WASH in healthcare facilities life cycle costing approach

Learning from interventions in Ethiopia and Ghana

Introduction

Plans to improve community and institutional water, sanitation, and hygiene (WASH) services often fail to include budget for maintenance and large repairs. A life cycle costing approach (LCCA) can help by providing a detailed breakdown of the costs for delivering sustainable WASH services. This enables district and regional decision-makers to make informed planning and funding decisions, support bilateral and multilateral donors to allocate funding to fill identified gaps, and advise local and international NGOs.

For several years, WaterAid has been supporting governments to use an LCCA to perform a detailed cost breakdown for sustainable WASH services and inform planning and budgeting for community water and sanitation systems. WaterAid identified similar gaps in planning and budgeting for the maintenance and rehabilitation of WASH services in healthcare facilities (HCF) in several countries. To address this, in 2023, we worked with district governments to use the LCCA as part of the 'Strengthening systems for WASH in HCF' project in North Mecha, Dera and Farta woredas in Ethiopia and Asutifi North and Wassa East districts of Ghana. The scope was to support policymakers and authorities, particularly at the sub-national level, in planning and budgeting to accelerate access to safe, affordable, inclusive and sustainable WASH services in HCF.

Why life cycle costing?

WASH in HCF cost estimates provide a first step towards determining the financial and human resources needed to tackle shortages in the health system.[i] Life cycle costing (LCC) identifies the funding required to ensure services are efficient and sustainable.[ii] It estimates the current and future costs of services and helps decision-makers understand the cost implications of the different service delivery models for WASH in HCF. It is therefore useful for making informed budget allocation decisions (e.g. technology choices, number of WASH facilities). By estimating the cost of keeping services running, it helps make the case for allocating adequate budget to operations and maintenance (O&M).

i. Chaitkin M, McCormick S, Alvarez-Sala Torreano J, et al (2021). Estimating the cost of achieving basic water, sanitation, hygiene, and waste management services in public health-care facilities in the 46 UN designated least-developed countries: a modelling study. *Lancet Global Health*, vol 10, no 6. Available at: www.thelancet.com/journals/langlo/article/PIIS2214-109X(22)00099-7/fulltext (accessed 16 Feb 2024).

ii. Agenda for Change (2017). *A district level roadmap for universal access to sustainable WASH services*. Available at: washagendaforchange.org/wp-content/uploads/2020/04/20171106_agenda_for_change_roadmap_revised.pdf (accessed 16 Feb 2024).

LCC calculation tools can be adapted for the context, responding to the local situation, indicators, and services standards and targets. WaterAid learned from the sector's use of LCC and expert guidance to develop an Excel-based tool to analyse LCC for WASH in HCF. This tool was customised for each country and finalised in consultation with country programme staff from Ethiopia, Ghana, Malawi, Rwanda and Uganda who have experience working on LCC with their respective governments.

The LCC tool assists in the planning for multiple HCF across districts and enables budgets to be estimated for different scenarios. To ensure services are sustainable, the LCC tool estimates the:

- capital expenditure (CapEx) required to achieve service-level targets.
- operational and minor maintenance expenditure (OpEx) of existing and new infrastructure.
- capital maintenance expenditure (CapManEx) of replacing assets at the end of their life.
- staff costs and need for support from local government and others for planning, monitoring and adherence with regulations.

The tool requires input data on:

1. The five areas of WASH in HCF – water, sanitation, hygiene, healthcare waste management (HCWM) and environmental cleaning – (e.g. from a database or survey) using WHO/UNICEF Joint Monitoring Programme (JMP) definitions in line with the Sustainable Development Goals (SDGs) service levels (and additional details such as age of infrastructure/assets).
2. The reference unit costs of services.

The tool was developed to complement rather than replace existing planning and budgeting processes by helping to break down the costs of sustainable WASH in HCF.

