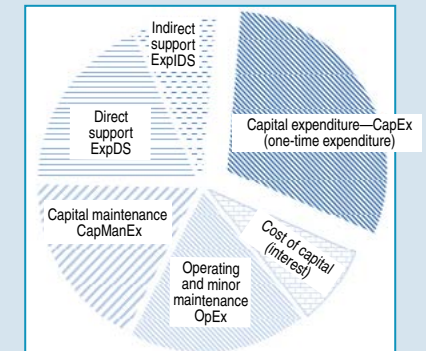
In this document you will not only find summaries of some of the key findings but also links to longer documents that explain the issues and findings in greater detail. These are part of the WASHCost legacy and we hope that you will be able to use and learn from these resources.

André Uandela,

*Country Director,
WASHCost Mozambique*

December 2012

Figure 1
WASHCost pie chart of costs that need to be covered when budgeting



Key finding 1

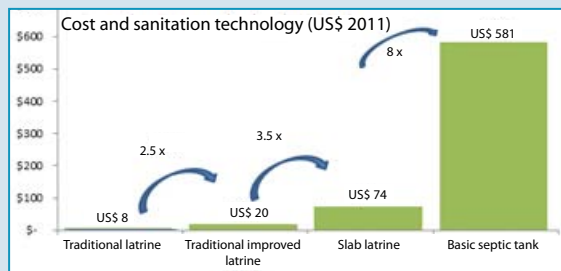
Families carry the main cost of sanitation

Headlines

The cost of sanitation falls largely on the family in Mozambique. Three-quarters of latrines in rural areas are built and maintained by the family using local materials. Where payment was made, the typical capital costs spent on building latrines were as follows (rounded):

- ❑ 230 meticaís (MT) (US\$ 8) for a traditional latrine
 - ❑ 600 MT (US\$ 20) for an improved latrine with a non-cement slab
 - ❑ 2,150 MT (US\$ 74) for an improved latrine with a cement slab
 - ❑ 16,900 MT (US\$ 580) for an improved latrine with a septic tank
- Each step up the sanitation ladder from a traditional latrine to an improved traditional latrine to a latrine with a cement slab requires at least a two and half times expenditure increase. A latrine with a septic tank requires another eight times higher capital costs (but is rarely found in rural areas).
 - Latrines in more densely populated peri-urban areas are two to three times more expensive than their rural equivalents.

Figure 2: The cost of improved sanitation technology



Behind the headlines

WASHCost compared costs and service levels between countries. Capital costs in Mozambique are mid-range when compared with the benchmark figures (Table 1) based on data about latrines that meet basic service standards in the four WASHCost research countries. These benchmarks represent the least and most that is needed to provide sanitation that meets the basic level of service. If costs are below the lower figure, the service level may not be met or may not be sustainable. If costs are above the upper limit, they may not be affordable.



Table 1 Benchmark figures for capital costs of sanitation

Cost component	Latrine type in area of intervention	Cost ranges [min-max] US\$ 2011
Total capital expenditure (per latrine)	Traditional pit latrine with an impermeable slab (often made from local materials)	7-26
	Pit latrine with a concrete impermeable slab, or VIP type latrine with concrete superstructure, ventilation pipe and screen to reduce odours and flies	36-358
	Pour-flush or septic-tank latrine, often with a concrete or brick-lined pit/ tank with sealed impermeable slab, including a flushable pan	92-358

Sources: S-01 (Rural)-S-03 (Peri-urban), Briefing note 3 – Applying the life-cycle costs approach to sanitation

Key finding 2

Only 1 in 14 of the rural population has access to adequate sanitation

The WASHCost sanitation service ladder shows what is needed to meet an adequate, basic level of service, based on national and international standards. Meeting standards for accessibility, use, reliability and environmental protection is a challenge, particularly in remote areas with a tradition of open defecation. In rural Mozambique, access to sanitation is very low – but where toilets exist they are used and looked after. This provides a basis on which to build.

