WASH services in small towns

Midline report for quasi-randomised control trial to assess impacts of the ONEWASH Plus programme

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Contents

List of figures

List of tables

Executive summary

The ONEWASH PLUS programme (2014-2018), led by UNICEF with financial support from DFID, aims to improve WASH services provision and increase sustainable use of sanitation and hygiene facilities, services and products at household and community level. To achieve this goal, the project introduces and tests innovations in integrated WASH service delivery approaches in small towns and surrounding villages, including the construction of new infrastructure and development of management capacity and other institutional arrangements. The project is focussed in eight towns in four different regions in Ethiopia: Abomsa, Sheno and Welenchiti in Oromia; Maksegnit in Amhara; Adishihu and Wukro in Tigray; Kebridehar and Jijiga in Somali. Jijiga, where the project interventions focus on improving solid waste management, was added to the project at a later stage, with a baseline conducted in February 2016, and therefore it is not considered in this midline report.

In order to assess the extent to which the programme has contributed to achieving sustainable, equitable and resilient WASH services and its desired impact, improved household health and well-being, a quasi-randomised control trial is undertaken, which includes a baseline survey (late 2014), and midline survey (mid-2016) with an endline survey planned in 2018. This report presents the methodology and results of the midline survey.

Methodology

Data for the midline study was collected through surveys (of households, water points, urban water schemes, micro enterprises engaged in solid waste collection, WASH services in institutions and public places), water quality testing, secondary data collection, and focus group discussions.

Data collection took place between mid-August and early October 2016. Mobile phones with the Akvo FLOW application were used by the data collectors to collect primary data. Indicators and variables were calculated and reformatted in SQLite and R. Furthermore MS Excel was used for exploratory analysis and generating tables and charts. SPSS was the primary tool used for statistical tests during the mid-line.

Country and town context

The project interventions in 2015 and 2016 were carried out at the time of one of the biggest climate hazards that occurred in decades and one of the most widespread civil unrests experienced in the past 20 years. Both have affected the project regions and woredas and contributed to reducing the momentum the project has created in improving the WASH situation.

Economic improvements of the past decade have continued with steadily increasing GDP and per capita income, nationally. Following the trend at the national level, in the project and control towns, the average household income has significantly increased and the proportion of households living under the poverty line has significantly declined.

Water service provision

At the time of the midline survey, construction activities towards improving the town water schemes were ongoing, with the exception of Adishihu, where town level interventions focussed on sanitation. The remaining six towns differ in terms of progress made. However, since town water scheme infrastructural developments have not been completed in any of the towns, this was not expected to have resulted in improvements in the water supply situation yet.

The **number of household connections** connected to the town water scheme in the seven project towns has increased since the baseline, as has the number of household connections in the control

schemes. However, this has not translated into an observed increase in the proportion of households using piped water on premises as a main drinking water source. **Reliability** of piped water supply is a major challenge in the project towns, with six of the seven project town piped water schemes reporting to have year round water rationing, while only three of the eight control towns reported year round rationing. The annual **quantity** of water produced as well as sold was found to be lower at the time of the midline than at the time of the baseline for most towns, project and control. The average decrease in the project and control towns has been more or less the same. The piped water **quality** situation is worst in the project towns Sheno and Adishihu and best in Wukro and all the control towns.

In the project areas, no statistically significant difference was found between **access to water services** in the baseline and midline. In the control sites, however, an overall statistically significant deterioration of access was found, especially in the urban context. While at the time of the baseline access was significantly poorer in project sites than in the control sites, in both urban and rural areas, at the time of the midline, no significant difference was found in access to water between project and control sites. The same was found to be true for the proportion of households accessing a certain level of water services. Considering the **level of water services** that households access in terms of accessibility, quantity and perception on quality, service levels have improved slightly in both the project as well as the control towns since the baseline. Similarly, rural services have improved slightly in project sites as well as the control sites, with a statistically significant improvement in the control areas only. Although there has not been a significant improvement in the levels of urban water service provision in the project towns, **user satisfaction** with water services has significantly increased in project towns over the past two years. In the control towns, satisfaction levels with urban water supply have actually gone down. In rural areas user satisfaction has improved in both the project as well as in the control areas. However, these improvements are not statistically significant for project sites.

The water interventions have not resulted (yet) in measurable improvements in water services at the time of the midline survey. This is not surprising considering that the water related interventions have not been completed yet.

Sanitation and hygiene services and practices at household and community level

In all seven project towns, activities have been undertaken related to improving the sanitation situation, including training of health extension workers and triggering using the Community Led Total Sanitation and Hygiene (CLTSH) approach. As a result of the above mentioned activities in the seven towns and the surrounding rural areas, -some positive impacts have been observed but challenges remain. A greater impact in terms of improved access to liquid waste services is expected once the sanitation infrastructures and desludging equipment become available as part of the ONEWASH Plus minimum sanitation package.