Countries' experiences

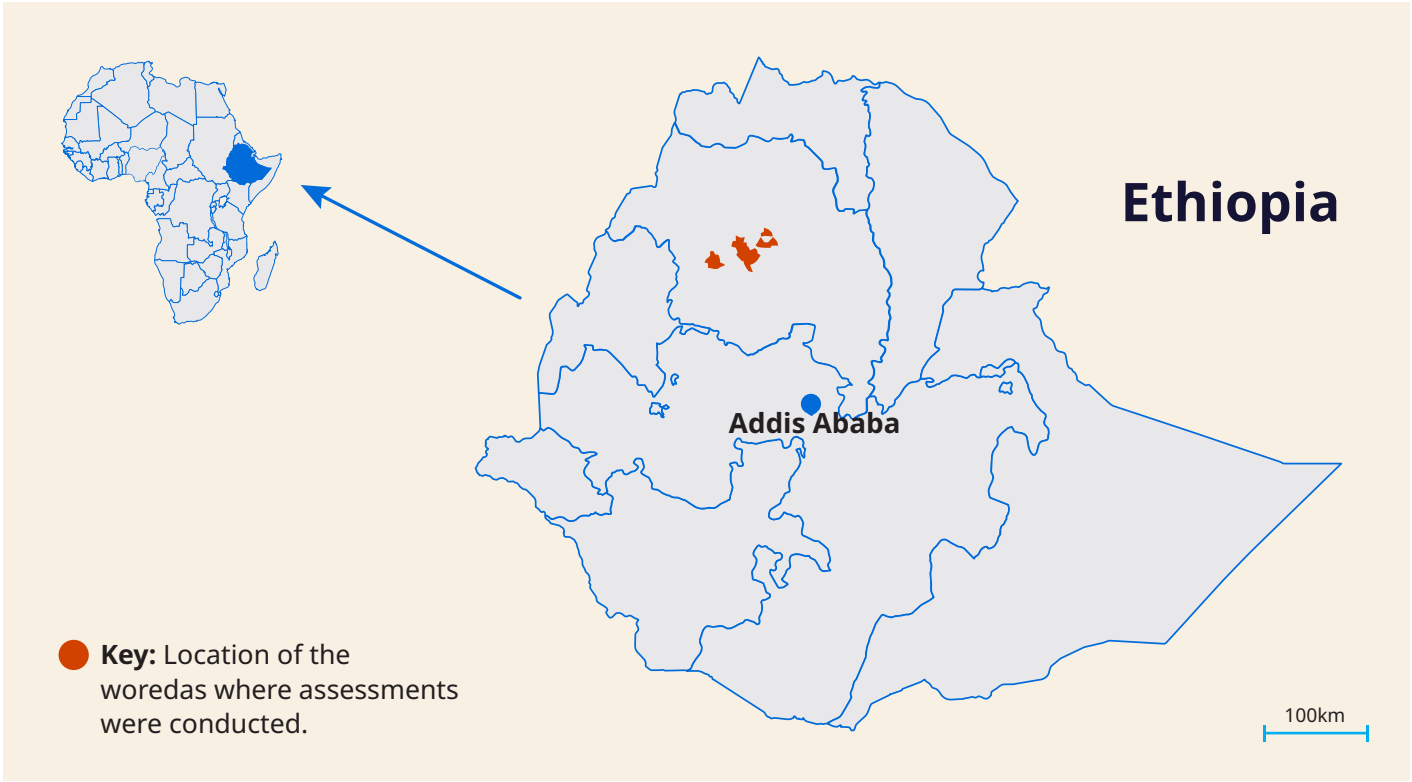
WASH in HCF budgeting legislation, processes and challenges

Ethiopia

In Ethiopia, the health sector financing and budgeting process involves various funding sources, including government funding, donor support, healthcare financing, and out-of-pocket payments from individuals accessing healthcare services. The regional governments operate autonomously, with the regional president serving as the head and governance structures established at the level of the regional parliament, cabinet and auditor.

Upon receiving block grant transfers from the federal government, each autonomous regional government exercises control over its budget allocation. The regional government determines the portion of the budget retained for regional-level interventions, deciding on sectoral allocations for expenditures within the region. Additionally, it allocates block grants to woredas, granting them autonomy to determine sectoral allocations for expenditures at the woreda level. This decentralised approach allows regional and woreda authorities to tailor budget allocations to local priorities and needs, enhancing governance effectiveness and responsiveness to community requirements.