Headlines

- **Accessibility:** 7% of the rural population (1 in 14) and 38% of the peri-urban population (1 in 3) have access to a level of sanitation that meets national and international norms.
- **Use:** Almost all (99%) toilets are in use, but not by everybody in the family and not all the time.
- **Reliability:** Of those few with toilets that meet the standard, at least half (57%) have a reliable service. There is evidence of care being taken to clean the toilet.
- **Environmental protection:** Sanitation services researched by WASHCost did not pose a threat to water sources or the environment. This will become an increasing challenge in areas with a growing population, in particular near the coast.



Behind the headlines

Table 2 WASHCost sanitation service ladder, showing criteria for each level of service

	Accessibility	Use	Reliability (Operation and maintenance—O&M)	Environmental protection
Improved service	Each family compound has one or more toilets with easy access	Used by all household members	Regular or routine O&M (including pit emptying) requiring minimal effort. Care and cleaning of toilet	No problematic environmental impact. Safe disposal & re-use
Basic service	Cement or impermeable slab latrine per household or shared. National norm distance from household	Used by some household members	Unreliable O&M (including pit emptying) requiring high level of user effort. Evidence of care and cleaning of toilet	No problematic environmental impact. Safe disposal
Limited service	Platform (no impermeable slab) separating faeces from users	No or insufficient use	No O&M (e.g., pit emptying) taking place and the presence of extremely dirty toilets	Significant environmental pollution, increasing with population density
No service	No separation between user and faeces, e.g., open defecation			

A basic service, as shown in Table 2, requires a toilet (with impermeable slab) at or close to home, used by some or all family members. There should be evidence of care and cleaning and safe disposal of sludge. Sanitation does not cause environmental problems or pollute water sources. In Mozambique, few families have toilets that meet these standards but, where latrines exist, they are used. Only 11% of households who had a toilet with an impermeable slab failed to achieve the basic service level (through poor use/dirty, reliability problems or causing pollution). The other 89% provided at least a basic acceptable service. Expanding the number of families with such latrines would raise the overall numbers with an acceptable service from current very low levels.

Sources: SO2: Níveis do serviço do saneamento
Working Paper 3: Assessing sanitation service levels

Key finding 3

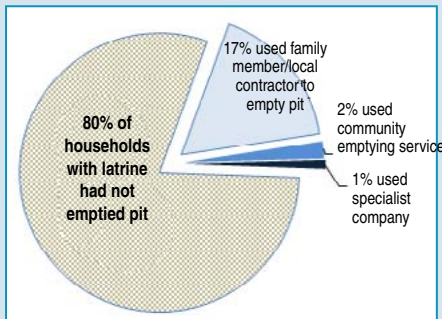
Emptying pit latrines in peri-urban areas is a challenge for the near future

WASHCost research in peri-urban areas shows that only 20% of households had emptied their latrines, and only 3% had used a contractor who could ensure that sludge was disposed of safely.

Headlines

- Only one in five (20%) of peri-urban families with a latrine has emptied it.
- Many latrines are new and don't need emptying yet – however, emptying is a challenge for the near future.
- Pit emptying – when done – is usually by family or community members.
- Where there is payment for this informal service, the average cost is 350 MT (US\$ 12).
- Of those who emptied a latrine, only 15% (3% of all latrine owners) found a safe method of disposing of sludge.
- 1 in 10 households who emptied their pit (2% of all latrine owners) used a good community service, at an average cost of 1,325 MT (US\$ 44).
- 1 in 20 of those who emptied their pits used a specialist company, at an average cost of 2,750 MT (US\$ 92).
- The cost of ensuring that a latrine continues to provide a basic service for 20 years can be 5-20 times the cost of building it in the first place.

Figure 3 Pit emptying in peri-urban areas of Mozambique



Based on WASCost Mozambique data and WASHCost Infosheet 2: The cost of sustaining sanitation services



Behind the headlines

Building a latrine is only a first step towards effective sanitation. The latrine must be used, kept clean, maintained and emptied if families and communities are to benefit long-term.