At the midline, **open defecation** in urban sites has remained the same in control sites, while it has declined in project sites. This suggests that the project has succeeded in reducing open defecation and in helping people to get on the sanitation ladder. This was found to be the case in urban towns, but especially in rural areas surrounding the towns. However, in terms of the **level of sanitation services**, there has been little change in other indicators. The regular desludging of latrines, expected to commence in 2017, may be expected to help in improving the cleanliness of latrines. **User satisfaction** with sanitation increased in the project towns, while it stayed more or less the same in the control towns. In the rural areas, user satisfaction increased in both the project areas as well as the control areas. **Hygiene behaviour** including hand washing and safe disposal of children's faeces has improved more or less equally in both the project as well as the control sites.

Solid (and liquid) waste management

In collaboration with the micro and small enterprise development agency the ONEWASH Plus programme established solid and liquid waste collection micro enterprises or re-organized existing enterprises in each of the project towns and provided trainings. Despite some improvements observed in the service they provide, the micro enterprises continued to experience challenges, related to selection of members; covering costs and expanding their service and client base. Significant improvements in the number of households that have their solid waste collected and taken have not (yet) been observed in the project towns. Greater impacts may however be expected as all the different components of the solid waste management systems are put in place.

Institutional WASH services and practices

ONEWASH Plus interventions related to institutional WASH have focussed on interventions in health facilities, schools, and public latrines.

In the project areas, a significant increase was observed in the proportion of **schools** meeting school WASH indicators since the baseline. Improvements have especially been observed related to latrine use, presence of hand washing facilities and presence of separate toilets for boys and girls. An increased proportion of schools meeting the benchmark on these indicators was also observed in the control areas. However, the increase was observed to be greater in the project areas than in the control areas, which suggests a positive effect of the project interventions. Menstrual hygiene management in schools has received a lot of attention under the project. This has led to an increase in menstrual hygiene facilities in schools and has been reported to have had a positive effect on reducing girl school absenteeism.

Improvements in WASH in **health facilities** as a result of the ONEWASH Plus programme have not been clearly observed.

Interventions related to **WASH in public places** are ongoing within the framework of the project. Some progress is made in the project areas as compared to the control areas.

Conclusions

Over the past two years, packages of integrated WASH interventions in the project towns and satellite villages have included sanitation and hygiene interventions at household and institutional levels. Towards improved water supply, initiated service delivery improvement measures have not yet been completed and have thus not resulted in significant change yet. Project activities have had a positive effect on decreasing open defecation in the project areas and on WASH in schools.

1 Introduction

UNICEF, with financial support from DFID, is undertaking an ambitious and challenging ONEWASH PLUS programme (2014-2018) aiming to complement the One WASH National Programme (OWNP) launched in 2013. The ONEWASH Plus programme seeks to introduce and test innovations in integrated WASH service delivery in small towns and surrounding villages, including the construction of new infrastructure and development of new management and other institutional arrangements. On the basis of new evidence, the programme also seeks to influence policy and support the development of capacities at a national scale through the OWNP.

Small towns are considered a strategic area of intervention for several reasons including: rapid growth, limited efforts to date to improve water and sanitation services, lower institutional capacities compared to larger towns and cities, the high potential for serious disease outbreaks and negative health impacts, and their importance as centres of local business and growth. The eight towns selected by the programme are located in four different regions: Abomsa, Sheno and Welenchiti in Oromia; Maksegnit in Amhara; Adishihu and Wukro in Tigray; and Jijiga[1] and Kebridehar in Somali region.

Key features of ONEWASH Plus interventions in the selected towns are:

- integration of a comprehensive package of multiple interventions related to water and sanitation infrastructure, service delivery and behaviour change.
- concern to address equity challenges with special attention to the poor, women and girls.
- attention to the full-cycle of service delivery including solid and liquid waste management issues.
- inclusion of satellite villages around the main towns (generally within 8 km of the town) in the programme, through either connection to centralised piped water supply systems or separate solutions (note: satellite villages are not included in Somali region).
- innovation to test new solutions to overcome challenges and with potential for wider national uptake.

The ONEWASH Plus programme strives to contribute to “accelerated achievement of the Universal Access Plan (UAP) targets achieved under the One WASH programme with specific attention to future proofing of investments through concept proofing of equitable, sustainable and resilient based programming nationally and in four regions by 2018”. In this way it strives to have a positive impact on household health and well-being for all by ensuring sustainable, equitable and resilient WASH services, in the programme areas and nationwide. The six cross-cutting result areas of the programme as presented in its log-frame are related to 1) governance; 2) private sector; 3) resilience; 4) equity; 5) urban WASH services; and 6) capacity development.

As defined it its monitoring framework, the programme works towards contributing to achieve three major outcomes:

- Outcome 1: Improved WASH services provision and increased sustainable use of sanitation and hygiene facilities, services and products at household and community level in programme areas
- Outcome 2: Proof of concept of integrated WASH service delivery approach for small towns and satellite villages
- Outcome 3: One WASH National Programme strengthened through the uptake of innovations and unlocking new capacities

[1] In Jijiga, project interventions focus on improving solid waste management. As this town was added at a later stage in the project and a baseline had been conducted only recently (February 2016), this town is not considered in this midline report.

