

# Systems Strengthening for Sustainable Urban WASH Services: Big Gains from Small Funds

## Experiences from WaterAid Ethiopia's 20 Town Capacity Development Programme



Millions of dollars of investments are being made in improving and expanding infrastructure for water supplies in Ethiopia's small towns. However, such investments do not systematically include budget provision for capacity building of those who will operate and sustain the systems. This note describes a WaterAid Ethiopia project which has effectively 'filled the capacity development gap' in 20 towns across the country. This learning note documents experiences, costs, successes and lessons learned from the ongoing five year-long Yorkshire Water-supported capacity strengthening programme in Ethiopia, implemented in partnership with the Ministry of Water Irrigation and Electricity. It provides an overview of the approach taken for developing capacity, and shows that a small investment in capacity development can be catalytic (and essential) in maximising the impacts and sustainability of urban WASH programmes.

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*This note was commissioned by WaterAid Ethiopia, and developed by Will Tillet (Aguaconsult), with inputs from Harold Lockwood (Aguaconsult), and Manaye Siyoum, Haile Dinku and Bethlehem Mengistu from WaterAid Ethiopia.*

## Executive Summary

Ethiopia has steadily increased the proportion of urban residents who have access to improved water supplies in recent years. This is impressive considering the high rates of population growth and rural to urban migration the country is experiencing. The government has a major sector-wide programme ('One WASH') aiming to achieve universal access to WASH services, and the Second Growth & Transformation Plan (GTP II) sets ambitious targets for raising WASH service levels, in line with its aspiration to move towards a lower-middle-income status.

Despite these laudable achievements, there are widespread challenges affecting sustainable WASH service delivery in Ethiopia's towns. The public water utilities and town administrations struggle to keep pace with the rapid urban expansion in terms of extending already stretched water supply and waste management services. Capacity in the water utilities is often low, and infrastructural investment projects in the towns often neglect to include meaningful or effective capacity development components. With over 980 towns across the country, governmental units mandated to support the individual town water utilities are often overstretched. The utilities have weak internal systems and processes, with inefficiencies in their operations undermining their ability to be financially sustainable, or to provide an adequate and quality service to their customers. As an example of the inefficiencies of management, in 2015 the sector average for utility non-revenue water stood at 39%. The utilities commonly face challenges in meeting their recurrent costs from tariffs, and are generally reliant on external grants and subsidies for major maintenance and expansion works. Town administrations often struggle to manage the ever-growing volumes of solid and liquid waste generated in their municipalities, creating significant environmental health issues in many of the towns.

WaterAid Ethiopia (WAE) has been implementing a Yorkshire Water (UK) funded capacity development project in twenty towns across the country since 2014. These towns were selected as they had previously received infrastructure investments from the Government or Development Partners, but such investments did not include capacity strengthening components. The twenty-town project, which is implemented in partnership with the Ministry of Water Irrigation and Electricity is due to run until 2019, and is around half-way through its timeframe. This learning note provides an overview of the capacity development project, its key achievements, and lessons learned to date.

There are widespread challenges in capacity strengthening initiatives in the sector, which can lead some stakeholders to question the value of investing in such initiatives rather than focussing funds only on 'hardware' investments. Capacity strengthening initiatives in the sector are often restricted to one-off trainings for individual staff members. These can be of limited effectiveness, as the skills are lost when the trained staff member moves on. Trainings often lack follow-up mentoring or monitoring, and trainees often face challenges to implement their new skills due to a lack of resources in the utility, or a lack of commitment in the utility or town administration to implement new approaches. Capacity strengthening through technical assistance can in some cases undermine ownership and leadership of the host organisations, and can sometimes be a case of consultants 'doing' rather than 'enabling and supporting'.

The WAE twenty-town project takes a holistic, sustained, systems building approach to capacity development. Trainings are accompanied with the provision of manuals and where necessary equipment, and trainees are required to develop post-training action plans, the implementation of which are reviewed during bi-annual monitoring and mentoring visits to each

town. Microgrants are provided to the towns to undertake post-training initiatives such as customer mobilisation campaigns, and there is a strong focus on strengthening not only personnel skills, but also the water utilities' internal processes and systems. Annual meetings of all the towns allow for inter-town support and learning networks to be established, and the performance ranking and awards provided for progress creates healthy competition and motivations for the utilities to continue to reform and excel. A first step of the project is to strengthen the WASH governance and coordination structures in the towns, and also to strengthen the customer-utility dialogue, to ensure a conducive enabling environment in which to make subsequent progress.

The project focusses on twelve core concepts, as outlined in the table below.

Focus Areas	
1. Understanding policies, strategies, roles and responsibilities	2. HR management
3. WASH governance arrangements (Water Board, Urban WASH Management Forum, Customer Forum)	4. Technical O&M (Electro-Mechanical)
5. Strategic business planning	6. Integrated database management
7. Asset management	8. Customer service and billing
9. Leakage management	10. Water safety and quality
11. GIS and networking	12. Urban sanitation and hygiene

The main body of this report provides an overview for each of these twelve concepts in terms of the pre-intervention issue, what has been done, and improvements achieved to date. It also provides concrete evidence and case study examples from the towns.

In summary, examples of key improvements have included (but are certainly not limited to):

- **Town Water Boards** have been refreshed and oriented in their roles, and have moved from relatively dormant and often un-supporting structures, to effective and engaged governance bodies maintaining oversight over the utility, and assisting in strategic planning, problem solving and decision making. The Boards have now established performance contracts with the utilities.
- Utilities have moved from relatively weak annual budgeting cycles, to developing and updating multi-year **strategic business plans**. The business plans have been key in projecting revenues and investments required, helping to form an objective basis for tariff reviews. They have also increased the credit-worthiness of the utilities, as they are able to demonstrate to grantees and creditors the long-term financial viability of investments made in their infrastructure.
- There has been a long history of poor communication, cooperation and trust between the utilities and the residents in many of the towns. Through customer mobilisation campaigns and establishing '**customer forums**', there is now constructive dialogue and collaboration between the utilities and residents, and a stronger sense of accountability of the utility to its customers. The establishment of multi-stakeholder **Integrated Urban WASH Management Forums** in the towns has created platforms for cross-agency coordination and collaboration, which has proved key in

addressing multi-stakeholder issues such as leakage management, protecting water quality, and on issues of urban planning and development.

- The concept of **Asset Management** is now understood and applied in the towns, helping to maximise the design life of their water supply systems. Above and below-ground assets are now depreciated in accounting, and there has been a shift from unplanned reactive repairs, to routine, preventative and planned maintenance and replacement works. The management of stocks has gone from heaped piles of items in rooms and yards, to having dedicated stores and clear stock management systems. This has considerably reduced repair times as critical items are kept in stock and replenished when low, and time is not wasted searching for stored parts. The development and updating of asset inventories has also helped identify expired items which can be re-sold, providing valuable additional revenue streams to the utilities.
- Through training and concerted efforts on **leakage management**, utilities have been able to make major reductions in their non-revenue water rates, with an average reduction across the twenty towns of 30% from baseline levels. Seven of the twenty towns have achieved reductions of over 40%. It is calculated that in total over the twenty towns, the reductions in rates of unaccounted for water represent around 5,250m<sup>3</sup> of water saved each day, which theoretically could provide around 130,000 more people with water, and bringing savings/additional revenues of GBP £185,000 per year.
- Through training and software provision on **Integrated Database Management**, the utilities have moved from relatively inefficient, manual paper-based processes to modern, automated and computer-based systems. This has helped in real-time information flow between utility departments, increased data availability for audits and operational management, and modernised the financial management methods. The automation of the customer billing processes has helped reduce billing preparation times from over 30 days to less than 1 day, and GPS-enabled meter reading applications have increased the accuracy of the billing processes. Customer satisfaction has increased due to quicker bill payment times, less errors on their bills, and the fact in some towns they now receive automated SMS messages informing them their bill is ready for payment.
- Following training in **Electro-Mechanical Operation and Maintenance**, the utilities have invested their own funds in establishing workshops, pump testing facilities and procuring tools for their technicians. Where before utilities were often disposing of broken (repairable) items, or suffering long system downtimes waiting for maintenance support from the Regional Bureaus, the utilities are now able to identify and remedy faults rapidly, and repair and re-use items, thus maximising the lifespan of their assets and reducing maintenance costs.
- From the trainings in **Human Resources Management**, the utilities have put in place performance-based management arrangements with their employees, which, together with establishing more clear and transparent HR procedures, has strengthened the motivation and teamwork of the staff.
- Following training in **water safety planning**, and training and equipment provision in **water quality** testing, utilities have gone from infrequent and often ineffective water quality monitoring, to having in-house equipped laboratories, undertaking routine monitoring at points across the water supply system. Water Safety Plans have been developed for each town, with utilities fencing the sources and working to legally acquire land around well fields to act as buffers from source contamination. Within the towns, the Health Extension Workers who were trained from

Microgrants of the project are monitoring for contaminant risks, and educating users on the importance of the 'safe water chain'.

- Whilst it is a relatively recently added component of the project, there have been considerable improvements in **solid and liquid waste management** in the towns. Previously the Health Departments and Town Administration lacked any data on waste generation rates or analysis on waste flows and financing needs. Following training and undertaking of key studies in the towns, waste management plans are being developed, and resources are being mobilised for investments in waste transport, disposal and treatment facilities. Equipment such as motor-tricycles and training has been provided to the Micro-Scale Enterprises engaged in waste management in the towns. As a result of improvements in the management and revenue streams in waste in the towns, the MSEs are increasing their incomes, employing more staff (many of whom are women and/or from vulnerable households), and are increasing waste collection coverage rates.

The improvements of the project extend well beyond the twenty towns. Well performing project towns have become 'model towns', which other towns in the regions visit to learn from. For example Debere Tabour, one of the best performing of the twenty towns, has already hosted (self-funded) learning visits from over 160 towns. The utilities supported in the WAE project are providing mentoring and also technical services to neighbouring town utilities, for example helping to map their water networks, cascading trainings to their teams, and providing a repair service (on a fee basis) through their newly established workshops. Tigray Region has adopted a utility clustering model, whereby groups of around seven-eight towns in an area are clustered together for peer-peer learning and cross-town support. The Tigray Regional Water Bureaux is already planning to scale the WAE project to an additional seven towns in the region, to ensure there is at least one 'model' project town in each cluster.

Overall the capacity development project has made impressive gains in strengthening the efficiency, effectiveness, accountability and sustainability of WASH services in the towns. The relatively minor investments in capacity development add considerable value to the much larger investments being made by others in infrastructure. It helps to maximise the impacts of the infrastructure, and strengthen the financial viability and strategic management of the WASH services, meaning the utilities and town administrations will be less reliant on external grants and subsidies for the future.

Infrastructural investments in the twenty towns are of the magnitude of GBP £45m, whilst the total WAE capacity development project budget is just GBP £1m, representing just 2% of the total investments in the towns. Per capita costs of the capacity development project are around GBP £1.1 (approximately ETB 30). The project has also helped to lever considerable additional resources from the utilities, town administrations, customers and other local stakeholders. These investments are on items such as source and network expansion, establishing water quality laboratories and warehouses, on IT hardware and waste management equipment. Data from four of the towns shows that on average for every GBP £1 invested in the capacity development project in the towns, a further GBP £5.64 has been subsequently levered from local sources.