These incur recurrent costs. Keeping the latrine clean and maintained is “operational and minor maintenance”. Emptying the pit, safe disposal of sludge and major repairs are “capital maintenance”. These must be financed each year with the cost of support to communities.

Table 3 Benchmark figures for recurrent costs of sanitation

Breakdown of recurrent expenditure	Cost ranges [min-max] in US\$ 2011 per person, per year		
	Traditional pit	VIP type latrine	Pour-flush or septic-tank latrine
Operational and minor maintenance expenditure	0.5-1	1-4	1-4
Capital maintenance expenditure	0.5-1.5	1-3	2-6
Expenditure on direct support	0.5-1.5	0.5-1.5	0.5-1.5
Total	1.5-4	2.5-8.5	3.5-11.5

Benchmark figures are based on from all research countries, relating to latrines that met standards for a basic level of service. If spending is below this level, services are unlikely to be sustained in the long term.

Key finding 4

Only 1 in 20 of the rural population receives an adequate basic water service

The WASHCost ‘water service ladder’ shows the requirements to meet an adequate, basic level of service for drinking water, based on national and international standards. Meeting the standards for quantity, quality, accessibility and reliability is a challenge, particularly in remote areas where there are traditional informal water sources and a dispersed population. The headline figures show extremely low numbers achieving the basic service level in rural and peri-urban Mozambique, mainly due to people not accessing 20 litres of water per capita from an improved source each day. Almost half the rural and peri-urban population receive a service which is “sub-standard” rather than “no service”. There is a basis on which to build.

Headlines

- In rural and peri-urban areas, only one user in 20 (5%) received a basic level of service.
- Rural water services are underfunded to provide and sustain a basic level water service that meets national norms and standards, in particular with regards to water quantity.
- The requirement for water points to be checked for water quality is also often missed.
- 45% of people received a sub-standard service (between 5-20 litres per person per day) or water from sources that have not been adequately tested.
- 46% were classed as having “no service”. This does not mean that people have no water, but the water is of such low quality (e.g., from traditional sources) that it cannot be characterised as a service.
- System breakdowns and lack of capital maintenance to protect services is a big issue.

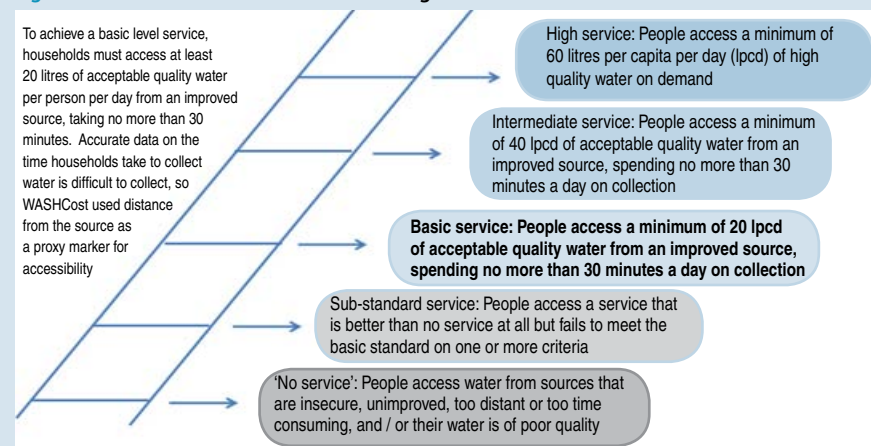
Sources: WASHCost Working Paper 8: The recurrent expenditure gap: Failing to meet and sustain basic water services
WASHCost Working Paper 2 - Ladders for assessing and costing water service delivery



Behind the headlines

Most communities where WASHCost did its research have at least one safe water source and are considered (partly) covered according to national data. However, most people did not receive a minimum level of service. This is not unique to Mozambique; in none of the four countries where service levels were analysed did a majority of people achieve a basic level of service.

