

Life-cycle costs approach for WASH services that last



Life-cycle costs in Ghana

Briefing Note 1: Background and Methodology

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WASHCost project partners have developed a methodology for costing sustainable water, sanitation and hygiene (WASH) services by assessing life-cycle costs and comparing them against levels of service provided. The approach has been tested in Ghana, Burkina Faso, Mozambique and Andhra Pradesh (India) and Mozambique. The aim of the life-cycle costs approach is to catalyse learning to improve the quality, targeting and cost effectiveness of service delivery.

In Ghana, Kwame Nkrumah University of Science and Technology (KNUST), International Water and Sanitation Centre (IRC), and Community Water and Sanitation Agency (CWSA) are using the WASHCost Life-Cycle Cost Approach to identify the true costs of providing sustainable Water, Sanitation and Hygiene costs in rural and peri-urban areas. This series of briefing notes has been developed to explain the methodology, share the findings, and draw out the implications for policy and practice in the Ghana's WASH sector.

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Front page photo

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WASHCost is a five year action research project investigating the cost of providing water, sanitation and hygiene services to rural and peri-urban communities in Ghana, Burkina-Faso, Mozambique and India (Andhra Pradesh). The objectives of collecting and disaggregating the cost data over the full life-cycle of WASH services are able to analyse cost per infrastructure and service level, and to better understand the cost drivers and through this understanding to enable more cost effective and equitable service delivery. WASHCost is focused on exploring and sharing an understanding of the true cost of sustainable services (see www.washcost.info).

Life cycle costs in Ghana:

Background and Methodology

Rural WASH service delivery in Ghana

The delivery of sustainable water and sanitation services requires the provision of infrastructure, daily operation and minor maintenance, occasional major repairs and upgrading and, eventually, rehabilitation. For this to happen there is the need for proper management of the facilities by service providers. In addition, appropriate support (facilitation, regulation, technical assistance, spare-parts supply, capacity building and monitoring) must be provided to service providers. This support has to be provided at several different institutional levels. Finally, service providers, service authorities and providers of support services need to be able to operate with a framework of rules (policy, legislation, regulation and guidelines) that defines their role, responsibilities and accountability to each other. **For sustainability to be achieved, all of this needs to be paid for by someone, be it users, government or external donors.**

WASHCost aims to understand how much the different parts of the WASH service delivery system cost now, and should cost in the future – for different types and levels of service.

Under the Community Ownership and Management (COM) model, overall responsibility for water, sanitation (including water related sanitation) and hygiene related service delivery lies with the District Assemblies (DAs). This responsibility is sometimes referred to as a Service Authority function. Day to day provision of water services (Service Delivery function) is delegated to community structures: for smaller rural point-systems water and sanitation committees (WATSANS); for larger piped schemes in small-towns, Water and Sanitation Development Boards (WSDBs). In some larger small-towns the WSDB oversees the operations of a private system manager.

Government's Community Water and Sanitation Agency (CWSA) is mandated to play a facilitating and backstopping role to DAs in their Service Authority functions. This role includes the provision of design standards, guidelines for operations and maintenance, preparation of Strategic Investment Plans etc.

Rural sanitation provision is essentially a household level responsibility, although infrastructure is often provided with the support of government projects. Increasingly, with the adoption of the zero-subsidy Community Led Total Sanitation (CLTS) approach, it is expected that the use of subsidy will decrease and DA's role will consist of hygiene and sanitation promotion, capacity building and monitoring. While not currently much exercised, it seems clear that DAs also have a responsibility for the safe disposal of waste from latrines (sullage), along with all other aspects of environmental sanitation.

While good progress has been made in the last decades in raising nominal coverage in water services (in May 2011 access stood at 63% by CWSA norms; it was already 74% in 2008 according to JMP), sanitation lags far behind (7% in 2008 according to JMP).

What is more, water services are confronted by a number of challenges, including relatively high levels of non functionality. High non functional rates between 20 % and 70 % have been reported in Africa by the Rural Water Supply Network. One of the reasons given for the unacceptable levels of non functional systems are systemic weaknesses in a planning and implementation process that is strong on the delivery of the infrastructure but relatively weak on other activities such as operations, maintenance, replacement of key equipment and rehabilitation of infrastructure.

Life Cycle Cost Analysis

WASHCost believes that cost information is an essential for proper planning, budgeting and implementation of sustainable WASH services. However, there is currently little systematic collection or use of this information in Ghana's rural WASH sector. To develop a true understanding of cost of delivering services it is essential to look not just at the initial capital investment cost of providing new boreholes or latrines, but also at all the other costs related to managing this hardware to deliver a service. To aid in this, WASHCost has developed a framework for assessing all the main components of service delivery over the life-cycle of the different components.