Recommendations are captured in Section 12 of this document. Moving forward, it is hoped that practical examples such as these can continue to demonstrate cost-effective options for capacity development, as with around 980 towns nationwide, the sector faces considerable challenges to meet the capacity gap to ensure sustained and adequate urban WASH services.



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## Acronyms

AfDB	African Development Bank
DfID	Department for International Development
EIB	European Investment Bank
ETB	Ethiopian Birr
EU	European Union
GBP	Great British Pound
GIS	Geographical Information Systems
GoE	Government of Ethiopia
GPS	Geographical Positioning System
GTP	Growth & Transformation Plan
HDPE	High-density polyethylene
HR	Human Resources
IT	Information Technology
JMP	Joint Monitoring Programme
KPI	Key Performance Indicators
L/c/day	Litres per capita per day
M&E	Monitoring & Evaluations
MoWIE	Ministry of Water Irrigation & Electricity
MSE	Micro-Sized Enterprise
O&M	Operation & Maintenance
TA	Technical Assistance
UK	United Kingdom
WAE	WaterAid Ethiopia
WASH	Water, Sanitation & Hygiene
WSPs	Water Safety Plans

## 1. The Context and Challenges of Capacity and WASH Service Delivery in Ethiopia's Towns

Ethiopia has sustained substantial economic growth in recent years, and is experiencing considerable rates of rural-to-urban migration. Ethiopia's second Growth and Transformation Plan (GTP II) clearly highlights the political commitment in the country towards the water and sanitation sector, setting ambitious targets for access and improving service levels. The One WASH National Programme also provides a clear framework and costed programme to move towards universal access to WASH services. Data suggests that 77% of urban residents have access to basic or safely managed water services (WHO/UNICEF JMP 2017). Despite high rates of population growth and rural to urban migration, Ethiopia has been able to steadily increase the proportion of urban residents with access to improved WASH services over the last decade.

However despite the progress in increasing water access, the access figures mask considerable issues of service quality, such as intermittent supplies, long system outages, disparity of services, high operational costs, utility inefficiencies, poor water quality, and low customer satisfaction. Ethiopia is already facing considerable challenges with water shortages in many of its towns, yet the recent government targets have raised the expected per capita water provision from 20l/c/d to between 40-100l/c/d<sup>1</sup>. The fast-paced construction of industrial zones, new universities, and new residential areas also pose major challenges for utilities to meet growing water demands. Rapidly increasing urban populations are putting a strain on urban sanitation systems, with municipal authorities struggling to manage the growing volumes of solid waste and to ensure safe transport of liquid waste. Environmental sanitation remains a considerable risk to public health, with waste often left rotting on streets or being burned due to infrequent or complete lack of waste collection services in many areas.

The Government of Ethiopia and development partners are investing considerable resources in constructing and upgrading urban water supply systems, and to a more limited extent in constructing waste (solid and faecal sludge management) disposal facilities. However, such investments are not systematically including long term capacity development initiatives for the public utilities and town administrations which are expected to manage them. There is around 980 towns in Ethiopia, each with a different utility managing their systems. This is a large number of service providers to monitor and support, and given sometimes stretched government capacity, and the size of the country, not all towns receive the level of monitoring and technical support which they may require.

Public water utilities suffer considerable gaps in capacity, in terms of staff numbers, skills, equipment, and efficient internal processes and systems to manage water supply and sanitation infrastructure. There is no systematic training of utility staff in the sector, and utility managers are often appointed with no former experience or related qualifications. The management of water supply infrastructure in towns is often more 'reactive' or 'firefighting' of problems rather than strategically planned and implemented, so as to maximise cost efficiencies and the lifespans of infrastructural assets. As an example of the inefficiencies of management, in 2015 the sector average for utility non-revenue water stood at 39%. The GTP II raises expectations on the performance of utilities, with targets of non-revenue water of below 20%, and expectations to increase service duration to 16 hours per day. However without considerable support to utilities, these targets will be challenging to meet. There is no formal sector regulator, and major gaps and weaknesses are present in lines of accountability and clear incentives for utility performance. The inefficiencies of management of the water supply infrastructure mean that rather than being financially self-sustaining, the utilities are

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<sup>1</sup> The Government includes sector targets in its second Growth and Transformation Plan (GTPII) for the period 2015/16 to 2019/20

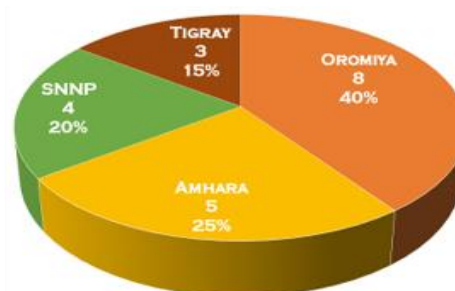


often reliant on subsidy sometimes for operational costs, and often for rehabilitation and expansion of their systems.

## 2. WaterAid Ethiopia's 20 Town Programme

WaterAid has been implementing WASH programmes in Ethiopia since 1981, primarily in rural areas, but is increasingly engaging in the urban context, and focusing on strengthening the sustainability of WASH service provision. Between 2011 and 2012 WaterAid Ethiopia (WAE) implemented a capacity strengthening project in seven towns<sup>2</sup>, funded by WAE and DfID.

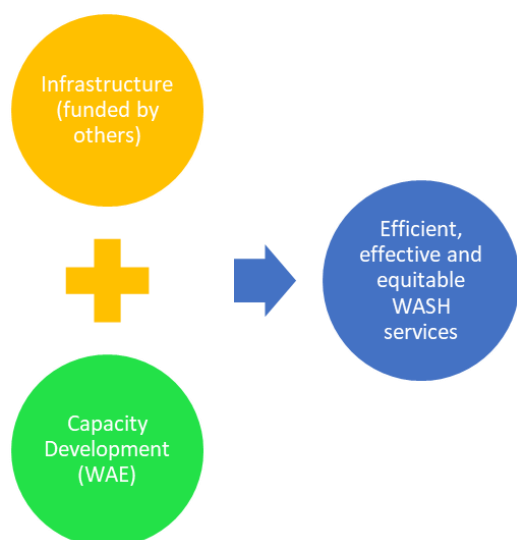
This project was seen as an initial pilot, from which WAE derived lessons, and subsequently partnered with the Ministry of Water, Irrigation and Energy (MoWIE) to scale up to twenty towns. The selection of the towns was undertaken by MoWIE in consultation with WAE, and focused on towns which had either undergone, or were expecting investments, in their water supply infrastructure (funded by GoE, World Bank, EIB, AfDB). These investment projects included limited or no 'capacity development' activities such as training the utilities, municipalities and health offices, so the 20 town project was seen as having the potential to add considerable value. In addition to the project objective of strengthening efficiency, effectiveness and relevance of WASH service provision in the twenty towns, the wider goal is to implement a model of capacity building for utilities and municipalities, which can be scaled up to other small towns nation-wide.



**Figure 1: Location and Regional Distribution of the 20 Towns**

The twenty towns project is a five-year long programme, running from 2014-2019, supported by a UK water utility called Yorkshire Water who provide the £1 million budget and also technical assistance on specific concepts. The principal project activities include: training, supporting the strengthening of internal systems, mentoring, competitions and cross-learning, together with the provision of basic equipment and small grants.

<sup>2</sup> Sebeta, Burayu, welkite, Butajira, Hossaena, Mizan Aman and Asossa



**Figure 2: The 20 Towns Project Concept**

The twenty towns are distributed in four regions of the country, with populations ranging from 25,000-130,000 (with an average of 45,000). In Ethiopia water utilities are 'graded' by the government, based on their service population, performance and other factors. The grading runs from Grade 1 down to Grade 6, with the twenty towns being a mix of towns in Grades 1 to 4.

### 3. The Purpose of this Learning Note

A key goal of the 20-towns project is to demonstrate a model for capacity strengthening that can be scaled. The project is now half-way through its implementation timeframe, and is already yielding some key successes and interesting lessons. The purpose of this learning note is to raise awareness of the project and wider

approach followed for capacity strengthening, and to help add to - and potentially influence - the sector debate in Ethiopia on how capacity can be effectively built for urban WASH services. The learning note aims to demonstrate how critical and cost-effective capacity strengthening can be done in a sector context with a predominant focus on infrastructure.

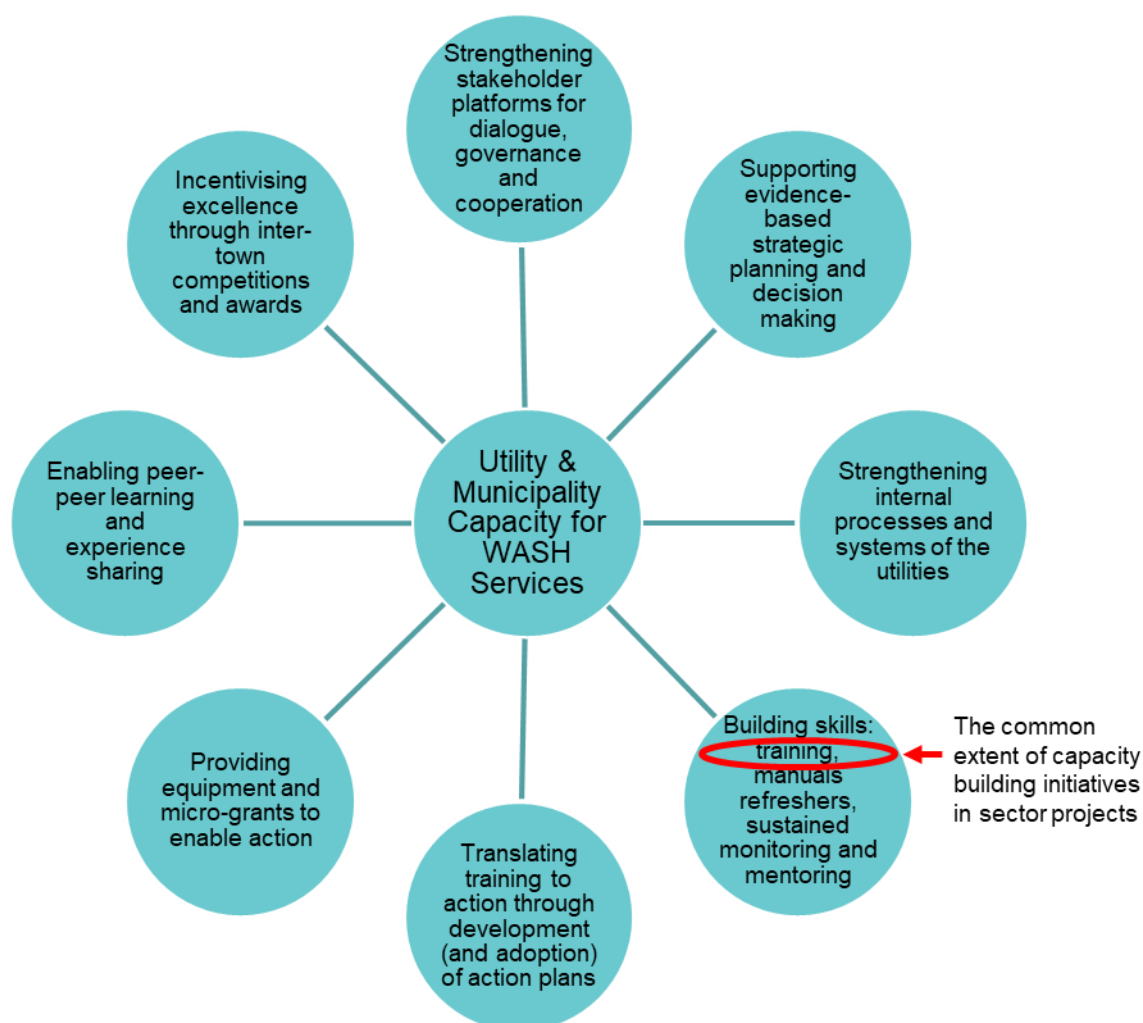
### 4. Approaches and Common Challenges in Capacity Strengthening Initiatives

There are common challenges in capacity building initiatives in the WASH sector, both in Ethiopia and more widely around the world. These include (but are not limited to):

- Trainings are often one-off, with limited refresher trainings and are often project-based meaning there is not a mechanism for the trainings to be continued after the project finishes. With the chronic issue of staff turnover within the municipalities and utilities, this considerably undermines the effectiveness of trainings provided.
- The basis of selecting *who* should be trained can lack transparency and trainees can often be more interested in the travel or per diem associated with the training, than in the training itself. This can lead to a lack of commitment during the training, and in post-training follow-up.
- Trainees are often not required to pass-on or cascade their training down to their colleagues, and may not be able to implement their newly acquired skills due to a lack of support, systems or resources within their organisations. There is often no post-training follow-up to check if the skills are being put to practice, or to address bottlenecks to progress.
- Capacity building through Technical Assistance (TA) is another widespread mode of capacity strengthening, but also with common issues. For example in some cases TA can undermine ownership and leadership of the host organisation and can sometimes be a case of consultants 'doing' rather than 'enabling and supporting'.