After the national budget receives approval from parliament, each woreda submits its budget proposal to the respective regional government for further approval. This budget proposal is a comprehensive document detailing the specific needs, priorities and estimated costs associated with implementing various projects and programmes within the woreda. Once received, the regional government reviews these proposals thoroughly, considering both the woreda's requirements and the available resources at the regional level. Adjustments may be made to align the proposals with regional priorities and to ensure effective allocation of resources across the region.



This iterative process allows for coordination between national and regional levels of governance, ensuring that local needs are addressed within the broader context of regional development goals and resource constraints.

Due to the absence of a dedicated budget code and budget line, there is no direct allocation of funds specifically designated for WASH services in HCF in the above-described budget allocations. However, WASH in HCF interventions are incorporated into other budgeted activities, such as maternal and child health, wider WASH programmes, and healthcare facilities expansion. This means funding for WASH initiatives within HCF is typically sourced from broader health budget categories rather than being explicitly earmarked. As a result, the implementation of WASH interventions in HCF relies on integrating these activities within existing budget allocations for related programmes or services, highlighting the importance of strategic resource allocation and coordination across different sectors to ensure adequate provision of essential services in HCF.

Challenges include:

- Significant gaps in WASH provision within HCF (improved water source 55%, improved sanitation 78%, hand hygiene facilities at points of care 70%, waste management – water segregation 93% and waste treated 64%, and no evidence of environmental cleaning – presence of cleaning protocols and training on cleaning)[iii], including shortcomings in infrastructure, supplies and access to water.
- Lack of a separate budget line for WASH in HCF, including for water, waste management and other WASH components.
- WASH services in HCF are heavily reliant on donor support, as the woreda does not allocate a budget specifically for these services.
- CapEx, CapManEx and OpEx associated with WASH exceed the financial capacity of HCF internal revenues and even that of the woreda.
- Lack of adequate and sustainable domestic financing for HCF WASH interventions at the national, regional and woreda levels.

iii. WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (2022). *Progress on WASH in health care facilities 2000–2021: special focus on WASH and infection prevention and control*. Available at: www.who.int/publications/i/item/9789240058699 (accessed 19 Jul 2024).

