

Collecting WASH services cost data: experiences from Mozambique

Arjen Naafs (WASHCost, Mozambique)

Abstract

There is considerable interest in how to collect and use life-cycle cost information, which is critical to planning and budgeting for sustainable services. This document discusses how the information has been collected in Mozambique within the framework of the WASHCost project. An assessment is made of which tools have proven to be most suitable to collect which type of information, and this information will be useful for planning similar efforts in other provinces of Mozambique or in other countries. Unit rates for each of the tools are presented as well as the variables collected with each tool.

Household questionnaires are the main source of information for contextual information, service level indicators and sanitation cost components. System surveys, in conjunction with specific research into contracts provide the main information on cost and technologies. Other specific research will be needed to fill identified gaps.

It is interesting to note that the a considerable part of data collection lies not in applying a tool in itself (i.e. actually collecting the data) but in reaching the location and mobilising teams to collect the data. This has implications for how future research of this kind might be structured.

The challenges ahead include drawing out all the richness of the data through detailed analyses and scaling down the methodology for future replication, by identifying some 'golden indicators' and by using opportunities to collect data which do not require separate and expensive logistics. One of the key strengths that emerges from data collection in Mozambique comes from working closely with partner governmental organisations and within a learning alliance approach. This opens doors to data collection and to in-country expertise that would never be available to a research project that attempted to go it alone. Partnership in Mozambique has had a direct impact on our ability to collect critical data and will continue to have an impact on our ability to help to embed this data and its relevance in district, provincial and national planning and budgetary authorities.

Keywords

Mozambique, WASH, costs, services, data collection, tools, questionnaires.

INTRODUCTION

Like many developing countries, Mozambique is striving to attain the Millennium Development Goals for water and sanitation. The government of Mozambique has recognised the need for reliable cost data, in particular to support the decentralisation processes in the country (DNA, 2008). This was a major factor in the WASHCost project being implemented in Mozambique and the Directorate of Water (DNA) being the project's host. WASHCost Mozambique, initiated at the end of 2008, has collected data on a large scale. This paper discusses the process of data collection, the methodology, and lessons learned. The aim is to share the experiences and guide similar processes in other countries.

BACKGROUND

The objective

WASHCost is a five year action research project investigating the costs of water supply, sanitation and hygiene services to rural, small town and peri-urban communities in Ghana, Burkina-Faso, India (Andhra Pradesh) and Mozambique. The objectives of the collection and disaggregation of cost data of WASH services are first to understand better what factors drive costs and second, through this understanding, to enable more cost effective and equitable service delivery (see www.washcost.info).

The international picture

Assessments were made concerning the status of available knowledge on cost data in each of the four countries (Salomon Lda, 2008). These served as the basis for the design of the methodology. Each of the countries developed their own methodology and tools, and in addition bi-annual international research meetings were held in order to align between countries and to share insights between research teams. This resulted in the development of the international research protocol (Fonseca, 2010) and the data organisation and coding protocol (Verhoeven, J. et al, 2010).

Mozambique country approach

WASHCost Mozambique is hosted by the National Water Directorate (DNA), in particular the Rural Water Department (DAR) and the Planning and Finance Department (GPC). This has enabled WASHCost to link with a national initiative of data sharing called *Sistema de Informação Nacional de Água e Saneamento* (National Information System for Water and Sanitation – SINAS). Furthermore, WASHCost is working together with various institutions, using a *learning alliance* approach (Smits et al., 2007). This approach has two fundamental objectives:

- To ensure that innovation processes result from a broader collaboration among sector stakeholders
- To allow replication and expansion of innovative approaches, institutionally and geographically.

In practice, this has translated into working together with the pre-existing and well-established sector platform GAS (Water and Sanitation group - *Grupo de água e Saneamento*).

Understanding costs and services

In general, initial costs for water and sanitation are regarded as direct investment costs such as drilling a borehole or making latrine slabs. However, supplying a borehole does not mean that the people actually receive a service. For WASHCost, the focus should be on *water services* – i.e. the delivery of water to people. A conceptual difference is made between the service itself, loosely defined as the quantity of water of a given quality accessible by users, and the system (hardware and software) used to deliver it. In practice, the two are often closely related (Moriarty, 2010).