Figure 4 The WASHCost water ladder showing the criteria for each level



Key finding 5

Borehole construction costs stabilised in 2012

Headlines

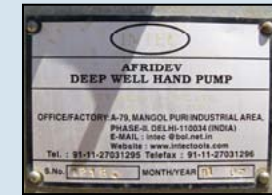
- The average cost of providing a borehole with a handpump in 2012 in Mozambique is US\$ 11,000 (320,000 MT).
- Data collected from contract prices for drilling and installing boreholes with handpumps gives local government and donors a clearer idea of capital costs.
- The costs of drilling boreholes and constructing wells and pumps vary across the country. In the most expensive Province, Gaza, prices are more than 2.5 times higher than in the lowest cost Province, Niassa.
- Overall prices rose sharply between 2010 and 2011 but fell back 12 percentage points in 2012. These trends were consistent across the country.



Table 4 Cost of boreholes with handpumps 2009 to 2012

Year	Current costs (MT 2011)	% of 2011 costs	Current cost (US\$ 2011)
2009	304,000	83 %	\$ 10,500
2010	311,000	85%	\$ 10,700
2011	364,000	100%	\$ 12,550
2012	320,000	88%	\$ 11,050

Table 4 shows the average cost of drilling a borehole and fitting it with a handpump. Costs rose between 2009 and 2011, but fell back in 2012. Figures rounded to nearest 1,000 MT and nearest US\$ 50. Comparisons use 2011 as the reference year.
Sources: Publications C04, C06A

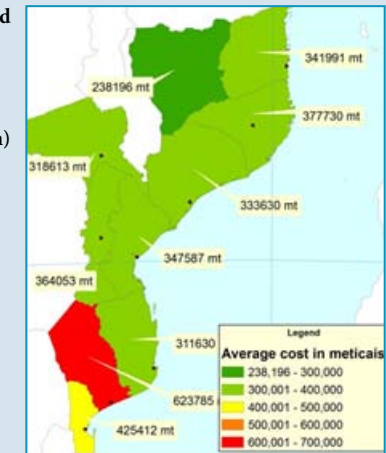


Behind the headlines

Provincial partners provided information for more than 130 contracts, representing in excess of 3,500 boreholes. Information was shared and analysed around planning meetings and resulted in regular, transparent and detailed information twice a year. This key output for the sector will continue to be published by SINAS (National Information System for Water and Sanitation) and the National Directorate for Water (DNA).

Cost variations between provinces triggered a debate. Contractors are paid only for successful boreholes that provide water, leading to higher costs in problematic zones like Gaza. Excluding Gaza and Niassa, costs are more or less even across the country, between 311,000 and 380,000 MT (US\$ 10,400 and US\$ 12,600) in 2011. The capital investment per person varies from 820 MT (US\$ 29) to 1,378 meticaís (US\$ 48).

Figure 5 Average borehole construction costs per province, 2011



Key finding 6

Piped water services cost almost eight times more than services based on boreholes and handpumps

Headlines

Piped systems in Mozambique

- Capital expenditure (CapEx) on intermediate piped schemes was US\$ 193 per person – while the capital cost of a single large scheme was US\$ 85 per person. This suggests that economies of scale are important for piped systems.
- There is considerable difference between schemes: the capital costs of nine intermediate schemes¹ varied from US\$ 30 per person to US\$ 380 per person.
- In addition to hardware costs, the capital software² costs of planning and preparation also need to be considered: the mean capital expenditure software was US\$ 8 per user for intermediate schemes (4% of hardware expenditure) compared to US\$ 2 per user for the larger scheme (2% of hardware expenditure).

Comparing piped systems with boreholes

- Significant expenditure would be required to move away from boreholes and handpumps. Costs per person for intermediate piped schemes are nearly eight times higher (US\$ 261) versus US\$ 33 for a borehole and handpump.
- Basic maintenance has a positive effect on reliability. The most reliable boreholes were those where US\$ 5-100 is spent maintaining the boreholes every year. Reliability was most problematic for systems where expenditure is very low (<US\$ 5).
- Some schemes demand high levels of expenditure yet fail regularly. This explains the association between lack of reliability and high (>US\$ 100) annual maintenance costs.