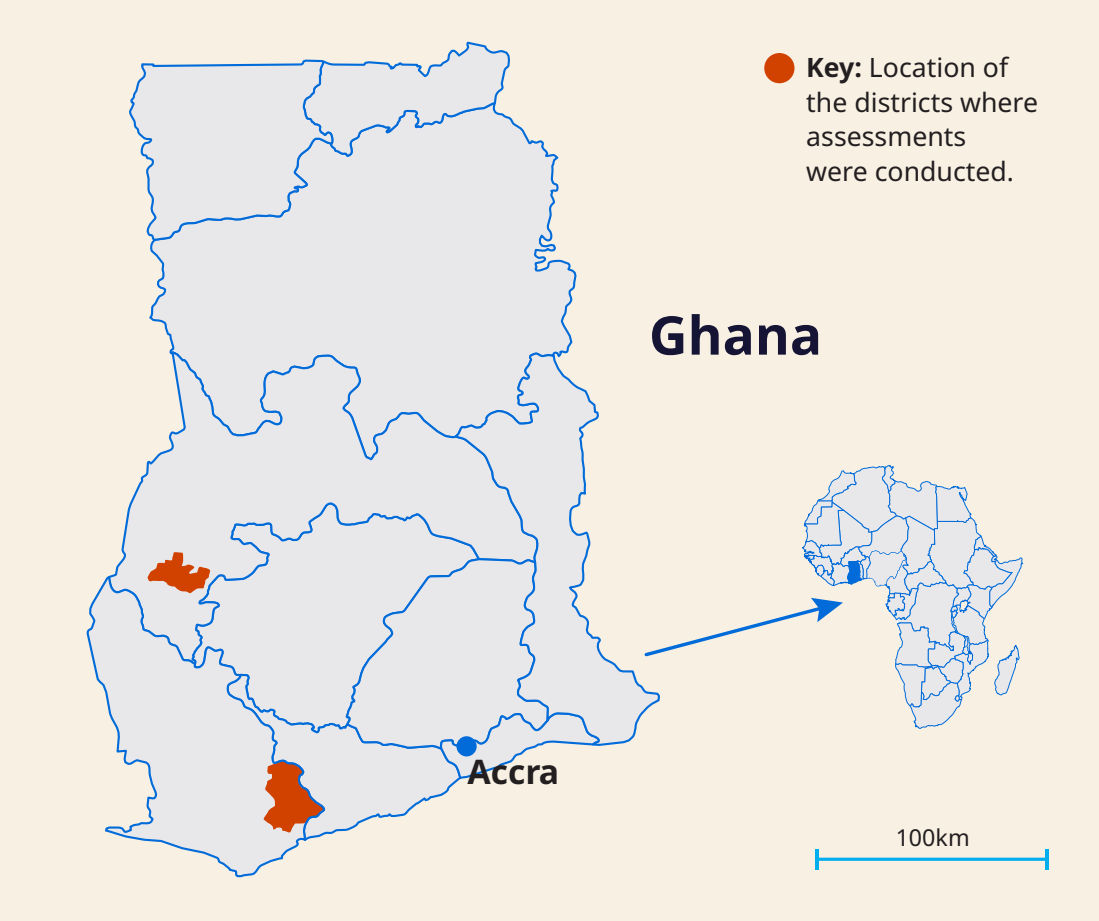
Ghana

In Ghana, district assemblies in consultation with the district health directorates (Ghana Health Service – GHS) plan and budget for capital expenditures and major rehabilitations. Plans and budgets are consolidated into district medium-term development plans (MTDPs) and annual plans for funding from the national government (District Assembly Common Fund – DACF). GHS plans and budgets for O&M and minor rehabilitations.

There is a data management and information system (DHIMS) in the health sector but there are gaps in access to WASH in HCF data due to the absence of detailed information about specific facilities and the availability of WASH services. The practice of routine monitoring/assessment of HCF facilities and assets, including WASH and infection prevention and control (IPC), is project-based.

WASH in HCF is a challenge for Ghana. In 2021 GHS estimated that around 45% of HCF lacked a basic water service, 50% had no basic sanitation service, 43% had no basic hygiene service, and 40% had no basic waste service (waste management in HCF has seen little improvement in the past years). This was confirmed in the assessment performed in two districts.

In Ghana, around 90% of WASH in HCF is largely donor funded. A national costed strategy on WASH in HCF has been developed but is yet to be rolled out. It is estimated that approximately $13.9m is needed for CapEx, excluding new HCF, and $13.6m is required for annual O&M costs.[iv] The national costed strategy does not provide clear allocations needed from government, donors, the private sector, and so on. Therefore, WaterAid Ghana in partnership with the district government carried out LCC work for WASH in HCF at the district level.



iv. Cost estimation from 2018.

LCC process – working with districts/woredas to understand current WASH service levels

Ethiopia

The assessments were conducted in three woredas of Amhara region – North Mecha, Dera and Farta (see Table 1).

Table 1: Ethiopia assessment statistics by woreda

Woreda	Number of kebeles (wards)		Population	Number of HCF		
	Rural	Urban		Health posts	Health centres	Hospitals
North Mecha	33	8	323,193	40	10	1
Dera	36	3	310,037	39	11	1
Farta	32	1	192,819	31	8	0

To understand current WASH in HCF service levels, the team developed a WASH in HCF service level assessment survey. The assessment included questions on water, sanitation, hygiene, waste management, environmental cleaning, and staff inventory.