### 5. The Approach to Capacity Strengthening in the 20-Town Programme

Unlike many other projects, the twenty-towns project takes a sustained, multi-pronged approach to strengthening service delivery, as shown in Figure 3 below.



**Figure 3: The multi-pronged approach to capacity strengthening in the 20 towns project**

An initial entry point in the project has been to strengthen the governance, coordination and cooperation platforms in the focus towns, to ensure the utilities and municipalities have a conducive and enabling environment from which to make subsequent progress. This has included orientation training to town Water Boards<sup>3</sup> on their mandate and governance protocols; establishing multi-sectoral coordination and problem-solving platforms named 'integrated urban WASH management forums'; and establishing 'customer forums', which provide the opportunity for increased representation of water users and dialogue between service users, utilities and the municipalities.

Trainings are complemented with the provision of basic equipment (such as IT software, GPS units, leakage detection and water quality testing equipment) and also small grants, to enable the institutions to put skills into practice and achieve their post-training action plans. The project supports surveys to address key knowledge or data gaps<sup>4</sup>, which then provide the basis for discussion, raising awareness and political will to address the issues identified, and form the evidence base for strategic planning and budgeting. Focus has been on

<sup>3</sup> Water Boards are multi-stakeholder executive boards that are mandated to maintain oversight and governance over the public water utility in the town. They are commonly around 9 members, often chaired by the town Mayor. Whilst boards exist in all towns with utilities, they are often inactive, politicized and unclear on their mandates and jurisdictions.

<sup>4</sup> For example undertaking solid waste audits, business plan analysis, shit flow diagram studies, etc

strengthening not only skills but internal *systems*, such as finance, HR, asset management etc. to ensure utilities have enabling internal processes to achieve effectiveness, and particularly efficiency. The project has also sought to ensure there are motivational factors in place for staff and institutions to excel, through introducing performance-based management arrangements for staff and between the utilities and the boards, and setting up competitions between the towns, recognising and rewarding successes. In short, the project aims to strengthen systems, structures and skills to help reform relatively inefficient, and ineffective public utilities and municipalities into model towns which surrounding towns can learn from and aspire to (there are 980 towns in Ethiopia).

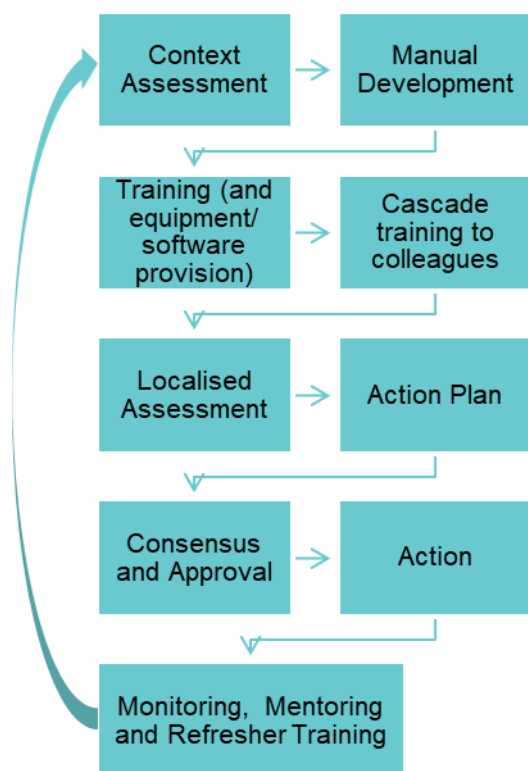
The project focusses on twelve core strategic and interlinked concepts for training and institutional strengthening, as presented in Table 1.

**Table 1: Focus concepts for the 20 towns project**

Focus Areas	
13. Understanding policies, strategies, roles and responsibilities	14. HR management
15. WASH governance arrangements (Water Board, Urban WASH Management Forum, Customer Forum)	16. Technical O&M (Electro-Mechanical)
17. Strategic business planning	18. Integrated database management
19. Asset management	20. Customer service and billing
21. Leakage management	22. Water safety and quality
23. GIS and networking	24. Urban sanitation and hygiene

Whilst each concept is unique, there has been a common approach to how the topics were approached in terms of module design, delivery, implementation and follow-up, as presented in Figure 4. The topics were initially selected based on a baseline survey in the 20 towns, which identified the key gaps in capacity common to many of the towns. Then focusing on individual concepts, they were generally designed based on needs assessments or surveys in all, or a representative sample, of the 20 towns, which were done by the contracted training service providers<sup>5</sup>. From this understanding of the context, the trainers subsequently developed manuals (provided to each utility for future reference and internal trainings), and undertook training for 1-2 participants per town. Before the end of the trainings participants

<sup>5</sup> The training service providers varied by topic, and included a mixture of local consulting firms, training institutions (such as the Ethiopian Management Institute, the Ethiopian Water Institute), large utilities (such as Yorkshire Water and Addis Ababa Water & Sewerage Authority), the WHO, and WAG TECH



**Figure 4: The common process taken for each topic covered**

were supported to develop post-training **action plans**, and were encouraged to cascade trainings to colleagues on their return. Many topics required trainees to undertake subsequent detailed assessments in their towns, to then inform the development of an action plan on that specific topic. Considering such action plans often have financial implications, these plans were presented for agreement by the utility (or municipality) management approval, and where applicable also presented for endorsement by the Water Board. This process ensures consensus and buy-in for the subsequent action, and increases cross-stakeholder cooperation. As an example of the process, following the training on leakage management, trainees (usually the network engineer of the utility) returned to provide cascade training to his technical staff of plumbers and operators, who then jointly undertook a detailed leakage assessment of the system, and produced a costed action plan, which was approved, and a budget allocated for action. A multi-stakeholder task force on leakage

was assembled, and progress to the action plan is presented in periodic Water Board meetings.

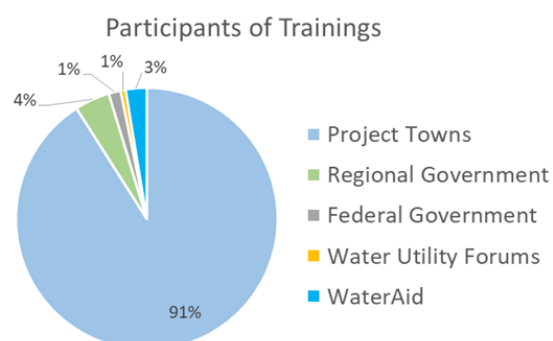
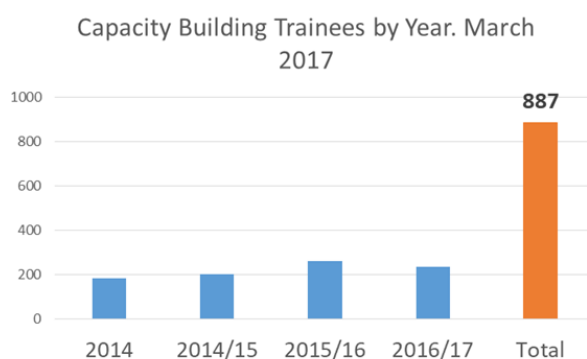
Following trainings, WAE staff undertake periodic monitoring visits to all towns. This is to review the progress on implementing the action plans developed in the trainings, to provide coaching and mentoring, identify ongoing gaps in knowledge or barriers, and organise refresher trainings or follow-up support by the trainers as needed.

The project benefits from a five-year duration, allowing considerable time for hand-holding and monitoring of the utilities (as change can take time and constant encouragement). The flexible funding from Yorkshire Water allows WAE to identify ongoing barriers and evolving needs, during the annual reviews, where the town and regional representatives can identify ongoing barriers and evolving needs, for the targeting of the subsequent year's (financial) support.

## 6. Improvements Achieved to date in the Project

The twenty-town project commenced in March 2014, and was approximately half way through its duration at time this learning review was commissioned. To date, a total of 887 trainees have benefitted from capacity strengthening initiatives, which has included not only the project towns, but has also representatives from the Regional Water Bureaus, Federal Ministries and regional and national Water Utility Forums.





To date the project has delivered trainings and provided ongoing support in twelve key concepts. The following sub-chapters provide a brief overview per topic of the issues before project intervention, what the project activities included, and improvements that have been observed so far in project towns. Further information on each topic can be found in the short concept briefs, presented as annexes separate to this document. As the project is ongoing, it is important to note that some activities and improvements are work-in-progress, and also importantly that there are differences in the progress and performances across the twenty towns, with around 15 of the 20 towns making strong progress, and around 5 have made less improvements (discussed further in later in this report). Quantitative data on improvements is also a challenge due to weaknesses in tracking of Key Performance Indicators (KPIs) by utilities, therefore, improvements presented below are more qualitative in nature and may not apply to all 20 towns. Where quantitative data is available and robust, it is presented, and WAE is currently working to strengthen the utility's understanding of and monitoring of KPIs.

## 6.1 Establishment and Strengthening of Governance Structures

### • Strengthening the Town Water Boards

Whilst most towns had Water Boards, the baseline survey found that many were inactive, met infrequently, were unclear on their mandates or division of responsibilities between them and the utility management, and were often unaware of the challenges and realities that the water utility faced in delivering quality services. There were limited formal protocols or guidelines on which to objectively oversee or appraise the utility's actions, and there were common challenges of utilities being unable to increase tariffs (to realistic levels) due to influence and a lack of systems thinking on Board decision-making. The degree of autonomy provided to the utility managers varied considerably, and the annual review by the Board was often limited to presenting the annual statement of accounts and budget for the coming year, rather than an appraisal of actual performance on service delivery, or reviewing strategic-multi-year targets and plans of the utility.