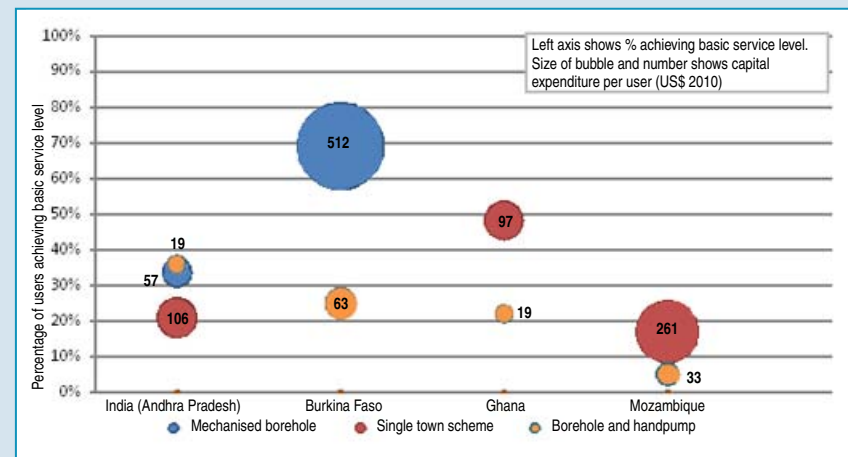
1. An intermediate service area is one with 5,000-15,000 inhabitants. Large service areas have more than 15,000 inhabitants.
 2. Capital software is one-off work with stakeholders prior to construction or implementation, extension, enhancement and augmentation (including one-off capacity building).

Behind the headlines

How is Mozambique doing in an international context?

As shown in Figure 6, in all countries, boreholes serve less than 40% of their population with basic services. Although piped schemes generally provided a higher level of service, this was not always the case. In India, single village piped schemes are even less efficient than the borehole schemes with only 20% of the target population receiving basic services. More sophisticated technology does not automatically improve service levels. Relative to the other countries, Mozambique has expensive piped systems that still struggle to provide basic services. Nevertheless, no piped systems have reached 50% service coverage in any of the four WASHCost research countries.

Figure 6: Percentage of users receiving a basic service level with capital expenditure per user (US\$ 2010)



Source: WASHCost Working Paper 8

Key finding 7

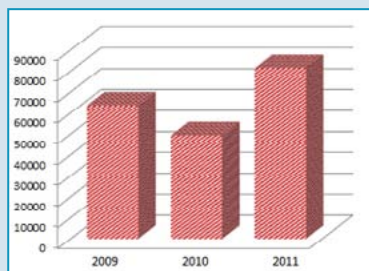
Capital maintenance is essential for boreholes

— and they are worth it!

Headlines

- Investment is being provided in Mozambique for capital maintenance (CapManEx) to restore boreholes and keep services running.
- However, boreholes are currently rehabilitated on an ad-hoc basis and only when not working for a long period. Preventive maintenance is in its infancy.
- Funds are currently too low to ensure that investment in water points is protected and services are sustained. Assets need continuing investment to remain functional.
- Rehabilitated boreholes are just seven years old on average — the need for rehabilitation can occur much sooner than the theoretical life span of 20 years.
- Only 3.6% of boreholes are rehabilitated each year; at this rate, the average borehole will wait 27 years for rehabilitation.
- The cost of rehabilitating a borehole and handpump is about 16% of the cost of a providing a new one, but this investment is worth it. Even if three major repairs are required over 20 years, that still saves half the cost of a new borehole with handpump.
- Focusing on rehabilitation in planning and budgeting would strengthen the ability to sustain existing services.

Figure 7: Cost of rehabilitation contracts 2009-2011



In 2011, 280 boreholes were rehabilitated in six provinces at an average cost of almost 80,000 MT (US\$ 2,800) each. This was 22% higher than in 2009 and 39% higher than in 2010. This was mainly due to installation of deep pumps in 2011 and the high inflation rate of 14.5% in that year.