The survey was carried out using mWater, a free data collection and analysis tool. Training was organised for HCF and district WASH focal people on the survey questions, the use of the mWater application, and how to collect and submit the data. The trained focal people returned to their HCF and districts to collect and submit the data. During data collection and submission there were security problems in the country where the internet was limited or blocked. To verify the data and fill in any gaps, the team made phone calls to the HCF and district-level focal people.

mWater training in Ethiopia

WaterAid

The results of the assessment are presented in Table 2. They indicated higher service levels for water, waste management and hygiene services than for sanitation and environmental cleaning.

Table 2. Service levels for WASH in HCF in Ethiopia

	Water	Sanitation	Hygiene	Waste management	Environmental cleaning
North Mecha					
Basic	7	1	10	7	3
Limited	4	10	1	4	7
No service	–	–	–	–	1
Dera					
Basic	7	6	8	9	5
Limited	5	6	2	3	6
No service	–	–	2	–	1
Farta					
Basic	3	1	3	5	4
Limited	3	7	5	2	4
No service	2	0	0	1	0

Key:
- Basic water
- Basic sanitation
- Basic hygiene
- Basic healthcare waste management
- Basic environmental cleaning
- Limited service
- No service

Ghana

In Ghana, the LCC approach was used in the Asutifi North and Wassa East districts (see Table 3). Asutifi North district is one of six metropolitan, municipal and district assemblies (MMDAs) in the Ahafo region. Wassa East (formerly Mpohor Wassa East) district is one of 14 MMDAs in the Western region and is located at the south-eastern end of the region.

Table 3: Ghana assessment statistics by district

District	Population	Number of HCF						
		CHPS compounds	Health centres	Hospitals	Clinics	Maternity homes	Infirmaries	Christian Health Association of Ghana (CHAG) facilities
Asutifi North	76,678	5	2	3	4	1	3	1
Wassa East	103,893	17	3	2	5	2	0	0

In Asutifi North there are four Community Health and Planning Services (CHPS) compounds fully built or completed but not operational awaiting connection to water, electricity and other essential equipment. Wassa East previously had 31 HCF but two of the facilities are currently not in operation (Kakabo CHPS and Nsuta).

As in Ethiopia, an assessment was carried out using a standard survey to understand the current service levels for the five areas of WASH in HCF (as per the JMP definitions) in Ghana.

In Asutifi North 22 HCF were assessed and 28 were assessed in Wassa East. Table 4 shows the outcome of the assessment of WASH in HCF service levels in the two districts. The results indicated low service levels for sanitation, waste management and environmental cleaning.

Table 4: Service levels for WASH in HCF in Ghana

	Water	Sanitation	Hygiene	Waste management	Environmental cleaning
Asutifi North					
Basic	12	0	14	0	0
Limited	9	17	0	14	22
No service	1	5	8	8	0
Wassa East					
Basic	17	0	14	0	0
Limited	10	24	11	14	27
No service	1	4	3	14	1

Key:
- Basic water
- Basic sanitation
- Basic hygiene
- Basic healthcare waste management
- Basic environmental cleaning
- Limited service
- No service

Use of Excel-based tool for LCC

WaterAid developed an Excel-based tool to calculate the life cycle costs for WASH in HCF. This tool requires data on current service levels, reference unit costs for services, staffing and certain planning details (e.g. rehabilitation, new infrastructure), as previously described.

In both countries, collating data on reference unit costs for services presented some challenges. Often in previous budgets infrastructure costs were recorded as lump sums rather than costs per unit. Some reference unit costs had not previously been recorded (e.g. incinerators, mechanised boreholes, refuse bins, specific types of toilets).

OpEx costs were not available for several HCF as the facilities did not document the amount spent on operations. In addition, certain standard reference unit costs used in the tool needed adjustment to suit the country context. For instance, in Ethiopia, HCF typically use a single incinerator for all waste, including used menstrual hygiene materials. Both country teams worked with district/woreda stakeholders to estimate unit and operational costs. In Ghana, the team engaged the district engineering and works departments to collect data on the reference unit costs of WASH infrastructure.