To address this, and as an initial entry point to the project, WAE provided training to Board members on sector policy and strategy, with a focus on the mandate of the Boards. A subsequent training and manual was provided which outlined the processes, activities and protocols of the Boards. From this, the Boards developed localised guidelines which all members of the Board were oriented on. The Utility Managers were also provided an orientation on KPIs and Performance Contracts were then developed and agreed between the Utility and the Boards in all towns, which now serve as a basis for performance-based monitoring and appraisal of the utility. This performance-based management now provides a

clear basis for salary review of the Utility Manager, and creates a clear incentive to excel, which was not there before. Improvements that have come about as a result of strengthening the board have included: having a more engaged Board who are more understanding and supportive of the utility's operations, and also understand the impact of their own activities on the utility's performance; the Boards have a more transparent (and less politicised) means of managing the utility, and Utility Managers have often been given more autonomy and 'space' in which to operate and achieve their agreed targets. As presented later, the development of Strategic Business Plans also helped form a more objective basis through which the Boards could review and consider tariff modifications.

- **Establishing Urban WASH Forums**

Another common challenge was the very poor coordination and collaboration between stakeholders in WASH issues, for example in areas of solid and liquid waste management, urban planning and water resources management. There were overlaps in institutional mandates on liquid waste, and weak coordination and joint planning on issues such as urban and industrial development (and the water and waste services needed to support them). Blame for problems were often placed on individual organisations or entities, with limited multi-agency collaboration for solutions, rather than collaborating for city-wide development.

To address these issues, **Integrated Urban WASH Management Forums** were established, comprising representatives from the Town Administration, the local Health Department, the Water Utility, the Customer Forums, the Education Office, and the Women and Children Office. The forum has an overall steering committee, and sub-technical committees to work on specific issues. The forums meet monthly and also on an *ad-hoc* basis as needed, to share information, coordinate, plan jointly and problem solve. These forums are particularly helpful where issues cut-across organisational mandates, or are too large or complex for any individual stakeholder to address. For example, some towns established water safety groups from the forums, to address complex issues such as obtaining legal rights to the land immediately around the boreholes for source protection, collaborating with numerous stakeholders to prevent housing or agricultural activities in such areas, and collaborating with the department of Health and the Municipality to monitor and prevent water quality risks to the distribution network.



*Photos left-right: An example of a Strategic Business Plan for the Maychew Utility that was approved by the Water Board; the Manager of Debere Tabour Water Utility shaking hands with representatives of the Customer Forum; a meeting of the General Assembly of the Customer Forum (>110 members) in Debere Tabour; An example of a joint site visit from the Urban WASH Forum members. Photo credits: Will Tillett & Haile Dinku.*

- **Customer Forums:**

In many of the towns there were chronic issues in customer-utility relations, which grew from a history of poor customer orientation of the utilities, a lack of communication channels

between (disgruntled) customers and the utilities, inaccurate billing, community water theft and lack of reporting (and timely response to) leakage, and other issues. This affected willingness to pay bills and water wastage and illegal connections were not being readily reported by the water users. There was an overall lack of trust by residents over the water utility and board, a ‘blame game’ culture between users and the utility, and a lack of sense of ownership of the water infrastructure assets in the town.

To address this issue **Customer Forums** were established in each of the project towns, comprising of community-elected representatives from the various administrative zones (Kebeles) of the town, and with an overall management unit for representation and coordination with the utilities and the urban WASH Forum. Generally, the forums meet monthly at the Kebele level, and quarterly at the municipal level. WAE provided guidelines and training for the Forums, and have also provided small grants to the municipalities and utilities to undertake customer communication campaigns, and support some of the early meetings of the Forum. In certain towns, these Forums have been crucial mechanisms for strengthening utility-customer relations. For example, the Forum meetings allow customers to voice their concerns, report issues, and even give feedback on the field-level work of utility staff to its management and Board. Such meetings also allow customers to gain a better understanding of why, for example, there may be water shortages, thereby building mutual understanding, accountability, and trust. Many forums are now taking an active role in monitoring and reporting leakage and water theft in their respective communities, and many of the utilities now have Customer Charters and are actively monitoring customer satisfaction levels<sup>6</sup>.

#### **Example of Customer Forums in Debere Tabour**

In Debere Tabour town, there used to be major issues in trust and communication between the town’s residents and the water utility. Revenue collection efficiency was at just 75%, and customers often did not report leaks for fear of the area being cut-off for water for weeks on end.

The utility has collaborated with local residents to establish a customer forum, with Kebele level sub-forums, and a general assembly of over 100 members. The forum is so helpful to the utility that the utility has provided office space for the customer forum management team, who help to channel and process customer complaints, and pass feedback to the relevant staff of the utility. The forum has also been key in local fundraising and community mobilisation to assist in upgrading of the water supply system and expanding the pipe network for poor households. There is now constructive dialogue and problem solving between residents and the utility. A recent utility-commissioned survey found that 97% of customers stated satisfaction with the service of the utility, and the manager of the utility remarks that ‘we see the customer forum as our regulating body’, demonstrating how the utility has increased its orientation towards accountability to its users.

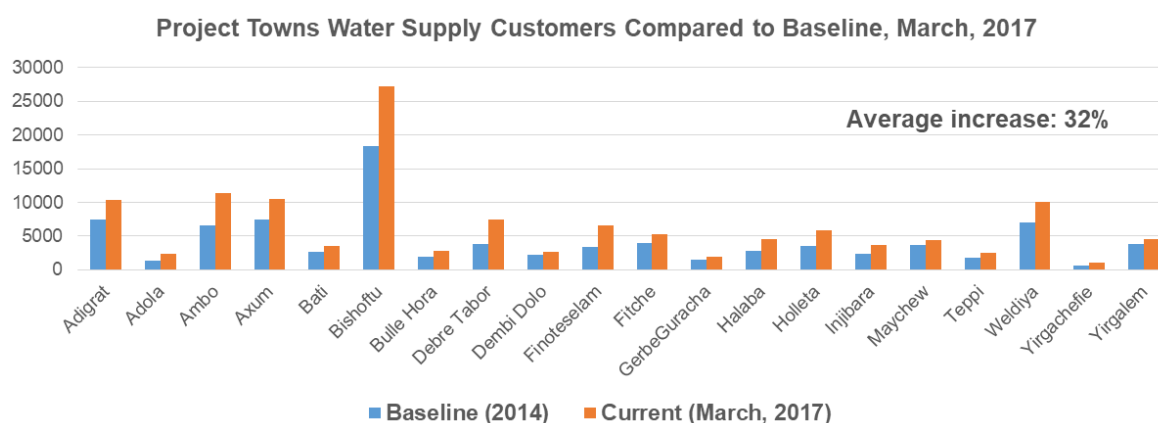
Overall the establishment and strengthening of the Boards, Customer Forums and WASH Forums provide a more robust framework for upward and downward accountability of the utilities and municipalities and provide a strong platform for subsequent service improvements through strengthening stakeholder dialogue, collaboration and joint problem solving.

## **6.2 Pro-Poor Household Connections**

<sup>6</sup> For example the water utility in Debere Tabour commissioned a local NGO to undertake a quantitative survey on customer satisfaction on the services that it is providing.

The drinking water in the towns is provided either through public tapstands or private connections. Those without domestic taps were purchasing water by the 20 litre jerry can container from public taps, from households with connections, or travelling considerable distances to access water, often from unimproved sources. Whilst those with domestic connections paid by cubic meter consumed (commonly around 5 ETB / GBP £0.17 per m<sup>3</sup>), those paying per jerry can were often paying 3 to 9 times more per m<sup>3</sup>, and were often at the mercy of the private households who sold them water. The key barrier to them accessing domestic connections was lack of affordability for the upfront capital cost (which varied by distance, but averaged around ETB 2000 or some GBP £66). To address this, WAE encouraged all 20 utilities to put in place **customer financing mechanisms**, allowing customers to pay over a period of 12 months. Overall the number of customers (individual connections) in the twenty towns has risen on average by 32% since the baseline, however there is still a long way to go to achieve 100% domestic connection rates.

In Debere Tabour, one of the best performing towns of the group of 20, they have made a concerted effort to increase the connection rate for the poor, as presented in Box 1. This approach has been showcased at the 20 town annual review, with many other utilities considering to apply it in their towns.



**Figure 5: Increase in New Connections in the 20 Towns**

#### **An Example of a Pro-Poor Connection Initiative**

In order to increase the connection rate of poor households, the utility in Debere Tabour partnered up with the Customer Forum. The first initiative was for the Customer Forum to mobilise the poorer households and neighbourhoods, process applications and prioritise the most vulnerable households for initial support. Once selected, the forum mobilised the community to undertake the pipe trenching to reduce the capital costs, and mobilised additional funds for the initiative from the wealthier residents and from the local university. The approach taken was a '1:5' ratio of one tap per five households, allowing the capital cost of extending the pipe to their street to be shared between households. This communal tap with a meter is then used by the five families surrounding it, with a committee formed of the households to ensure proper usage, and to collect the revenues for monthly payment for the water. Now the households are on a volumetric (m<sup>3</sup>) tariff like other residents, and their monthly water bills are considerably reduced, with the potential for each of the five households to connect to the pipe for a private connection in future when their funds allow. To date this scheme has allowed 410 new households in the town gain access to connections.

### 6.3 Strategic Business Planning

The baseline survey identified that only four of the towns had multi-year business plans in place to project their costs, service levels and revenue streams. Such plans were commonly developed by consultants at the time of infrastructure design, with limited involvement of the utility staff. In the other towns there was no multi-annual planning and forecasting, managing the system instead on an annual basis, presenting only the annual expenditures and future year budget to the Board for approval. Six of the towns had expenditures exceeding their revenues, and few had strategic reserves of funds, making them particularly vulnerable to unexpected major breakdowns.

To form a solid foundation for strategic planning and management of the assets and services, WAE supported the development of **Strategic Business Plans** for all the towns. This was undertaken through consultants undertaking an assessment in the towns, and developing a 'model' business plan for four towns. Utility Managers and Planning Officers were trained on the process of developing business plans, and every utility produced a draft Strategic Business Plan which received feedback from the consultants and WAE before finalisation and approval by the Boards. The plans included strategic forecasts of demand, supply, costs and required revenues to meet defined service level targets. They form a clear, objective basis for tariff review (helping to reduce politicisation of tariff decisions by the Board), and have enabled numerous utilities to access loans and grant funding, as business plans are a common pre-condition to access such financing sources. In this the Strategic Business Plans are not only key management and governance tools, but they also increase the 'creditworthiness' of the utilities for subsequent investments. For example, Axum utility used the business plan to develop proposals to the Kuwait Government and Ethiopia's Water Resources Fund. In Adigrat, the utility has already accessed loans, and is using the Business Plan to reassure existing creditors on their ability to service their debts. They have also used the business plan to raise ETB 2.1m (around GBP £70,000) from additional proposals. Debere Tabour's utility has been able to strategically plan for the construction of 3 new boreholes and installation of the associated pipeline, costing around 7.1m ETB (around GBP £236,000) paid for by community capital contributions, an increase in tariffs, and grants from a local university.

### 6.4 Human Resources Management

The baseline survey identified that most utilities had vacant posts (six positions on average), that the existing staff had inconsistent levels of qualifications and experience by cadre, and that few staff had opportunities for ongoing training and support. Poor motivation of staff and low team spirit were mentioned as a common issue, and few utilities had any form of performance-based management arrangements for their personnel, and those that did had unclear basis for performance recognition and promotions, causing complaints from staff of favouritism and bias, further reducing motivation and commitment. Despite availability of huge capacity development initiatives in other sectors, the utilities and municipalities are often neglected regarding WASH issues.