Behind the headlines

WASHCost, in collaboration with the National Information System for Water and Sanitation SINAS, has been collecting information on contracts signed by the sector for construction, rehabilitation and supervision of rural point water sources areas.

Figure 8 Cost of rehabilitations related to the number of lots in the contract

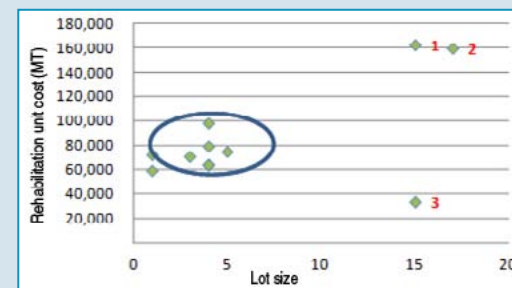


Figure 8 maps the average cost of rehabilitating a borehole against contract lot size. The circle groups the 'norm' for contract size and costs, but there is no "typical" rehabilitation contract. The extreme outliers (1 & 2) in Inhambane Province have higher costs because of the depth of the wells and the needs of the pump. The low cost outlier (3) in Niassa Province represents a larger package for 15 boreholes.

The contract price per borehole is usually lower when a large number of water sources is included in a contract. However, Table 5 shows that average contract size has fallen since 2008, a period that has coincided with decentralisation.

Table 5: Contract lot size is declining over the years

Rehabilitation	2008	2009	2010	2011
Number of wells per contract	30	13	14	5

WASHCost research across all four countries where data was collected has shown consistently low recurrent expenditure on boreholes and handpumps – between US\$ 0.10 and US\$ 0.50 per user. About one in three boreholes in sub-Saharan Africa are out of action at any one time and this suggests that capital maintenance expenditure is significantly below what is necessary.

Sources: C04 & Source: WASHCost Working Paper 8

Key finding 8

Supporting communities to maintain WASH services costs just over US\$ 1 per person per annum

Direct support strengthens the ability of service providers and communities to sustain services after the construction of facilities. This is a high priority for developing WASH services that are sustainable in the long term.

Headlines

- The role of PEC Zonal (Participation and Education of the Community) is to support communities to improve their capacity to manage their water supply as well as hygiene and sanitation.
- Support is commissioned from private companies and NGOs through 1-2 year contracts.
- The average contract size (2011 current values) was just over 3 million MT (US\$ 100,800) with an average costs of 33 MT (US\$ 1.1) per person.



Behind the headlines

PEC Zonal is funded nationally through the PRONASAR (National Rural Water and Sanitation Programme). As this is a relatively new approach, costs vary considerably. The highest average contract costs were 3,635,000 meticals (US\$ 121,200) in Zambézia Province with the lowest being 2,799,000 MT (US\$ 93,300) in Sofala Province. Costs per person also vary widely from 5–140 MT (US\$ 0.17- 4.67) per person per annum.

These variations do not correlate with district size, district population, population density or water coverage. However, it seems that costs reduce with experience. The three provinces with most experience of PEC have the lowest average costs and average costs, after adjusting for inflation, were lower in 2011 than in 2008.

Table 6: Average cost of contracts in meticals adjusted to 2011 prices

Year	Current cost	% in comparison to 2011
2008	3,742,840	114%
2009	2,524,160	77%
2010	2,422,458	73%
2011	3,297,271	100%
Average	3,024,828	

Key finding 9

The very poor have the lowest service levels

WASHCost kept a special focus on access to services by the poor. To study this, WASHCost Mozambique applied relative poverty criteria, similar to those used in national surveys by the National Statistics Institute (INE). This enabled analyses of services for three groups of households: the very poor, the poor and the less poor.

Headlines

- Good mechanisms are required for water and sanitation service provision if the Millennium Development Goals (MDGs) are to be achieved in an equitable way.

Sanitation

- Only half (52%) of the very poor have access to a toilet compared to two thirds (67%) of the poor and three quarters (73%) of the less poor.
- The very poor are almost twice as likely to defecate in the open and rarely have access to anything more advanced than traditional latrines.