Participatory workshop with government and HCF staff

The LCC approach and tool were new to district/woreda and HCF staff. A participatory workshop was held in both countries to introduce the LCC tool and train staff on how to use it. During the workshop, WaterAid had a thorough discussion with the government to understand its needs and what could be done to improve WASH in HCF using the LCC tool. The governments committed to include in their plans budget for O&M and CapManEx, which are often missed.

Results

Data analysis and outputs – including limitations and assumptions

The following graphs present the output of the LCC calculations in the various districts with cost breakdowns for the five areas of WASH in HCF presented year by year. Most new capital for gaps in infrastructure was planned to be built within one to two years of the assessment, resulting in a CapEx peak in the first few years.

As the assessment in all three woredas in Ethiopia was completed in 2023, there is a high peak in CapEx in 2024 compared with following years due to the decision to address the large infrastructure gap within the first two years. Gradually, as new infrastructure is put in place, CapEx decreases and CapManEx and OpEx increase to sustain the services. Water and sanitation CapEx is much higher than CapEx for hygiene, waste and cleaning. OpEx is consistent throughout the years.

In both Asutifi North and Wassa East districts of Ghana, sanitation CapManEx is highest in 2023 as this is the year the data was entered and assets need replacing at the beginning of the planning period. Water, sanitation and hygiene OpEx are similar across the two districts.

In Asutifi North, sanitation CapEx is high in 2023/24 as new infrastructure is required. Waste CapManEx is highest in 2026 as the government is planning large infrastructure repairs. In Wassa East, waste CapEx is only present in 2025 as per a decision made by the government on the age of infrastructure. Waste and cleaning OpEx are much lower than other areas as the lifespan of infrastructure is higher than for water, sanitation and hygiene.