To address this, WAE partnered with the Ethiopian Management Institute to deliver a customised five-day training of **Human Resources Managers** of the utilities, covering human resources (HR) concepts and legislation, processes and protocols for staff appointment, performance evaluation, promotion, disciplinary procedures etc. These trainees then undertook cascade training to their HR Officers and the Utility Managers, each town developed their own HR procedures and policies manuals (based on the government manuals and the generic training provided by the trainer), and undertook internal training of the utility staff.



As a result, utilities now have clear and transparent processes for HR management, which the staff understand. They have established performance management for staff, with incentive processes and reward/competition schemes helping to motivate staff to excel. Many of the utilities have written capacity development plans for their staff, and strengthened their knowledge management processes through establishing staff libraries with manuals and reference materials.



*Photos left to right: The Utility Manager of Finote Selam showing the newly constructed staff library of reference materials and manuals; trainees at the Strategic Business Planning workshop; the finance department of Axum water utility using the new IT software; the IT Manager of Maychew Utility showing some of the computer equipment purchased by the utility after the training and software provision on integrated database management. Photo credits: Will Tillett & Haile Dinku.*

## 6.5 Finance and Integrated Information Management Systems

The baseline identified poor financial management, low revenue collection efficiency, and weak information management as common issues across the utilities, affecting their viability, efficiency and auditability. Many of the utilities relied on basic financial record keeping through single-entry ledger books and manually produced bills through searching for customer records in files. The lack of automation of information slowed the flow of information between departments and meant that utility managers were unable to access financial status reports in real-time. Billing efficiency averaged 80%, and the process of producing bills often took up to 30 days, with manual data entry causing billing errors, leading to regular customer complaints. The management of financial records was haphazard, which combined with basic financial book keeping, caused common challenges during audits.

To address these challenges, WAE undertook various trainings and provided manuals on topics including financial management and accounting, billing, and on the IT system's software components (see Table 2). The utilities were also provided with an integrated database management software named **DAF TECH**, which allows the utilities to fully automate their internal systems, with a range of modules covering various work-streams, as shown in Table 2. Following these trainings the utilities invested considerable resources in procuring computers, servers and networking equipment. For example in Maychew the water utility has invested around GBP £7.500 in IT equipment. They have recruited personnel, and are currently in the process of conversion department-by-department to the new system.

Modules of the Integrated IT Software System that was Provided to the Utilities
Customer service
Bill management
Planning and reporting
Human resource management
Financial management
Asset management
Stock control
Accounting management and budget control
Technical service including mobile application

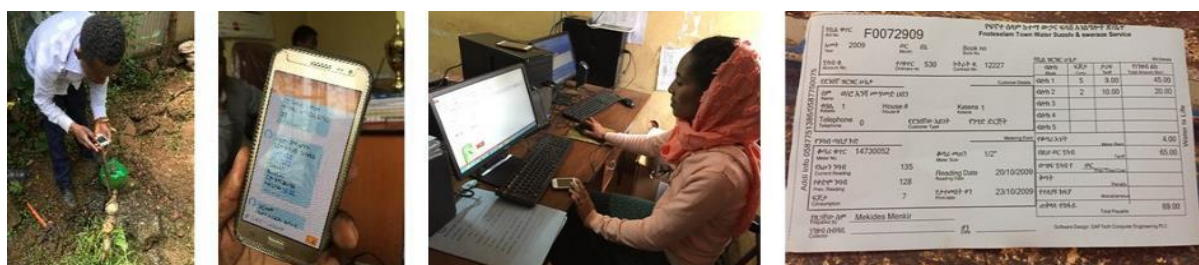
**Table 2: Components of the IT Software Provided to the Utilities**

The DAF TECH system allows for rapid information flow between departments, and instantaneous data querying to assist in planning, monitoring and management decisions. The utilities have also shifted to the 'double entry' mode of book keeping, bringing considerable improvements in auditability and comprehensiveness in financial oversight.

## 6.6 Meter Reading & Billing

It used to be common for the utilities to manage their billing through manual processes, with numerous inherent challenges. Meter readers would often make errors when reading or recording data from the meters, or errors would be made in manually entering the readings back in the office. This, together with a common issue of meter readers not actually visiting the properties, and instead guessing the consumption whilst sitting in the office, led to high volumes of customer complaints, a lack of trust, and reduced willingness of residents to pay the water bills. The lack of automation of the billing process also meant the time for bill production was long (>30 days in some utilities) and led to delays and long queues when customers came to pay their monthly bills.

One of the modules of the DAF TECH software allows for full automation of the meter reading and billing, and is being applied to date by eleven of the twenty utilities. The system links with a GPS-enabled app installed in smart phones (purchased by the utilities themselves), which has customer data uploaded to it. The GPS on the app requires the meter reader to be on site (at the property) to be able to enter the meter reading for that particular meter, meaning they can no longer avoid physical visits and guesstimate from the office. The meter readers record the consumption reading onto the app, which automatically compares with previous readings and prompts a re-checking in case of suspicious or potentially mis-entered readings. At the end of each day, the meter readers upload the data directly to the server (in seconds), with the software allowing bills to then be generated in minutes, reducing billing periods, errors in data entry and considerably reducing the time taken by users to pay their bills. The improved billing efficiency and reduced errors in billing has considerably improved customer satisfaction, and reduced the volume of complaints received. The software also allows for the automatic generation of SMS messages sent to customers stating their consumption and bill amount, and prompting payment. This SMS component is currently being applied in four of the utilities, with many of the other towns intending to introduce it in the coming months. An example of the impacts of the increased efficiency of metering and billing is in Maychew town, where the utility has been able to clear 97% of its accumulated customer arrears.



Photos left to right (covering the metering and billing process in Finote Selam Town): Meter reader using the smart phone app; an example of the automatically generated SMS bill on a customer's phone; uploading the data to the network and producing the bill; an example of the customer bill. Photo credits: Will Tillett.

## 6.7 GIS and Network Modelling

Despite being the custodians of infrastructural assets often worth hundreds of thousands of dollars, few utilities had even the most basic map showing where the system components and

pipe networks were located, or quantifying items such as valves, kilometres of pipelines, etc. The location of valves and buried pipes was knowledge often only in the brains of a few network technicians, who may move on or pass away, posing considerable risks for the utility in terms of loss of vital information. Pipe network damage from road works or construction activities in the towns were commonplace, as organisations were not aware of the location of below-ground assets. The lack of system information also made it challenging to undertake engineering designs and hydraulic modelling for system expansion, or make informed decisions for network operation (for example for zonal water rationing) or undertaking water audits to calculate leakage in areas of the distribution system.

To address this, a five-day training was provided to engineers or IT officers of the utilities on Arc GIS, and the software was provided to each utility together with GPS devices. Following the training the utilities undertook an exhaustive field survey, mapping all pipes, junctions, valves etc. and entering this into the GIS attributes tables. From this the utilities have been able to generate network maps, which they hang proudly in their offices and have shared with customers and urban WASH forums for public communication and coordination purposes. Some utilities are using the databases as core components of their asset registry and are using the data for hydraulic modelling of the water network to improve pressure management and plan future system investments.

## 6.8 Asset Management

The term asset management was relatively new to many of the utilities, and often utilities only considered their office and transport equipment as their assets, not considering the hundreds of thousand dollars' infrastructure assets that comprise the above and below-ground components of their water supply systems. As such, infrastructural assets were not depreciated in accounting or financial projections, with limited forward planning and budgeting for major maintenance and component replacement. The maintenance protocols were often more reactive and 'firefighting' than planned, routine and strategic, leading to unnecessary system downtimes fixing problems as they arose, rather than monitoring and identifying issues prior to failure and planning for their repair or replacement. Stock management was also a widespread challenge, with items being heaped, or 'lost' in bags in poorly organised stores. Storekeepers sometimes took days to locate items, with the lack of inventories or stock management systems and protocols leading to unnecessary damage of the stored equipment and risking embezzlement of items due to poor monitoring. As stock levels were not properly monitored, leakages or system outages were often prolonged whilst waiting for out-of-stock parts to be procured, and also utilities would procure stocks they already had, due to uncertainties of what they actually had in store.

In response to these challenges WAE commissioned a context analysis study, and from this developed a model '**Asset Management Plan**' document for four of the twenty towns. These model plans were used in the subsequent trainings, and accompanied the Asset Management Guideline which was provided to each utility. The training on Asset Management was undertaken in three phases, each lasting 2-3 days. Following the training and subsequent cascade training, the utilities undertook full asset inventories of their water systems. This included noting the locations, materials, functional status, ages and design lives of every infrastructural component, helping to identify components that had already expired, those that required maintenance, and those needing replacement or major overhaul in the coming years. From this inventory each utility developed an asset management plan, costing and prioritising investments required (and when), which was presented to the Board, and costings



incorporated into their updated Strategic Business Plans. All 20 utilities are now factoring in depreciation of their system assets in their financial accounting, and there has been a marked shift in many utilities towards more systematic routine monitoring and preventative maintenance practices.

Following the trainings, the utilities also made considerable efforts to improve their stock management, many investing considerable funds in constructing warehouse buildings to house stocks which were inventorised and grouped, allowing storekeepers to retrieve items in minutes rather than days. For example Debere Tabour invested around ETB 500,000 (approximately GBP £16,000) in the construction of warehouse facilities, and has introduced a clear stock tracking process.

Improved stock management processes such as the use of BIN cards and undertaking bi-annual stock audits now allow for closer monitoring of items, reducing the risk of theft, and allowing for planned re-stocking, reducing system downtimes waiting for spares, and also allowing for more planned procurement of items, allowing less rushed and therefore more competitive procurement processes. The asset management process also allows the utilities to identify items which are expired and can be sold, bringing much-needed additional revenue streams. For example, Adigrat raised 540,000 ETB (around GBP £17,500) in revenue from the sale of expired assets, and Axum raised around GBP £7,500.



*Photos left to right: An example of the GIS map produced for Weldia water supply network; the engineer in Axum showing the network map; an example of the old system of stock (mis)management in the utilities; rusted pipes that have been reclaimed, replaced with HDPE, and sold providing revenue streams to the utilities; an example of the new warehousing and stock management arrangements, in Debere Tabour. Photo credits: Will Tillett & Haile Dinku.*

## 6.9 Operation & Maintenance (Electro-Mechanical Skills)

The baseline survey identified key challenges in utility operation and maintenance (O&M) activities, which caused frequent and prolonged breakdowns and system outages, reduced the quality of service provided and reduced the overall design-life of the system and its components. In the common absence of technical skills or training, the utilities often relied on the Regional Water Bureaus to provide parts or skills for breakdowns, which meant downtimes could last days and sometimes even weeks. Some utilities complained that private sector suppliers could sell them counterfeit or poorly functioning items, due to their inability to identify challenges or test the products before installation. Many utilities lacked workshops in which to undertake preventative maintenance and repair work, and the absence or deteriorating quality of tools was identified as a key challenge to O&M in the baseline survey. Utilities were incurring considerable costs in replacing items when they would have been possible to repair (if the expertise was available), and maintenance and repair works was often ‘firefighting’ and reactive, rather than routine and strategic.