One of the driving principles of making services sustainable is the proper planning and budgeting of life-cycle costs (LCC). They includes not only the costs of constructing new systems but also what it costs to maintain them in the short and long term and the indirect costs of supporting services through various institutions. Costs for both district and national level administration and planning are taken into account, as well as the costs of replacing and extending or improving infrastructure (Fonseca, et al, 2010b). Without a proper understanding of all these costs, and without planning and budgeting for them, sustainable services are impossible. They cannot be properly planned due to lack of capacity, or they degrade over time or they are abruptly left hanging when a critical part of the system fails and cannot be repaired and replaced. These costs are categorised according to

Table 1.

<i>Abbreviation</i>	<i>Full name</i>	<i>Short description</i>
CapEx	Capital Expenditure	Capital investment in fixed assets
CapManEx	Capital Maintenance Expenditure	Expenditure on asset renewal, replacement and rehabilitation costs
CoC	Cost of Capital	Costs of accessing capital for investment
OpEx	Operating and Minor Maintenance Expenditure (OpEx)	Regular operational expenditure, typically expenditure on labour, fuel, chemicals, materials, regular purchases of any bulk water
ExpDs	Recurrent expenditure on Direct Support	Post-construction support activities direct to local-level stakeholders, users or user groups

Table 1 Cost categories used in WASHCost after (Fonseca, et al, 2010b).

The research questions

In order to guide the research in the various countries, five research questions have been developed (Fonseca, 2010):

1. What is the current, actual magnitude and relative magnitude of different cost components (CapEx, OpEx, CapManEx, etc.) per technology? (per capita, per household, per m³ delivered)
2. What is the current, actual magnitude and relative magnitude of different cost components (CapEx, OpEx, CapManEx, etc.) per service level?
3. How do service levels received by poor and non-poor households differ?
4. What are the main cost drivers of providing a sustainable service?
5. What are the “golden indicators” for analysis of sustainable and equitable WASH service delivery?

WASHCost has collected data relevant to all the questions, with current analyses (November 2010) focusing on addressing the first three.

Data collection – primary data tools: steps and methodologies

The development of a research methodology requires a process of discussion, testing and verification which took us from our initial ambitions to a worked out methodology and data protocol. Each of the steps is discussed in more detail in the individual sections below.

Step 1: Getting started

The first step consisted of defining *what* was needed to be collected. The country assessment (Salomon Lda, 2008), together with the first international research meeting (Scheveningen, 2008), outlined an extensive list of expected variables. These variables covered various types of data (costs, services, etc.) that can be found at different institutional levels (from national down to household).

Step 2&3 Development and testing

The development of the tools took place in typical cycles of development, testing, analysing and evaluation. Three rounds of testing of tools were undertaken (January, May and December 2009). After each round, an assessment was made of which tool worked and which tools needed further refinement. The testing took place in areas that were selected in conjunction with the learning alliance partners (GAS – January 2009) and the results were discussed during various follow-up meetings (GAS – June, July and December 2009). The tools are presented in Table 2, which shows the level where they were used, the target group and what they cover. The table also identifies which of the main research questions each tool addressed. No data is specifically collected for research question 5 as that will be answered on an analysis of all the data and results.

<i>Tool</i>	<i>Level</i>	<i>Target group</i>	<i>Description</i>	<i>Main Research question addressed</i>
Household Questionnaire	Household	Heads of Households	Extensive questionnaire asking about household service levels, investments and operation costs	1, 2, 3
Rapid Household	Household	Household member	5 key questions concerning type of latrine, water source, water quantity, payment and household size	1, 2
Point source questionnaire	Community	Water committee	Questionnaire concerning boreholes and shallow wells asking about current status, past interventions ^A , operation and maintenance and service provision	1, 2, 4
Small system questionnaire	Community	Operator	Questionnaire concerning systems (typically max 50 household connections) asking about current status, past interventions, operation and maintenance and service provision	1, 2, 4
Focus Group Discussion	Community	Beneficiaries	Guided discussion with mixed community members concerning the perception of costs incurred, services received and poverty	2, 3
Institutional latrines	Community	Schools and health posts	Questionnaire for usage costs of communal latrines	1, 4
Community questionnaire	Community	Local leaders	Short questionnaire capturing the basic community information, in particular intervention histories	1,2,3
Interview with mechanic	District	Local Handpump Mechanic	Semi-structured interview to assess the costs and support involved for larger repairs (CapManEx)	1,4
District interviews	District	District authorities	Semi-structured interview designed to capture the available information on interventions, costs and district expenses on supporting the interventions.	1, 4
Province interviews	Provincial	Provincial Rural Water department	Semi-structured interview designed to capture the available information on interventions, costs and district expenses on supporting the interventions.	1,4