Figure 1: Total costs for WASH in HCF in three districts of Ethiopia, 2023–2030

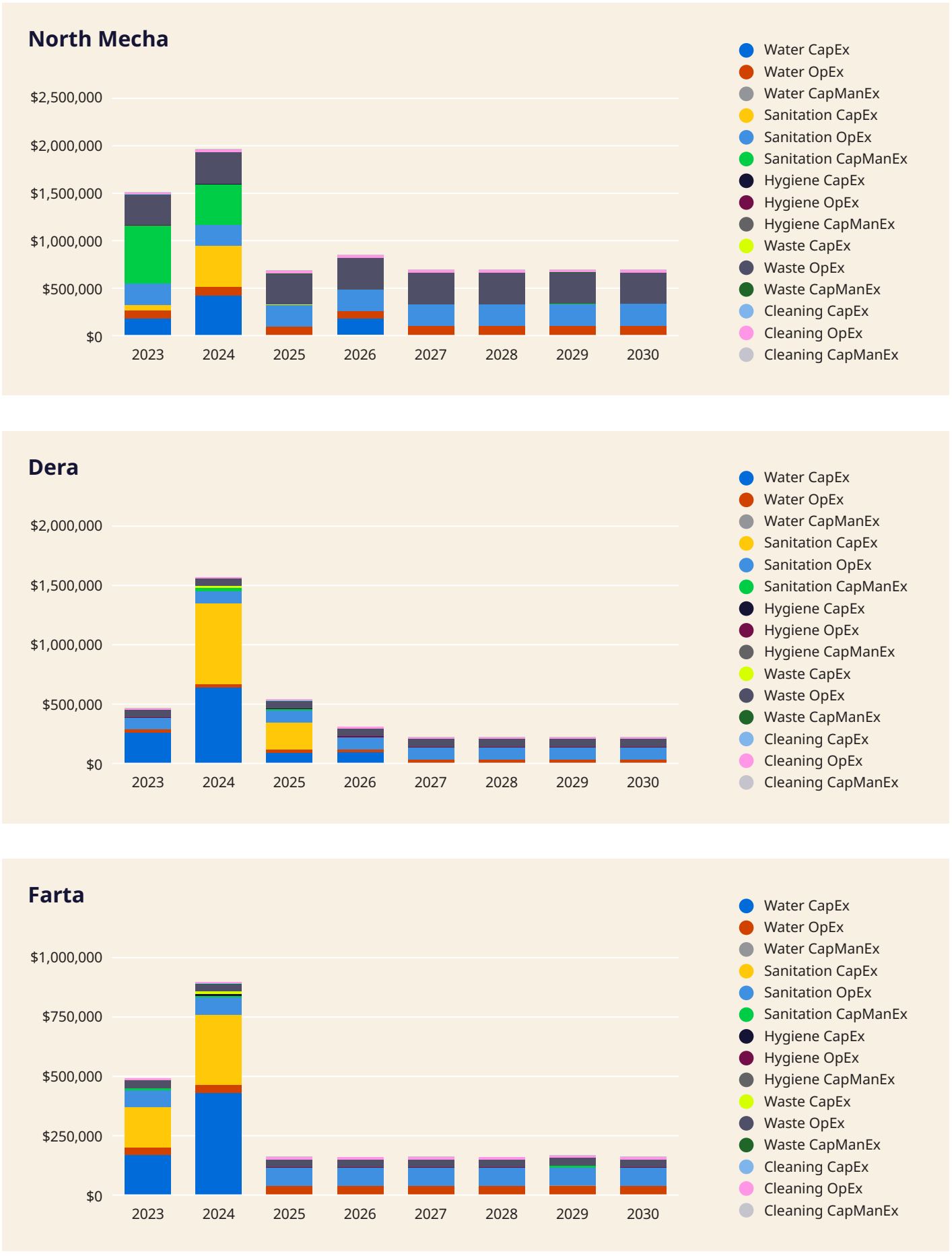
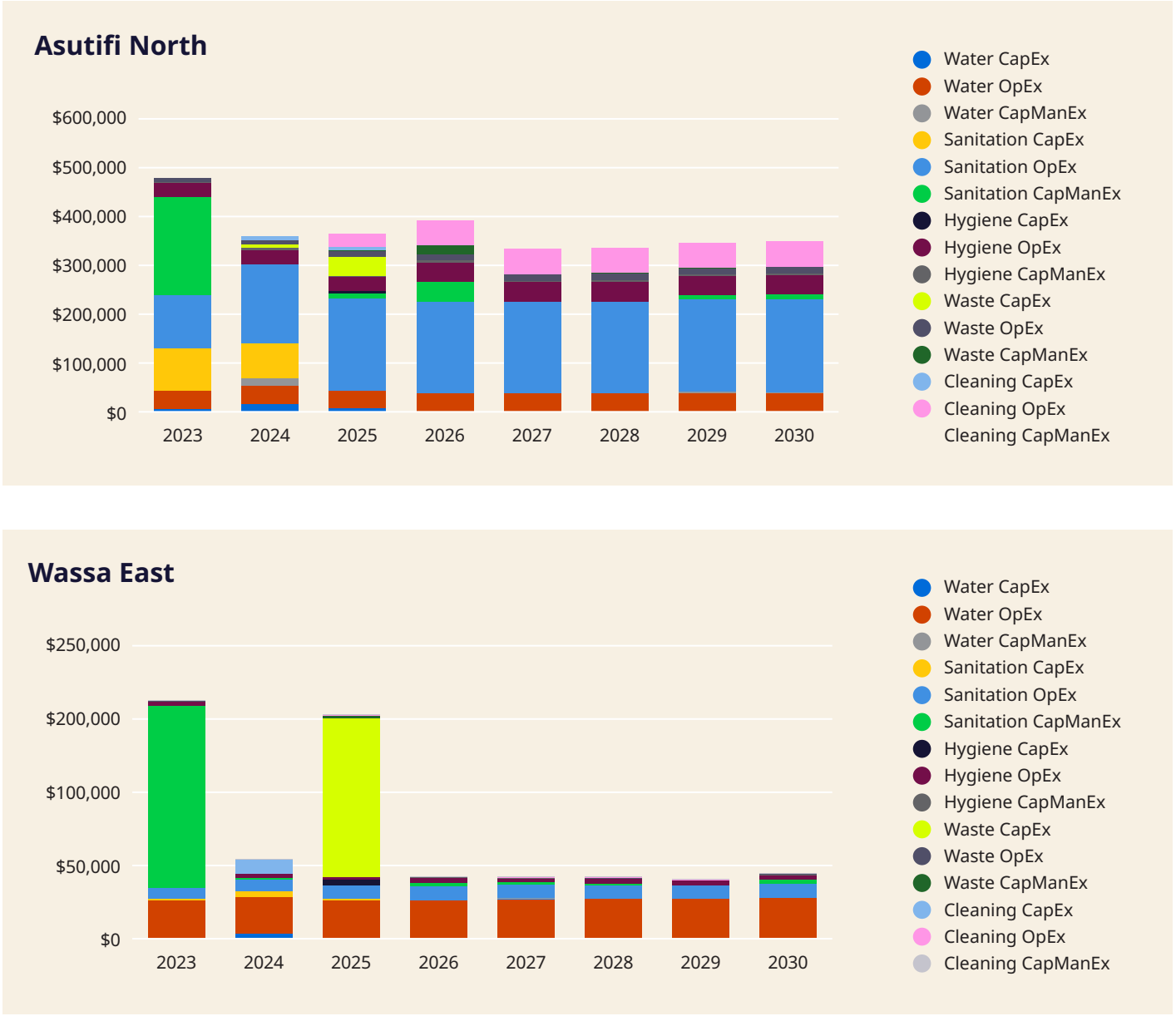