In response, WAE partnered with the Ethiopian Water Institute, who delivered a specialised three-week practical course on electro-mechanical operation and maintenance on water technologies to utility technicians. Following the training, the trainees provided cascade training to colleagues on maintenance and fault identification and an O&M Plan was produced for validation by the Utility Management. The plans identified protocols for monitoring and maintenance for system components, prioritised critical assets for maintenance, and identified resources and equipment required to achieve the plan. As a result all utilities have now invested considerable resources in constructing or upgrading workshops and procuring tools and equipment for the central workshop and decentralised staff. Now utilities are able to undertake many repairs themselves, considerably reducing system downtime, and saving thousands of dollars per year in repairing rather than replacing items. There has been a general shift from reactive maintenance to more strategic approaches of monitoring for issues, routine servicing, and planned repairs and replacements, which is helping to maximise the design life of the infrastructural assets.

#### **Examples of Improvements from O&M Training in Adigrat and Axum Towns**

Axum water utility has developed its own workshop, from which it tests and repairs switchboards, pumps and other system components. They estimate to have saved around GBP £7,500 so far by being able to fix switchboards, rather than before when they purchased new ones when the old ones had a fault.

The workshop in Adigrat's utility provides a service to nearby water utilities on a fee basis, and has developed its own pump testing facility, helping it to repair its own pumps, and test new pumps before they are installed. This avoids challenges experienced in the past of suppliers selling faulty or poorly performing pumps, and only identifying this once the pumps have been installed. The trained technicians have also started to innovate new electrical components, such as water level dipper sensors which have been installed in service reservoirs and wells.

### **6.10 Leakage Management**

Government data (GTP II, GoE 2015) suggests utilities across the country experience rates of 39% non-revenue water on average – that is water which is produced, but not paid for, either due to losses through leakages in the network, illegal connections and weaknesses in billing and revenue collection. The GTP II sets targets for reducing non-revenue water to 20% or less. The baseline survey in the twenty towns indicated nine out of eighteen of the towns who had data on unaccounted for water recorded rates of losses exceeding 30%. Key reasons for water losses included leakages in old metal pipelines, a history of poor repairs and sub-standard materials causing leakages at connection points, poor management of the pressure in the system leading to excessive pressures, limited customer reporting and slow responses to leakages, meter tampering and illegal connections by residents, broken water meters, and a general lack of monitoring for leakage by the utilities. In the contexts of marginal commercial viability of the utilities, such water (and therefore financial) losses represent a major problem for the utilities. Utilities in many towns already struggle to meet growing demands for water, with rationing being commonplace. Addressing water that is lost through leakage and water theft has a huge potential to increase the water available for users, thus increasing coverage and access, and in turn increasing the revenues to the utilities. However, despite these potential gains and impacts on service delivery and viability, the baseline found that few utilities were taking active measures to monitor and reduce water losses. In many of the



utilities the concept of leakage management was not widely understood, nor an area of focus for the organisation. As a result, utilities often requested government or donor funds for new infrastructure, rather than focussing on improving efficiencies with the existing system.

WAE supported two rounds of trainings for the utilities on leakage management, the first undertaken by experts from Yorkshire Water, and the second supported by national experts. The trainings covered the importance of leakage management, together with practical guidance on leakage prevention, monitoring, reduction and repairs. Equipment was provided to each utility in the form of sound rods and ultrasonic leakage detectors, together with manuals on their operation. The training was then cascaded to colleagues, and the following actions have been taken:

- Leakage management units have been established and equipped in all the twenty utilities, targets set for rates of non-revenue water reductions, and leakage management action plans have been developed and approved;
- Customer mobilisation campaigns have been made to stress the importance of reporting leakage, faults and water theft. This was financed by the micro-grants from WAE, and multi-stakeholder leakage taskforces have been established, with active involvement of the customer forums;
- Incentives and punitive arrangements have been established to encourage meter readers to report water theft (which they previously avoided doing for fear of damaging local relations with residents);
- Utilities are now monitoring for irregularities in flows and consumption for possible signs of leakage through night time listening and water audits (local water balances using water meter readings)
- Utilities have surveyed the network and meters, replacing old metal pipes with new HDPE pipes, and replacing broken water meters.

The following graph shows the baseline and current rates of non-revenue water in the 20 towns.

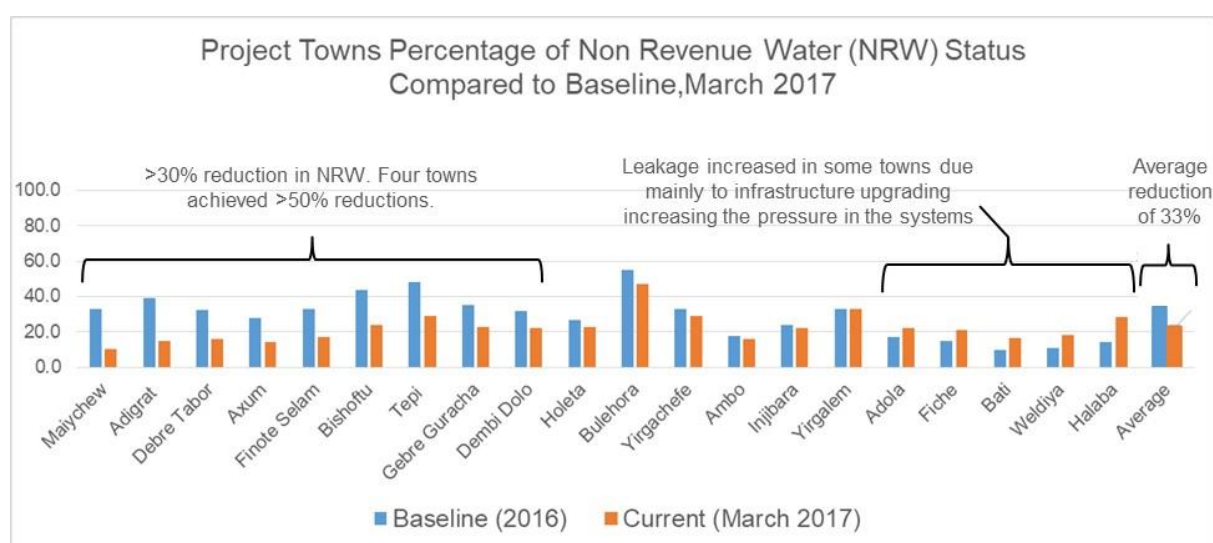


Figure 6: Rates of Non-Revenue Water in the 20 Towns

Overall there has been an average of one third reduction in Non-Revenue Water across the 20 towns, with seven towns cutting losses by more than 40%. The customer outreach work has increased the vigilance of the residents against pipe damage and illegal connections, and the reduction of leakage is bringing considerable improvements in terms of water availability (and therefore access), water quality and financial viability. In analysing the impacts of the reductions in unaccounted for water in terms of access and cost savings, our analysis indicates that the reductions in losses allow, over the twenty towns for:

- Savings of around 5,250m<sup>3</sup>/day (over 1.9 million m<sup>3</sup>/yr)<sup>7</sup>
- This can serve over 130,000 additional people, based on 40 liters/capita/day
- The saved water represents savings/revenues of ETB 5.7m per year (GBP £185,000)<sup>8</sup>

In some towns, such as Adigrat and Bishoftu, where they have large capacity production and also have achieved major reductions in unaccounted for water, the annual savings are calculated to be around GBP £38,000 and GBP £94,000 respectively.

#### Examples of Leakage Management in Maychew, Debere Tabour and Finote Selam

The utility in Maychew reduced non-revenue water from 24% to 10.4%. This involved: installing gate valves across the water network to allow greater rationing, and to shut-off flows in case of leaks; they established leakage detection teams; a survey was done on meters, and a widespread issue of customers reversing the meters was identified; around 700 water meters are replaced per year with tamperproof meters; water audits are undertaken monthly; there is greater monitoring of trucking activities; and there is now a formalised process for all new domestic connections to be checked by one of the utility's engineers.

In Finote Selam, the utility has reduced unaccounted for water by over 50%, which has helped them to increase their service provision from a 5-day per week to a 7-day per week service.

In Debere Tabour, the utility spent around GBP £9,000 on replacing old pipes with HDPE pipes. Thanks to this, and from numerous other measures to reduce physical losses and increase reporting and response to leaks, they have increased production by 10%, and reduced unaccounted for water by 50%



*Photos left to right: Leakage from old cast iron pipes; utility staff receiving training on leakage detection equipment from Yorkshire Water; replacing the leaking antiquated pipes with new HDPE pipes in Debere Tabour; the utility mechanic of Finote Selam Utility welding in the newly constructed workshop; the mechanic of Axum Utility demonstrating his electrical testing equipment (used for Axum and also to train staff from surrounding utilities); testing a submersible pump prior to installation at Adigrat Utility's newly constructed Pump Testing facility. Photo credits: Will Tillet & Haile Dinku.*

<sup>7</sup> This is calculated using current production levels of the towns, and applying the baseline and current unaccounted for water losses to these current production levels

<sup>8</sup> This is based on a simplified standard tariff of ETB 3 per m<sup>3</sup>

### 6.11 Water Safety and Quality

Water quality has not been a high sector priority in Ethiopia until recently, with plans made in 2015 to establish national water quality standards (GTP II GoE 2015). The baseline survey identified that only two of the 20 towns had any form of water quality testing equipment or allocated staff and that water treatment, such as chlorination, was undertaken only on an *ad-hoc* basis if it was practiced at all. Water quality testing was supposed to be undertaken quarterly in some of the utilities by the regional authorities, with samples needing to be taken to the regional capitals, at considerable cost and without incubation during transit. Whilst the local Department of Health was also mandated to test water quality, this in practice only happened during epidemics, and there was poor coordination or information flow between the utilities and the local Health staff. When water quality tests were done, the utilities did not always receive the results, and if results were received indicating contamination, there was not always actions taken to address the issues. Testing of water when done was predominantly on bacteriological parameters, with chemical parameters rarely tested for. There were (and continue to be) widespread risks to the water quality provided by the utilities, such as pollution around the water sources (which are often not adequately fenced-off), leaks in the pipe network and negative pressures risking water ingress, and contamination due to poor solid and liquid waste management within the towns.

WAE supported training to the utilities on water quality and water safety, including a two day course facilitated by experts from Yorkshire Water, then a one-day course facilitated with assistance from the World Health Organisation's Ethiopia office and the water quality testing company WAG Tech. The trainings covered water quality theory, testing practicals, and how to develop and implement Water Safety Plans (WSPs). Trainees were provided with water quality testing kits and operational manuals, and provided cascade training to colleagues. Following the training all utilities established water quality laboratories in their offices and assigned a focal person for water quality testing and management. The utilities are now undertaking in-house water quality testing on a monthly basis, taking action where water quality issues are identified, and reporting results to the Water Board, Urban WASH Forums and the Department of Health.

Multi-stakeholder task forces were established on water safety, who undertook joint assessments of the hazards to water quality from source to tap and in the household and a WSP was produced for each town. The WSP identified and ranked the risks and proposed a phased, costed plan which was presented to the utility management and Board for approval and resource allocation. Most of the twenty utilities have made efforts to fence off the area around their water sources, and in Finote Selam the utility has been able to legally acquire 140 hectares around the well field to protect source water quality and is partnering with the municipality and local groups to prevent development or agricultural usage of the land. Efforts on improving waste management in the towns, and public health promotion activities (as described below) has also been key in reducing the risks to water contamination.