Water service costing framework

The framework for costing water service delivery is based on the life cycle costing approach. Life-Cycle Costs (LCC) represent the aggregate costs of ensuring delivery of adequate, equitable and sustainable WASH services to a population in a specified area. WASHCost disaggregates the costs of providing WASH services as follows:

- **Capital expenditure (CapEx)** - The capital invested in constructing water facilities such as boreholes, pumps, reservoirs and pipes. It includes the first time the system is built, extension of the system, enhancement and augmentation. CapEx software includes one-off work with stakeholders prior to construction or implementation, extension, enhancement and augmentation.
- **Operational and minor maintenance expenditure (OpEx)** - Expenditure on minor repairs, labour, fuel, chemicals, materials, or regular purchases of bulk water.
- **Capital maintenance expenditure (CapManEx)** - Expenditure on asset renewal, replacement and rehabilitation costs. Capital maintenance expenditure is typically more 'lumpy' than operational and minor maintenance, with infrequent but relatively large items of expenditure on large items (e.g. replacing generators, pumps of storage tanks or occasional emptying of latrines).
- **Expenditure on Direct Support (ExpDS)** - Expenditure on support to local-level service providers, users or user groups. The costs of ensuring that local government staff have the capacities and resources to carry out planning and monitoring, to help communities when systems break down, to audit community management structures, to monitor private sector performance, to carry out regular hygiene awareness raising and so on.
- **Expenditure on Indirect Support (ExpIDS)** – Expenditure on government macro-level planning and policy-making, developing and maintaining frameworks and institutional arrangements, capacity-building for professionals and technicians through university course, technical schools etc.
- **Cost of capital (CoC)** – The cost of borrowing or otherwise acquiring the resources to provide the assets needed for a service. This is made up of interest payments on debt and dividend payment to equity providers.

Service levels

In addition to knowing what it costs to deliver a service, it is also important to define the service itself in terms of the level of service (judged against agreed indicators) that is supposed to be delivered, and that users actually receive. There is considerable disagreement in Ghana around figures for coverage with WASH services, and to some extent this is caused by lack of clarity as to how the service is defined (e.g. JMP figures define water services purely in terms of the type of technology used; whilst CWSA also includes norms for number of people sharing a service point and distance to it).

Therefore, in addition to the life cycle cost framework, WASHCost has also developed frameworks for assessing the level of service being received, based on national norms. Table 1 shows the framework used for assessing access to water services, and Table 2 for sanitation.

Table 1: Framework for assessing water services

Service Levels	Indicators		
	Quantity accessed	Distance to water source	Crowding-with-reliability
High	60lcd or more	500 meters or less	300 per point-system or standpipe
Intermediate	between 40 and 60lcd	500 meters or less	300 per point-system or standpipe
Basic	Between 20 and 40lcd	500 meters or less	300 per point-system or standpipe
Sub-standard	between 5 and 20lcd	More than 500 meters	more than 300 per point-system or standpipe
No service	Less than 5lcd	More 500 meters	More than 300 per point-system or standpipe

Table 2: Framework for assessing sanitation services

Service level	Parameters			
	Accessibility	Use	Reliability (O&M)	Environmental Protection
Highly improved	Each family dwelling has sufficient toilets for all members	Used by all family members and infant faeces disposed of in toilet	Routine O & M service requiring little user effort Lifespan: 10-20 years	Positive environmental impact, eg productive re-use of safe by-products
Improved	Each family dwelling has a toilet in the compound		Regular operation and maintenance Lifespan 5-10 years	Non problematic environmental impact/safe disposal
Basic	Households shares toilet facilities in the compound	All family members use toilets	Traditional latrine with maintenance requiring high user effort Lifespan 2-5 years	Significant environmental pollution, increasing with increased population density
Sub-standard	Households access the toilet outside the compound – public latrines or neighbours	- some restrictions or -queues exist or not And -outside compound/house	Not applicable	
No service	No separation between user and faeces, e.g. Open defecation, dig and bury, platform separate faeces from users	No use	Not applicable	

WASHCost research

To raise awareness of both the lack of data, and the importance of such data to properly understanding the bottlenecks in rural service provision, the WASHCost project in Ghana has developed and field tested a methodology for both service levels and the life-cycle costs for water, sanitation and hygiene services.