^A Interventions' include first installation and all subsequent repairs or replacements as well as supporting monitoring visits. The aim is to capture a history of all significant efforts and expenditure relating to the infrastructure

Table 2 Description of tools

WASHCost is not the first initiative in the sector to collect WASH related data in Mozambique and an inventory of available tools showed that three (household, point source and community questionnaires) could be based on existing formats developed by UNICEF (WE Consult, 2008). The small system questionnaire was derived from a format recommended by SINAS. Though these were used as a basis, considerable changes were made, in particular to include cost related data and intervention histories.

The district and province tools are semi-structured interviews with the objective of collecting available secondary cost information such as bill of quantities of contracts, annual financial books etc. (see section on specific research).

The tools and required resources are interdependent and together they strongly influence the sample size. After the final round of testing in December 2009, a sampling strategy for the main primary data collection was developed.

Step 4: Sampling strategy

One of the more challenging aspects to address in any research or data collection exercise is the balance between sampling size, statistical validity and resources. A survey must be of sufficient size that an effect with scientific significance will also be statistically significant

(Lenth, 2001). WASHCost Mozambique has been working with the National Bureau of Statistics (INE) in order to obtain a solid statistical background. The sampling used during the Multiple Cluster Survey (MICS¹) of 2008 (INE, 2008) was selected as basis with the following advantages:

1. Going back to the same areas where the MICS data was collected in 2008 allows WASHCost to make full use of existing data and historical comparison.
2. The sampling concentrates on those areas that were reported to have some form of water service² during the MICS 2008 survey (based on the thought, 'only go where there is information' on both service levels and costs).
3. MICS provides a workable definition of peri-urban and a method to select from these areas in a statistically sound way (poorest locations within urban areas).

The main disadvantages identified were that a) availability of source data of the MICS is limited, thus for certain parameters only aggregated provincial level data is available, b) enumerator areas do not coincide with community boundaries, c) areas with only unimproved sources are not captured (WASHCost Mozambique, 2010). Based on the knowledge that sanitation services are more frequent in the peri-urban areas, directive sampling took place to include more urban households.

The sampling can be regarded as *representative for the population with water services in the six provinces where sampling took place*, but as not all provinces have been surveyed due to resource constraints, results cannot be taken as representative of national data. It may be possible later to apply correction factors to generalise to national level but this has not so far been tackled.

Step 5: Data protocol

Following an internal international data meeting, the data protocol (Verhoeven, J. et al, 2010) was developed. This protocol defined how and in which way data will be shared within the project and how to prepare it for external use. Of paramount importance was defining and understanding the coding to be used. In Mozambique, the codification followed the system and numbering of the National Bureau of Statistics.

A second aspect of the data protocol was an exhaustive list of around 600 variables that are collected in the four WASHCost countries. The main categories and the quantity of variables are indicated in **Error! Reference source not found.** Following a visit of the international data manager to Mozambique in May 2010, a total of 423 variables were identified as valid in the Mozambican context. The 167 variables that are not valid for Mozambique are mainly related to technologies that are not in existence in country.

¹ MICS is a national survey conducted every five years, covering internationally comparable statistics and estimates of various indicators in the areas of health, education, child protection and HIV and AIDS. For more information: www.childinfo.org or email mics@unicef.org

² In Mozambique, only improved water sources are considered for coverage calculations. Improved water sources are piped systems, boreholes and shallow wells with handpumps, protected springs and rain water harvesting (Government Mozambique, 2007).

	<i>International</i>	<i>Applicable in Mozambique</i>	<i>% applied in Mozambique</i>
Contextual Information	92	81	88%
CapEx cost drivers	20	10	50%
Economic variables	4	4	100%
Technologies and infrastructure	70	45	64%
Sanitation - Cost components	121	75	62%
Water - Cost components	204	155	76%
Service levels indicators	79	53	67%
	590	423	72%

Table 3 Summary of WASHCost variables (May, 2010).