Photos left to right: The risk assessment matrix for the water safety plan that was developed by stakeholders in Axum town; the Water Quality Officer in Adigrat showing the water quality equipment; water testing protocols displayed on the wall in Adigrat; a demarcation sign in Finote Selam marking the source catchment protection zone. Photo credits: Will Tillett.

## 6.12 Urban Sanitation and Hygiene

The baseline survey identified numerous issues with urban sanitation, which are relatively common challenges across Ethiopia's urban areas. These included; limited political prioritisation on waste management and a lack of adequate budget allocation; limited capacity in the municipalities to manage the waste; poor coordination between stakeholders on waste management and overlaps in mandates especially for liquid waste; infrequency or absence of waste collection services (leading to dumping or burning); a lack of sanitary dumpsites or treatment facilities for solid or liquid wastes; and open defecation in the towns and poorly constructed pit toilets posing considerable public health risks.

Urban sanitation (solid and liquid waste management) is a relatively recently included component in the 20 towns project, and WAE has supported this in various ways. Consultants were provided to undertake solid waste management surveys in each of the towns, allowing (often first-time) data to be availed on waste generation rates, compositions, coverage of collection services, etc. For liquid waste, training was provided (to utilities, health department and municipality staff) by Leeds University (UK) on the 'Shit Flow Diagram', which quantifies faecal waste generation rates, and identifies the current disposal and management arrangements, highlighting the key gaps and opportunities for improved liquid waste management. These studies have been presented in the Urban WASH Forums and have been very useful in raising awareness on solid and liquid waste management issues, galvanising political will for action and providing basic data on which local plans have been established. Training has been provided by WAE to municipality officers on integrated solid waste management, to help them to form their own waste management plan, and who have in turn trained Micro-Sized Enterprises (MSEs) on principles of waste collection, recycling and disposal of waste. WAE has also provided motorized tricycles and micro-grants to the six high-performing towns for the improved capacity of the MSEs for household waste collection. Micro-grants have also been provided for the Department of Health-led training of hundreds of Urban Health Extension Workers in the 20 towns, for them to increase their hygiene promotion and sanitary surveillance activities in their respective neighbourhoods.

Whilst these initiatives are still in the early days, anecdotal evidence suggests improvements have already been made; these include: an overall improvement in the cleanliness and environmental sanitation status of the towns, with associated reductions in risks to water quality and public health; employment creation for staff of MSEs who have progressively increasing levels of business demand for waste management; and the increasing tendency of stakeholders to coordinate, collaborate and take joint action on sanitation issues, thanks in



part to increased awareness, political will, and the dialogue platform established through the Urban WASH Management Forums.

### Examples of Improvements in Solid Waste Management in Finote Selam and Adigrat

In Finote Selam waste collection used to be undertaken only for households that directly paid the MSEs for collection services. This meant that only the better off paid, the system lacked economies of scale, thus increasing the cost for the customer, and collection rates were low across the town. Following the WAE supported study and training, the town administration and other stakeholders have made key changes to the SWM system. Now all households in the town are charged a flat fee of ETB 20 (around GBP £0.66) per month for waste collection. The water utility has provided the MSE's with office space in their compound, so that when customers come to pay their monthly water bill, they also pay their waste collection bill.

This has led to considerable increases in revenue streams for waste management in the town. Waste collection coverage has raised to 96%, and collection is now every two days, bringing major improvements in environmental health, and also satisfaction of the town's residents. Employees of the MSEs are generally students and/or from vulnerable households. The number of employees of the MSEs has increased considerably, and their income has doubled.

In Adigrat, the town's MSEs involved in waste management has 65 members, 75% of which are female. The MSE's have been allocated space in the landfill for waste segregation, composting and recycling, with the revenues from sales adding to the income from the customers they collect from. The town administration and Health Department have also collaborated on 'healthy home' initiatives, with competitions for the cleanest homestead. Domestic level composting of organic waste is being demonstrated in 'model homes' across the town. Adigrat has recently won an award for the cleanest town in the Tigray Region.



*Photos left to right: The newly established MSE waste collection payment office housed within the Finote Selam water utility offices; the predominantly female MSE group named 'Development' in front of their waste collection tricycle in Finote Selam; waste segregation by MSEs for recycling of plastics and rubber at Adigrat's landfill; a 'model home' in Adigrat's suburbs which is practicing home composting of organic waste and kitchen gardening. Photo credits: Will Tillet.*

## 7. The Monitoring, Learning & Review Framework

Sustained monitoring and mentoring is a key component of the project, with WAE staff visiting each of the 20 towns at least every 6-12 months during the five year programme. During the visits, progress towards implementing the post-training action plans are reviewed, bottlenecks are identified and discussed, and where needed, mentoring and advice is given. During the visits a structured monitoring checklist is used, which collects information on the utility KPIs together with actions which they have or have not done (for example if they have/have not constructed an O&M workshop or water quality laboratory, etc.). This data is entered to the monitoring spreadsheet which provides a progress score for the town and findings from the checklist are discussed with the utility management team on the last day of the monitoring



visit, for their potential action. The checklist scores gives a ‘traffic light’ colour on the performance, and allow the objective performance ranking of each of the 20 towns, and prizes are given to the best performing utility per utility grade during the annual project review meetings. The awards are given by dignitaries attending the review meetings, and prizes such as laptops are provided together with the trophies to the utility managers. The checklists and competitions seem to be very effective means to get utilities to strive towards excellence. For example the Utility Manager in Adigrat mentioned “*we lost points (in the monitoring checklist) last year because we did not have the O&M workshop, and we didn’t want that to happen again! So we constructed the workshop this year!*” Interestingly, the checklist is evolved each year, continually adding targets which the utilities should attain, meaning the target evolves as their performance improves.

S.N.	Project Town	Region	Ranking Criteria and Weight (2016/17)					2016/17 Total Score (100%)	/2015/16 Score (100%)	2015/16 Traffic Light
			WASH Governance & Accountability (20%)	Implementation of Systems (60%)	Key Performance Measurement (15%)	Utilization of Transferred Budget (3%)	Reporting (2%)			
1	Adigrat	Tigray	16.5	54	14	3	2	89.5	59	G
2	Adola	Oromiya	10	32.5	11.5	1.5	1	56.5	50	Y
3	Ambo	Oromiya	9	56	13	3	2	83	71	G
4	Axum	Tigray	19	57	13	2	1	92	84	G
5	Bati	Amhara	13	37.5	11.5	1	1	64	31	R

**Figure 7: An example of the consolidated review and scoring matrix in the 20 towns programme**

The annual review meetings bring all 20 utilities together with members of WAE, Regional Water Bureaus and Federal Ministry representatives. Meetings cover short presentations on the progress, experiences and innovations from the different towns, and include a participatory review of challenges and recommendations for the coming year’s programming. The meetings are held in different project towns each year, with site visits allowing participants to visit examples of best practice in the towns.

## 8. The ‘Ripple Effect’: Extending benefits to additional towns

The improvements brought about by the project are by no means limited only to the 20 towns. By involving the Regional Water Bureaus and regional and national Water Utility Forums in project trainings and annual reviews, stakeholders who have oversight and interaction with the other 980 towns in the country learn about the project, and cascade the information onwards. For example the Regional Bureau of Amara has circulated project manuals from one of the project towns with all utilities in the region, and Debere Tabour (one of the best performing of the 20 towns has to date) has hosted learning visits from 160 towns who visited at their own cost, at the recommendation of their regional utility forums, to learn from good practice in the town.

In Tigray Region, a clustering system has been developed by the Regional Water Bureaus as a means to localise technical support to the utilities. In this, utilities are grouped into geographical clusters of seven or eight per cluster, with the idea that the stronger utilities support the weaker ones (this is possible in the Ethiopian context where the public utilities are not competing with each other). The three project towns in Tigray are the ‘model’ utilities in their clusters, and the Regional Bureau of Tigray is now in advanced discussions with WAE to scale up the programme to cover seven more towns in the region, allowing at least one project town per cluster for the whole region. In this scaled-up arrangement financing would be

provided on a predominantly cost-sharing basis between the Regional Bureaux and the utilities themselves (who are happy to invest, having seen the major benefits to the other project towns in the region), with WAE only providing technical support inputs.

At the local level, project towns are providing considerable technical support to the towns in their area, not only in Tigray but across the 20 towns. For example trained utility staff are providing cascade training to the other utilities in the area (normally at the cost of the other utilities, who are keen to learn), and trained and equipped utility staff are providing pay-for services to the surrounding towns, such as in repairing pumps and electrical control panels, in GIS mapping the town's water network, etc.



The cluster approach

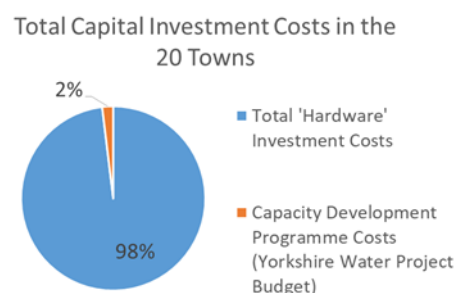
*Photos and figures left to right: The Utility Manager of Finote Selam proudly showing his trophy for best performing utility; Annual project reviews; signing of the Strategic Partnership Agreement (SPA) between WAE Country Director and Tigray Water Resources Bureau Head; a diagram showing the logic of the clustering of utilities by regional water bureaus, ensuring a 'model' utility within the cluster helping to inspire and support the others in the area. Photo credits Will Tillett & Haile Dinku.*

## 9. The Costs of Delivering the Project

As outlined previously, the 20-towns capacity strengthening project was focussed in towns which had received investments in their water supply infrastructure, for example through government, World Bank, EU and AfDB financing. However the financing did not include capacity strengthening activities, hence the 'pairing' with the WAE 20 towns project. The total infrastructural investments in the 20 towns are calculated to be in the order of GBP £45million. The total budget of the 20-towns capacity strengthening project is only GBP £1m. **This means that the WAE capacity development programme represents just 2% of total investments in the towns, and equates to approximately GBP £1.1 (around 30 ETB) per capita.** It should also be noted at this stage that the improvements outlined in this report are only what has been achieved by year three of the five-year project, and after utilising only around GBP £0.7m of the GBP £1m total budget<sup>9</sup>.

<sup>9</sup> However what is not included in the project budget is the costs of the preliminary work on the development of manuals on some of the technical topics, some of which was done by local consultants during the previous capacity building project in 7 towns (the project preceding the 20 towns project). It also does not include the 'in kind' contributions from technical partners providing their personnel to deliver some of the trainings, such as Yorkshire Water and Leeds University staff visiting Ethiopia for a couple of weeks. However these in kind costs are unlikely to exceed GBP £75,000, which barely changes the per capita costs or 2:98% ratio of capacity development to hardware costs.

Project Budget	Per Capita Cost
Total project (£1m)	£1.1 (~30 Birr)
Spend so far (£0.7m)	£0.76 (23 Birr)



**Figure 8: Project Budget, Per Capita Cost and Comparison of Budget with the Infrastructure Investments in the Towns**

The project has successfully levered considerable investments from the 20 utilities themselves, as they have invested their own funds to construct workshops, warehouses, procure tools for maintenance and mobile phones for meter reading, purchase computers for automating their billing and financial management systems, replace flow meters and sections of old leaking pipes, etc. Clearly the utilities see the return on investment from such initiatives, and the project improvements are reducing wastage, extending services and improving efficiencies of the utilities, which will all positively affect the cash-flow of the utilities. This in turn improves the commercial viability of the utilities, and reduces the need for future external (government) subsidies to these utilities.