The initial development and testing of the methodology was carried out in three regions (Ashanti, Volta and Northern) representing Ghana's three main hydro-geological zones. In each region a district was chosen, in consultation with local stakeholders, that was representative in terms of the type and level of WASH service being provided. In total 31 rural communities and 4 small towns were visited in the 3 districts, and 1,273 individual household interviews carried out (Table 3).

Table 3: Summary of the rural surveys

Regions	District	No of rural communities and (small-towns)	No. of WPS and (standpipes)	No. of Households interviewed in rural communities and (small-towns)
Ashanti	Bosomtwe	10(1)	28(22)	488(132)
Northern	East Gonja	15(2) ¹	31(31)	153(30)
Volta	Ketu South	6(1)	25(8)	391(79)

In addition to this, a number of broader desk studies, and more focused case studies were (and continue to be) carried out looking into among others: cost drivers for capital cost; experiences of successful small town systems; the costs of implementing CLTS in Ghana.

Figure 1 shows the location of the principal WASHCost study areas in which survey based work on access to services and costs of service provision was studied.

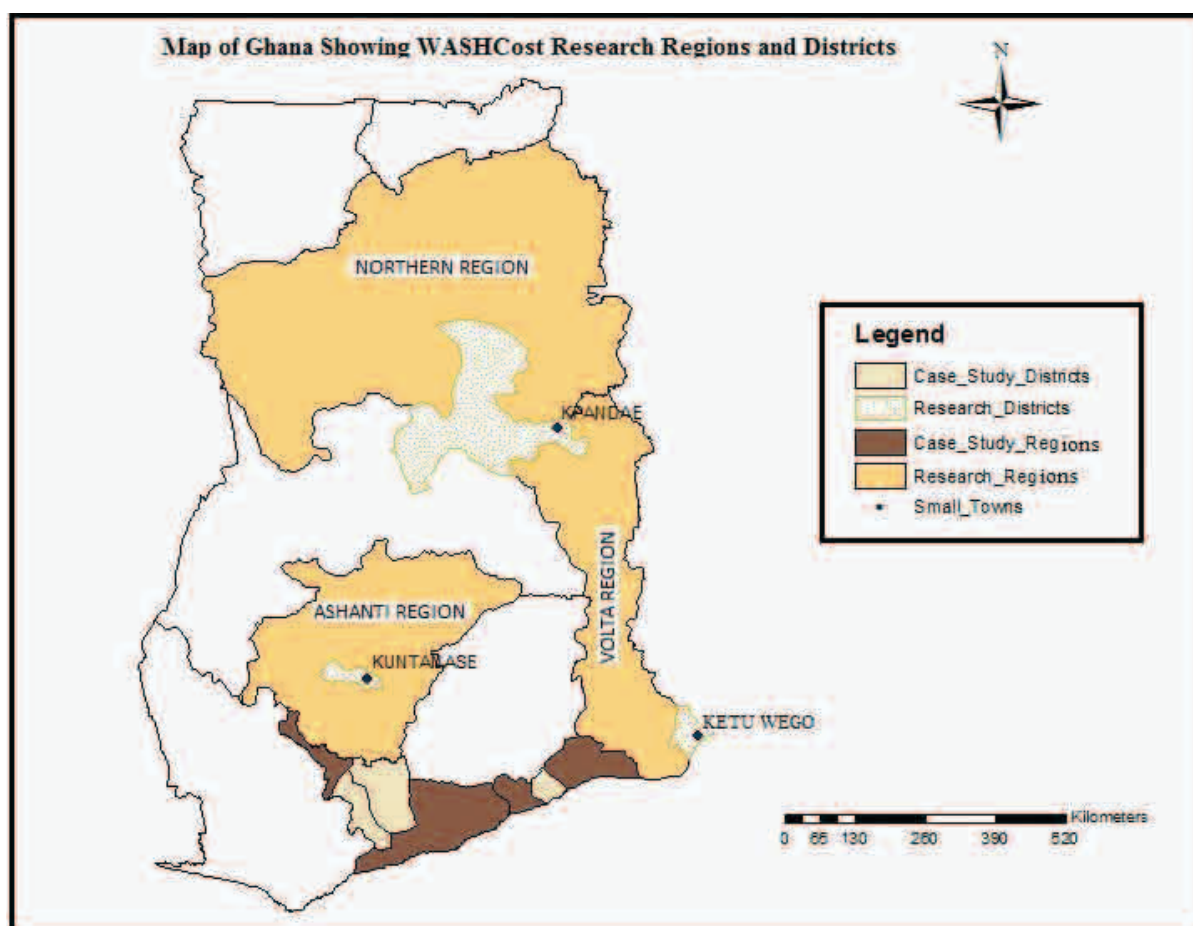


Figure 1: Map of Ghana showing WASHCost study areas

The field research team was made up of two research officers, four research assistants, six enumerators and two drivers. In addition there was regular backstopping by a lead researcher, country coordinator and governance advisor. The time for completing data collection in the field was approximately 30 days (calendar days) per district. Working in a community took 2 days and in the small towns 4 days with all the field team at work in the district. In all the cost for the data collection was between US\$ 120,000 and US\$ 150,000.