For each of the 423 key variables collected in Mozambique, the main tool for information has been identified. This is presented in Table 4, which shows for each tool the percentage of information that applies to each research question. Absent from this table are the institutional latrine questionnaire and the interview with the mechanic, since these are regarded mainly as sources for triangulation rather than for primary data collection. Furthermore, the table somewhat over-simplifies the issue as it does not consider the *significance* of a certain variable or the *quantity* of data that has to be collected in each case. For example the exchange rate dollar / meticaís, is a much more significant variable in how it affects results than is for instance the gender of a head of household, but the exchange rate is easy to find, while collecting data on the gender of household heads requires a much greater quantity of data collection and can only be done one household at a time at community level.

<i>Tool Moz. Source</i>	<i>Contextual Information</i>		<i>CapEx cost drivers</i>		<i>Technologies and infrastructure</i>		<i>Sanitation - Cost components</i>		<i>Water - Cost components</i>		<i>Service levels indicators</i>		<i>Total Variables</i>	<i>Total %</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>		
1. Households	23	28%		0%	6	13%	25	33%	11	7%	51	96%	116	28%
2. Water Systems	4	5%		0%	27	60%		0%	34	22%	1	2%	66	16%
3. Focus Groups		0%		0%		0%	4	5%	2	1%		0%	6	1%
4. Community	7	9%		0%		0%		0%	1	1%	1	2%	9	2%
5. District/ Province		0%		0%		0%	13	17%	10	6%		0%	23	5%
6. Specific research	47	58%	10	100%	12	27%	33	44%	97	63%		0%	199	47%
Grand Total	81	100%	10	100%	45	100%	75	100%	155	100%	53	100%	419	100%

Notes: 1. Tools 1 to 5 are considered main primary data tools.

2. The 4 economic variables are omitted from this overview. They are collected using specific research methods (see Data collection – specific research for an explanation).

Table 4 Quantity and types of variables collected with each tool

Step 6-Training of data collectors

Training on data collection was held in March 2009 in Chimoio, Mozambique. Due to the scope of the project and the variety of tools, people from various backgrounds with various skills needed to be trained. The project approach benefited strongly from the link with DNA and SINAS as it gave the opportunity to have participants from the provincial water and sanitation departments of all provinces³. The other group of people trained had experience in doing community and household surveys. In total 30 people were trained and three teams of enumerators were identified (one for each of the country's language zone). The provincial staff involved in the training are key people in each of the provinces, responsible for system surveys, provincial and district tools. Following the training, minor adaptations were made to the tools and they were finalised.

Resources used

For the primary data collection, two teams were mobilised, each consisting of a team leader, two enumerators and a driver with a 4x4 vehicle. One team worked for three months and the other for five months (over a six month calendar period). Disregarding driver time, a total of 4,800 professional staff hours were used (3 people, 8 months, 25 days per month, 8 hours per week). Table 5 shows that an estimated 2,803 hours were used in applying the tools (58% of the time). Thus around 2,000 hours (42% of the time) was used for mobilisation and to a lesser extent other supporting activities, such as preparation, verification, database design, data entry etc.

The budget for the primary data collection was US\$ 120,000. The costs of the senior core staff and use of assets related to the primary data are estimated at US\$ 4,000/month for a period of 6 months. A standard management fee of 15% is calculated, bringing the total estimated costs to US\$ 165,600.

The rate (without transport) per tool can be calculated; demonstrating an hourly rate of US\$ 34.50 (58.4% of US\$ 165,600 divided by 2,803 hours).

The methodology is regarded as a complete package: if you do household surveys, you also need to visit the district and the province. Therefore, it can be argued to attribute mobilisation costs *equally over all the tools*, or US\$ 9,842 per tool (41.6% of US\$ 165,600 spread over 7 tools⁴).

<i>Tool</i>	<i>Nº collected</i>	<i>Unit</i>	<i>Typical time per unit</i>	<i>Typical visits needed for completion</i>	<i>Nº hours Total</i>	<i>Net cost per unit</i>	<i>Mobilisation per unit tool</i>	<i>Total unit price</i>
Household Questionnaire	1710	Household	1 hour	One	1710	\$35	\$6	\$40
Rapid Assessment	1404	Household	5	One	117	\$3	\$7	\$10

³ By having staff from all provinces, WASHCost enabled the collection of secondary data from all provinces, paved the way for the dissemination of the life-cycle costs approach and prepared the ground for possible follow-up in other provinces.