Figure 2: Total costs for WASH in HCF in two districts of Ghana, 2023–2030



After determining the total cost for WASH in HCF between 2023 to 2030 for Ethiopia and Ghana, per capita costs were calculated for CapEx, OpEx and CapManEx. Table 5 shows the total and per capita costs for all five areas of WASH in HCF for eight years. Due to population variances, the per capita cost varies. The age of infrastructure also affects ongoing costs.

In both Dera and Farta districts per capita CapManEx is much lower than in other districts. This is because most of the new infrastructure construction is planned for 2023 and 2024 (see Figure 1 explanation) and therefore CapManEx would not be required immediately.

Table 5: Per capita investment per district/woreda

Country	District/ woreda	Population	CapEx	Per capita CapEx	OpEx	Per capita OpEx	CapManEx	Per capita CapManEx
Ethiopia	North Mecha	323,193	$1,282,822	$3.97	$2,602,096	$8.05	$1,049,635	$3.25
	Dera	310,037	$1,975,393	$6.37	$1,686,491	$5.44	$37,585	$0.12
	Farta	192,819	$1,066,609	$5.53	$1,238,005	$6.42	$23,198	$0.12
Ghana	Asutifi North	76,678	$248,396	$3.24	$2,371,814	$30.93	$337,902	$4.41
	Wassa East	103,893	$169,457	$1.63	$405,678	$3.90	$183,007	$1.76

Learning and next steps for WaterAid

Ethiopia

The LCC calculation and analysis helped HCF staff and local government to understand the gaps in their planning and budgeting processes regarding WASH services, especially for O&M and asset replacement. It is expected that the use of data for planning and budgeting will increase in the future. WaterAid Ethiopia plans to continue collaborating with North Mecha district and intends to reassess WASH in HCF budgets according to the LCC results.

Additionally, it aims to explore avenues for augmenting funds allocated to WASH in HCF. The district health office will then develop its annual WASH development and advocacy plans based on the SDGs, considering the context. The district will update its context using the LCC data, which will be incorporated into the development and advocacy plan.

Ghana

The two districts plan to use the outcome of the LCC assessment to influence decision-making and investments in WASH in HCF. The data will be used to influence the district assemblies that to date have not been budgeting for the replacement of assets (CapManEx) and the health directorate which does not currently have a budget line for essential operational costs (OpEx). The districts will be using LCCA to influence decision-making and increase investment in WASH in HCF. WaterAid is planning to continue using the LCC approach and tool to support other districts and cities to improve their planning and budgeting for WASH in HCF to ensure improved and sustained service levels.

Acknowledgements

The life cycle costing work in Ethiopia and Ghana presented in this learning document has been supported by the Conrad N. Hilton Foundation.