¹ Two small towns surveyed have subsequently come under the Kpandae district instead of East Gonja.

Lessons learned in applying the approach

The logic of the approach adopted for the survey based work in Bosomtwe, East Gonja and Ketu South was to explicitly link the full life-cycle costs of different models of service delivery to the actual level of service provided to rural communities. It was therefore deemed important to take the community as the primary level of analysis, to locate all water supply infrastructure within that community, and to identify all the costs associated with that infrastructure. Furthermore, it made sense to work in a limited number of districts and regions so that direct support costs could be directly linked to beneficiary communities. In practice this approach met with mixed success.

In terms of assessing service levels and developing a deeper understanding of the gap between service as designed for and service actually accessed (see briefing notes 4 and 7) it was a success. Findings including a significant difference in the quality of service provided by small-town and rural point-systems are important to feed sector dialogue, so too are findings relating to generally low levels of service provided (as judged against national norms) for rural water point-systems.

However, the approach was much less successful in terms of identifying the different cost components of actual services being provided by specific systems. This lack of success, while having many causal factors, in the end comes down essentially to lack of data availability. Simply put, data on the costs of providing rural services in Ghana is seldom recorded, more seldom stored, and even more seldom willingly shared with 'outsiders'. This is particularly true at the level of WATSANs (for waterpoint-systems) and households (for latrines). However it is also true at the level of DAs and RWSTs. Completion reports on major projects are difficult to come by and are seldom disaggregated making it difficult to identify to the level necessary for useful analysis. Indeed, it is also difficult to differentiate between software and hardware costs, or between water, sanitation or hygiene related expenditure (where all or some are included in one project). At the same time, it should be noted that record keeping by WSDBs for small town water supplies tends to be far better.

Recommendations for Policy and Practice

The methodology developed and tested by WASHCost for assessing access to services was found to work well and can be recommended for further development and replication. In particular, findings reported in this briefing note series, and the recommendations for policy and practice drawn from them, will remain indicative until they are verified by research at a far larger scale than WASHCost itself is in a position to undertake.

The methodology for assessing costs of specific water points and linking this to services received, while conceptually well founded was not practicable given the current realities of how household water related sanitation and rural water point-system services are provided in Ghana, due to the overall lack of financial record keeping and the tendency to lump systems into large batches for procurement. The approach worked much better in small towns where records are generally better kept.

For the WASHCost work, the next steps are to look for data on life-cycle cost elements for water point-system, water related sanitation and hygiene wherever this is available using a desk study based approach, and to abandon the effort to link it to specific communities or systems. At the same time, this statistical approach will be complemented by case studies of those few systems (point-source, latrines and small-towns) where data is known to exist and modelling based on 'ideal' systems and readily accessible market based cost data.

For Ghana and its rural WASH sector the primary recommendation from a consideration of the successes and failures of applying the WASHCost approach, is to **greatly strengthen the quality of reporting and the accessibility of data at all levels**. And to **include major cost categories in project documentation, including project completion reports**. **Publication of project completion reports** would likely, in itself, become a major driver to reduced costs and increased transparency.

WASHCost briefing note series

Briefing notes relating to survey based work in Bosomtwe, Ketu South and East Gonja

Briefing note 1: Background and Methodology

Briefing note 2: Post-construction costs of water point-systems

Briefing note 3: Costs of rural and small town sanitation services

Briefing note 4: Access to services in rural areas and small towns

Briefing note 5: Access to sanitation services

Briefing note 6: Functionality of rural water point-systems

Briefing note 7: Poverty and access to services

Briefing note 8: Uses and sources of water in rural areas

Briefing notes from desk or case study based work:

Briefing note 9: Case study of twelve small towns in the Central Region

Briefing note 10: Case study of Oyibi multi-village scheme

Briefing note 11: Cost drivers capital investment in small-town pipe schemes

Briefing note 12: Direct support costs to rural WASH service provision



Plate 1: Informal and formal rural water sources



Plate 2: A public standpipe of a small town water supply scheme



Plate 3: A typical focus group discussion with a WATSAN committee (rural)

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