⁴ Point source and small system are regarded as one tool, as often in a community one or the other supply is in place. The tools are not therefore used together but as alternatives.

<i>Tool</i>	<i>Nº collected</i>	<i>Unit</i>	<i>Typical time per unit</i>	<i>Typical visits needed for completion</i>	<i>Nº hours Total</i>	<i>Net cost per unit</i>	<i>Mobilisation per unit tool</i>	<i>Total unit price</i>
Household			minutes					
Point source questionnaire	118	Water point	2 times 1 hour	Two	236	\$69	\$42	\$111
Small system questionnaire	30	System	2 times 2 hours	Two	120	\$138	\$164	\$302
Focus Group Discussion	70	Community	1 time 3 hours	One	210	\$104	\$141	\$244
Community questionnaire ^A	70	Community	2 times 1 hour	Two	140	\$69	\$141	\$210
District interviews ^B	36	District	3 times 2 hours	Three	216	\$207	\$273	\$480
Province interviews	6	Province	3 times 3 hours	Three	54	\$311	\$1,640	\$1,951
^A Including Institutional latrines					2803			
^B Including Interviews with mechanics					Total			
					Hours			

Table 5 Overview of time and costs for each tool

These costs might be high at a first glance, but Mozambique is notorious for its high daily vehicle rate (US\$ 150 to 200 rent without driver) and distances are large (costs include mobilisation and demobilisation). However, note that the above costs do not include the costs for design and testing and training, nor for analysis and reporting.

Data collection – specific research

Aside from large scale data collection, specific research has been undertaken and is still scheduled to take place to fill the gaps that the large scale data collection has not been able to fill. Specific research is defined here as research collecting primary and related secondary data to address a specific sub-topic or variable, where the data collected through the methods above is not sufficient or applicable. Specific data collection needs to be designed on a case by case basis and follows entirely different procedures from those discussed in this paper. Mozambique has identified the following areas to be (mainly) covered by specific research:

- National expenditure and costs from water departments
- Census data
- Climatic and other national background data
- Economic indicators
- Detailed bill of quantity cost driver analyses
- Life span research
- Hygiene and sanitation promotion costs

Almost from the onset of the project in November 2008, specific research has been conducted by collecting secondary data. Initially, the project foresaw a clear period (2008/2009) which focused on secondary data collection. However, secondary data exists in

many places and refining and locating it is a continuous process parallel to the primary data collection (WASHCost Mozambique, 2009). This data collection does not follow the sample protocol and instead is based on one-on-one meetings with sector partners, collecting the information they might have available on a specific topic (not geographically limited).

One of the main tools of the specific research is the recording of any contract signed in the sector. Using SINAS, WASHCost collected basic information (contract objective, total value and number of interventions) of over 270 contracts. This contract database is the main source of CapEx information on water and hygiene. In addition, more detailed information is collected on Bill of Quantities (BOQ) of completed works, in order to define the cost drivers (research question 4). Furthermore, information is collected from national level institutions concerning annual financial books, disbursement plans and planning and budgeting.

FINDINGS AND DISCUSSION

Concerning the overall process, the first observation is that from the launch of the project to the start of the primary data collection, considerable time was used for design and testing. The involvement of other partners and alignment with other countries are processes that take time and should not be underestimated. For the development of the Mozambican methodology the regular international research meetings, the research protocol (Fonseca, 2010) and data protocol (Verhoeven, J. et al, 2010), were necessary guidelines. Reflecting on the learning alliance, it can be concluded that partners have played a key role in the sampling strategy, design of specific tools and providing credibility to the process.

A second overall observation relates to the perception that even with the considerable efforts and resources, the primary tools only cover about half of the desired variables, and specific research is needed to cover the rest. However, the primary data collection has considerable larger sample numbers than any of the specific research and as such will still be the main source of information for the project and its research database. In addition, considerable specific research has already been done, covering an estimated additional 25% of the variables, in particular related to CapEx cost drivers and the water cost components. This leaves a manageable estimated 25% of the variables to be determined during specific research in the next phases.

An interesting aspect of the data collection is in Table 5 which shows that mobilisation and reaching the location takes almost as much as much time and costs almost as much applying the tool itself. This emphasises that, at least in Mozambique, it is better to apply all tools once in a location, than to schedule return visits for application of other tools. The outstanding specific research is not expected to need to return to either district or household level and thus is expected to be considerable less costly, keeping the total budget for data collection below US\$ 200,000 (excluding design, testing, training, analysis and reporting).