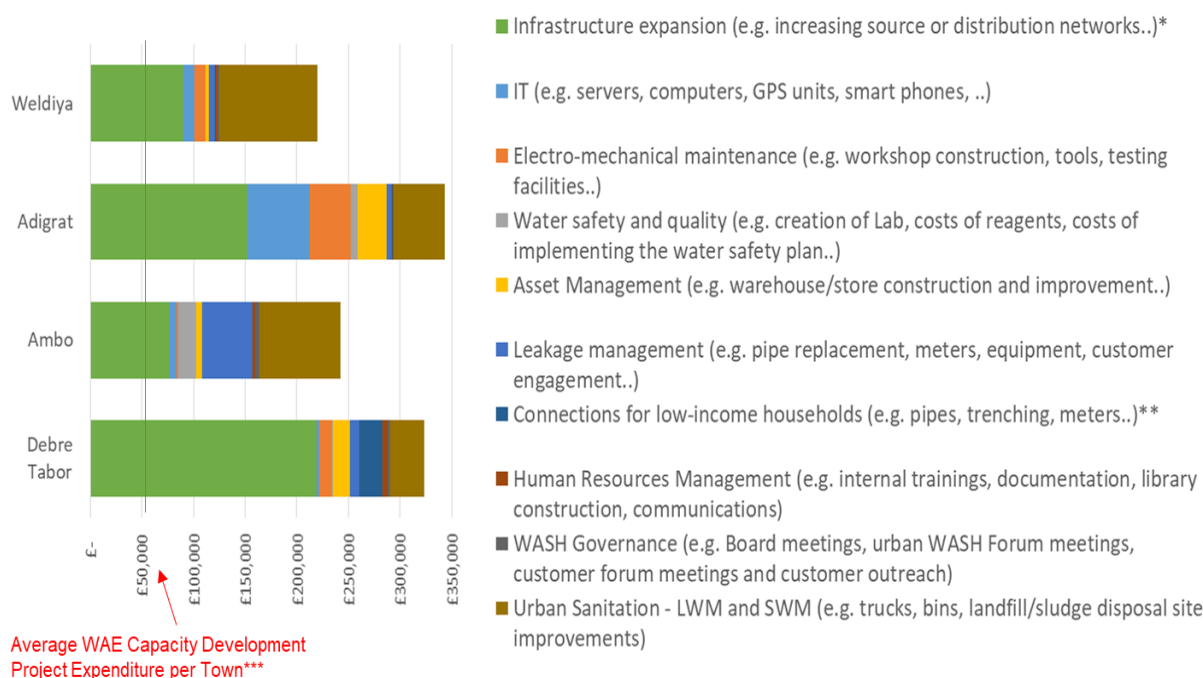
To calculate the additional investments made by the utilities and town-based stakeholders<sup>10</sup> as a result of the capacity development programme, the utilities were approached to provide cost data. The data provided by four project towns is presented in Figure 9. Whilst the approximate WAE capacity development project spend per town is approximately GBP £50,000<sup>11</sup>, the amount subsequently invested by the utility and local stakeholders in the four towns was on average GBP £282,307. **Based on the data provided by the four towns, this indicates that for every GBP £1 invested in the capacity development project, GBP £5.64 has been levered from local resources.**

**Figure 9: Locally made investments after the WAE Project Activities**

<sup>10</sup> Such as the town administration, local resident co-funding, and locally based sponsors such as universities, which are major water users in the towns.

<sup>11</sup> This is based on crudely dividing the total programme budget of £1m by the twenty towns.

Leverage: Investment made locally following the WAE project interventions



(NOTES): \* This may include investments by the utility, customer co-funding, and locally raised funds (e.g. from local universities); \*\*this includes funds from the utility, raised by the communities, and from other local sources e.g. universities; \*\*\* this is based on a crude division of the total project budget (£1m) by 20 towns.

## 10. Challenges facing the Project

Whilst considerable improvements have been made in many of the utilities, progress is not uniform. There has been relatively limited progress in around a fifth of the towns. Some of the key issues for limited progress in certain towns and on certain activities include:

- **Regular staff turnover of key individuals:** In some towns, potentially due to wider political and socio-economic factors, the Mayors and Utility Managers are replaced on a relatively regular basis. For example one town has experienced 4 Mayors in the past 2 years. Clearly stability in leadership is a key factor for success, as the performance improvements of the utilities and actions to improve the performance take time, and require sustained and consistent support from the leadership and Board.
- **The degree of autonomy the Utility has from the Board:** The degree to which the Board's give the Utilities (and particularly the Utility Managers) 'space' to operate and make decisions influences the efficiency of the utility's operations and also the motivation of the Utility itself. As the Board is often headed by political figures, the extent to which the utility governance is affected by political influence can also have a bearing on the utility's activities and performance.
- **Success can be overly-reliant on individuals:** It is clear that strong, visionary leadership both within the Boards, and particularly of the Utility Managers is a key factor for success. However of course such 'champions' cannot be found in all utilities, and there is a need to identify more systemic measures to guarantee progress, which does not hinge on individuals alone.

In addition to these, a number of other challenges have been encountered in the project, many of which are common to capacity strengthening initiatives generally, and are being worked on by WAE and the town authorities. These include: an occasional tendency for the Utility Managers or those in influential positions to send themselves on trainings rather than other staff; a lack of basic capacity in the towns to send appropriately qualified staff for certain trainings (e.g. for GIS); dispersal of the towns across wide geographical areas means monitoring visits (as they are done by WAE rather than the regions at this stage) are not as frequent as they could potentially be. There are also inherent challenges with the model of two separate projects being intervened in the town; one for the infrastructure, one for the 'capacity development'. Because the projects were not designed together, and may not be actively coordinated together during implementation, a delay in one project can affect the implementation of the other project.

The capacity development programme will help to enhance and sustain infrastructural investments that have already been made in the towns. However in some of the project focal areas, the 'capacity development only' investments can at some point face a challenge, whereby further improvements will require further infrastructural investments to compliment the gains made from the capacity development. For example in urban sanitation, considerable improvements can be (and have been) made on improving the waste collection and transport services, however this will not address the issue of the lack of sanitary facilities to dump or treat the waste, without major (hardware) capital investments.

## 11. Conclusions

The experiences in the 20-towns projects show that major improvements can be made in reforming utilities and municipalities to strengthen their performance in delivering urban WASH services. Relatively small, targeted 'capacity development' investments can lead to considerable gains in increasing efficiency, effectiveness, accountability, and overall sustainability of urban services. As an example, five of the towns have already been formally upgraded by the Government in terms of their grade classification, two of which are now top-grade utilities.

The twenty-towns project demonstrates the gains that can be made in working on systems strengthening for sustainable WASH services, which is a core component of WaterAid Ethiopia's country strategy.

Small investments in capacity development are key in maximising the impacts and sustainability of the infrastructural projects in the towns. The project helps to demonstrate that financing capacity strengthening initiatives can be an effective investment: initial expenditures can result in considerable cost savings and revenue increases for the utilities, meaning in the medium-long term they will be more financially independent, and less reliant on ongoing subsidies from the state or donors. In short, it is necessary to spend a little money, to be able to make and save a lot of money in future!

Associated with this finding is the scale of such investment and the fact that these benefits can be delivered for just around 2% of the overall capital investment, with per capita investments of only around £1.1. Finally, with regard to financing, this relatively very modest investment in capacity development can itself actually leverage further investment, by encouraging utilities, town administrations and other stakeholders to put more money into deepening and expanding investments, both in more capacity building, but also in 'hard'



investments such as warehouses, water quality laboratories and water supply system expansion. The precise extent of this leveraging is not yet fully captured, but data from four of the towns indicates that for every £1 invested in capacity development, £5.64 is subsequently invested by the utilities, town administrations and other local stakeholders.

The experience of the project suggests the ‘multi-pronged’ and sustained approach to capacity strengthening has been effective at achieving change and that such an approach is considerably more effective than one-off trainings, which are often the norm for capacity building activities in the sector. Project experience also suggest that focussing on establishing a motivational basis for performance improvements, particularly through formalising performance monitoring, management and reward processes, can be an effective route to stimulate healthy competition between staff and utilities, which is a key driver of success. The project has also found that strengthening the governance arrangements, and establishing multi-stakeholder platforms can be key enablers of progress, as they encourage collaborative action to drive change.

It is acknowledged that the project has by no means addressed all needs of the utilities and that some of the towns are lagging in terms of progress. It is also noted that there is high demand from Regional Bureaus and other utilities in the country to scale-up project activities, and all these present opportunities for the project to focus on for the remaining years of this Yorkshire Water funded project.

## 12. Recommendations for the Sector

From the experiences in the project to date, the following recommendations are proposed. Whilst the recommendations are classified by stakeholder category, they apply to all working on and supporting the urban WASH sub-sector in Ethiopia:

To Government:

1. Help to standardize HR requirements for the utility grades and ensure these posts are filled with appropriately qualified staff, as a pre-requisite for investment.
2. Establish clear and objective protocols for tariff setting, strengthen upwards reporting of utilities (including on KPIs), and ensure an ongoing mechanism for technical support to the towns.
3. Identify barriers and further incentives for lagging towns to catch-up, and stimulate commitment to performance improvements.
4. Identify mechanisms at the municipal, regional and national levels to ensure stronger joint planning in urban development and utility planning, particularly on issues relating to water resources. At the municipal level, the private sector should also be involved in the planning and problem solving, where they are also major users of water.
5. Whilst the cluster approach and cascade trainings from project to non-project towns is good in principle, ensuring the quality of training needs to be considered so that it does not deteriorate as it is cascaded down<sup>12</sup>.
6. Strengthen coordination and learning between the various organizations involved in capacity strengthening in the sector, to reduce ‘reinventing the wheel’ and shift from

<sup>12</sup> It is often the case that the quality of trainings deteriorates as a trained trainer cascades to others, and they cascade to others.

project-based approaches to a programmatic, sector-wide approach to capacity strengthening.

7. However, where aiming to scale-up capacity strengthening initiatives, ensure flexibility is provided (rather than prescribing rigid manuals and procedures) to allow for constant innovation and evolution of approaches, and for regional adaptation<sup>13</sup>.
8. Where scaling-up capacity strengthening 'projects' and allocating funds for this, also consider the required institutional arrangements and resource requirements for long-term post project support and refresher trainings.

To government, development partners, investors, and organisations supporting the urban WASH sector in Ethiopia:

9. Investigate and scale-up options for increasing poor household connections (through pro-poor approach).
10. Whilst developing the skills of utilities, consider also developing the skills of private sector (as per GTPII objectives) to provide some services to the utilities.
11. Identify why capacity building is relatively low priority for expenditure in the sector, what the bottlenecks are for utilization of allocated funds; and strive to influence how sector funds can be effectively utilized, by demonstrating successful approaches. This task will be significantly supported by collecting hard evidence on the leveraging effect of capacity development investments under this 20 towns project.
12. Consider making (meaningful) capacity strengthening of utilities and municipalities a requirement for infrastructural investments in towns. Consider how to partner 'capacity development' initiatives with infrastructure programmes from the outset, to maximize complementarity and reduce issues of cross-project coordination or delays.

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<sup>13</sup> Particularly considering the differences in contexts, and support needs between regions and towns