Water

- Water access and quantity are strongly related to poverty
- 40% of the very poor access less than five litres daily from an improved source—which counts as “no service”. The equivalent figure for the poor is 30%, and for the less poor, 22%.
- Most of the very poor (54%) do not pay for water—equivalent figures are (39%) for the poor and (31%) for the less poor.



Behind the headlines

Mozambique is one of the poorest countries in the world, placed 184th in the United Nations Human Development Index. In WASHCost research areas, 29% of households were very poor, 36% were poor and 35% were less-poor. Poverty is higher in rural areas.

Mozambique’s second Plan of Action for the Reduction of Absolute Poverty defined poverty as “the impossibility, disability, or lack of opportunity for individuals, families and communities to have access to minimum conditions, according to the basic norms of society.”

WASHCost definitions of “very poor”, “poor” and “less poor” are based on criteria devised by the Multiple Indicator Cluster Survey (MICS). This is based on assets, the structure of the house, the number of people in the household and the type of fuel used for cooking.

Source: Zita, J., Uandela, A., Naafs, A., Zavale, O. 2013 (forthcoming)
Dealing with inequalities in water services provision in Mozambique. WASHCost.

Key finding 10

Expenditure on annual recurrent costs needs to double

As outlined in key finding 8, more money is needed to cover annual recurrent costs to keep services running. A variety of recurrent costs demands a response from actors with different responsibilities at different levels.



Headlines

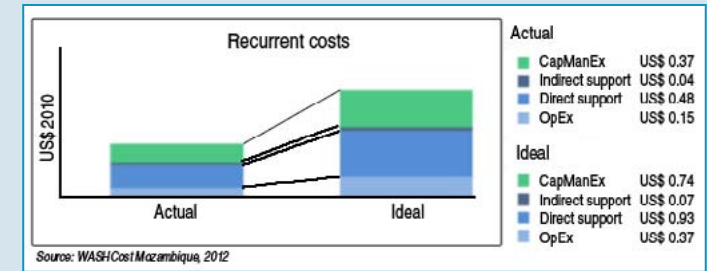
- Recurrent costs cover operational and minor maintenance (typically financed by the users), capital maintenance to protect assets) (typically financed by decentralised funds or NGOs), and direct support costs for expertise, training, monitoring and backup for service providers and communities (typically with near to no financing, or limited funds from district projects or special funding for PEC zonal).
- Recurrent costs also cover indirect support costs – expenditure on the policy framework and planning and training at regional and national level (financed by National Water Directorate), and the cost of capital (financed by Ministry of Finance).



Behind the headlines

Figure 9 shows on the left what was spent in 2010 per person per annum for water in Mozambique on capital maintenance (CapManEx), indirect and direct support costs and on operation and maintenance (OpEx). The right hand bar shows ‘ideal’ costs – what WASHCost believes needs to be spent on these components in order for services to become reliable and sustainable. These recurrent costs need to be met every year.

Figure 9:
Comparison of actual recurrent costs with what is needed (ideal costs) to deliver basic water services



- Current costs on the left come to just over US\$ 1.00 per person per annum and, at this level, service levels are mainly substandard.
- The right hand bar shows ‘ideal’ costs – what WASHCost believes needs to be spent on these components. Expenditure needs to double to at least US\$ 2.10 per person per annum to achieve better services. Existing expenditure is met as follows: basket funding \$0.37; central government \$0.04; district funds \$0.48; community \$0.15.

Once costs are known, the question is which current sources of finance are willing or able to double their expenditure? This is the new challenge as the WASHCost Project closes.

Source: WASHCost Mozambique. Data presented May 2012 during Mozambique Annual Sector Review meeting at Water and Sanitation Working Group GAS meeting. Also presented at AguaSan 2012, Gwatt, Switzerland.



Julia Zita, Arjen Naafs and André Uandela at the WASHCost workstation in the National Directorate of Water, Maputo.



Copyright © 2012
This work is licensed under a Creative Commons license.