CONCLUSIONS AND WAY FORWARD

In order to answer the question of how to collect information on cost services, we need to look at Table 6. For each type of data the main source(s) are indicated as well as which source is best for triangulation.

<i>Tool</i>	<i>Nº collected</i>	<i>Total unit price</i>	<i>Contextual Information</i>	<i>CapEx cost drivers</i>	<i>Technologies and infrastructure</i>	<i>Sanitation - Cost components</i>	<i>Water - Cost components</i>	<i>Service levels indicators</i>
Household Questionnaire	1710	\$40	M		T	M	T	M
Rapid Assessment Household	1404	\$10						T
Point source questionnaire	118	\$111			M		M	
Small system questionnaire	30	\$302					M	
Focus Group Discussion	70	\$244				T		
Institutional latrines	51	-		T		T		
Community questionnaire	70	\$210	T					
Interview with mechanic	17	-		T			T	
District interviews	36	\$480		T				
Province interviews	6	\$1,951		T				
Specific research	n/a	n/a	M	M	M			

M=Main source T = Triangulation

Table 6 Overview of tools and type of data collected

In summary, household questionnaires are the main source of information for contextual information, service level indicators and sanitation cost components. System surveys, in conjunction with specific research into contracts provide the main information on costs and technologies. Specific research will still be needed to fill identified gaps, in particular related to cost drivers.

Following the collection of the primary data, the next step is analysis, which will be split into two phases. The first will comprise extracting basic statistics, providing an understanding of the ranges of individual variables etc. This is anticipated to be completed by the end of 2010. The second phase requires more advanced statistical analysis such as regression and modelling.

One of the key principles of the current methodology is to be able to *scale-down* the methodology to a lighter and more easily reproducible format than the current, extensive tools. Indeed, this is even the objective of the fifth research question, to find the key “golden” indicators and select the best tools to collect and monitor these. The challenge lies in combining indicators from various tools and limiting the resources needed, so that ideally one might be able to collect data giving 80% of the information using 20% of the time and money. Considerable costs savings would result from by limiting mobilisation costs by creating modules that can be used as addendum/part of other surveys. It is hoped that this paper has made a start by describing the methodology and linking variables, tools and analysing their costs.

REFERENCES

- DNA, 2008. *Programa Nacional de Abastecimento de Água e Saneamento Rural (PRONASR), segundo draft*. Draft. Maputo: DNA.
- Fonseca, C., 2010. *Research Protocol version 8*. In print. The Hague: WASHCost.
- Fonseca, et al., 2010b. *Life-Cycle Costs Approach*. The Hague: IRC International Water and Sanitation Centre.
- Government Mozambique, 2007. *Política de águas*. Maputo.
- INE, 2008. *Multiple Indicator Cluster Survey*. Maputo: INE.
- INE, 2010. *Dados definitivos Census 2007*. Maputo: INE.
- Lenth, R.V., 2001. *Some Practical Guidelines for Effective Sample-Size Determination*. Department of Statistics, University of Iowa.
- Moriarty, P., et al., 2010. *Ladders for assessing and costing*. The Hague: IRC International Water and Sanitation Centre.
- Salomon Lda, 2008. *Sector Assessment WASHCost Mozambique Final report*. Maputo: WASHCost Mozambique.
- Smits, S. & Moriarty, P. & Sijbesma (eds), 2007. *Learning alliances: Scaling up innovations in water, sanitation and hygiene*. Delft: IRC: International Water and Sanitation Centre. (Technical paper series; no. 47).
- Verhoeven, J. et al., 2010. *WASHCost data organisation and coding protocol*. The Hague: WASHCost.
- WASHCost Mozambique, 2009. *Annual report 2009*. Maputo: WASHCost - internal.
- WASHCost Mozambique, 2010. *Sampling Strategy WASHCost Mozambique*. Maputo: WASHCost Mozambique.
- WE Consult, 2008. *A WASH baseline survey under the NL-UNICEF partnership for WASH, One million initiative*. Maputo: UNICEF.

CONTACT DETAILS

WASHCost Mozambique

Av. Tomas Nduda 1040 r/c, Maputo, Mozambique

Arjen Naafs arjen.washcost@gmail.com