In order to assess the extent to which the programme has contributed to achieving outcome 1, the overall outcome (sustainable, equitable and resilient WASH services) and the desired impact (improved household health and well-being), a quasi-randomised control trial is undertaken within the framework of the programme, which includes a baseline survey (late 2014), a midline survey (mid-2016) and an endline survey (2018). This will also provide insight into the level of achievements reached related to result areas 3 (resilience), 4 (equity) and 5 (Urban WASH services). Progress in other result areas (governance, private sector, capacity development) will be addressed in more detail in the sustainability checks which are executed on an annual basis in the project towns and their surrounding areas.

This report presents the methodology and results of the midline survey. The section which follows this introduction section presents the methodology, covering the overall study design, research questions, data collection tools and procedures, sampling strategy, and data management and quality control procedures. Section 3 presents the county and town contexts and the observed changes since the baseline survey. This will include an analysis of progress made on the impact on improving household health, in terms of diarrhoeal disease occurrence. This is followed by sections focussing on the sub-outcomes of outcome 1:

- Section 4: Water services (related to sub-outcome 1.2: Increased number of people with access to water supply systems in programme areas)
- Section 5: Sanitation and hygiene services and practices (related to sub-outcome 1.3: Improved hygiene and environmental sanitation practices at household and community level in programme areas)
- Section 6: Solid and liquid waste management (also related to sub-outcome 1.3)
- Section 7: Institutional WASH services and practices (related to sub-outcome 1.4: Hygiene and environmental sanitation practices at institutional level)

The report concludes with a section presenting the main conclusions and recommendations.

Box 1: Social accountability dialogue groups

As part of the ONEWASH Plus Programme, social accountability dialogue groups have been formed in all seven project towns to monitor the provision of WASH services in households, communities, institutions and public places and to ensure the responsiveness of the services to people with special needs, e.g., people with disability or poor people.

Initially, a stakeholder analysis was conducted in all the project towns to identify key players and their roles and responsibilities in the management of WASH facilities in towns and satellite villages[2]. In addition, a vulnerability analysis was carried out to identify vulnerable groups in each town[3]. The stakeholder analysis and vulnerability assessment were used as inputs to design participatory facilitation tools for inclusive WASH and stakeholders responsible for managing WASH services in towns were trained to use the tools. The trainees included WASHCO members, religious leaders, health extension workers, members of parent teacher associations, community based organisations, community representatives, representatives of vulnerable groups, government experts, teachers and private and public operators. The key topics covered in the training included: essentials of participatory planning and monitoring, planning tools and dialogue processes, service delivery evaluation criteria, equity and accountability.

The social accountability dialogues involved service authorities responsible for ensuring WASH service provision at household and institutional level, small and micro enterprises providing waste collection and other sanitation services and users. Although, the social accountability dialogue groups were expected to be platforms that facilitate dialogue between users, service providers and service authorities, and enable users to hold others to account, in practice they functioned as thematic task forces that facilitated cross-sectoral coordination and joint action. In the project towns, the social accountability dialogue groups were called sanitation and hygiene task

[2] World Vision Ethiopia, UWASH Project, Stakeholder Analysis in seven towns and surrounding villages, Report, February 2015
[3] World Vision Ethiopia, Urban water, sanitation and hygiene vulnerability assessment in eight towns and twenty seven satellite villages, Report, January 2015

forces. The task forces were set up at woreda/ municipality level and kebele and sub-kebele levels, for each thematic area or area of intervention.

The Seventh Quarter Report of World Vision (May 2016) provides a list of WASH service areas around which dialogue groups are organized and regular meetings are held. These include:

- Water Supply
- WASH in schools
- WASH in health facilities
- Solid and liquid waste management
- WASH in religious places
- WASH in market places and bus stations
- WASH in public institutions
- WASH in hotels, abattoirs and various business premises

The task forces/ dialogue groups set standards for WASH services in various areas and collected relevant data to assess problems in communities, schools and public places. Based on the assessment, joint action points and responsibilities were developed and regularly monitored. The group met periodically (once every two months or once in a quarter) to check progress on implementation of action points.

The dialogue groups helped to improve horizontal communication and coordination between sectors that are jointly addressing problems. For example, in Wukro, the dialogue group was instrumental in facilitating cross sector coordination and joint action between town water utilities and the municipality to reconnect public latrines to the town water supply system.

However, the dialogue groups also encountered some challenges. In some towns like Sheno, frequent reshuffling of government staff created a gap and reduced accountability of actors to carrying out agreed action points. In towns like Wukro, the representation of service providers and users in higher level woreda/ municipality task teams was less prominent or they were not represented. At the moment, the social accountability dialogue groups are highly dependent on the external facilitation of World Vision. In order for the process to continue after the project's life time, agreement needs to be reached on which institution will lead the process in the future.

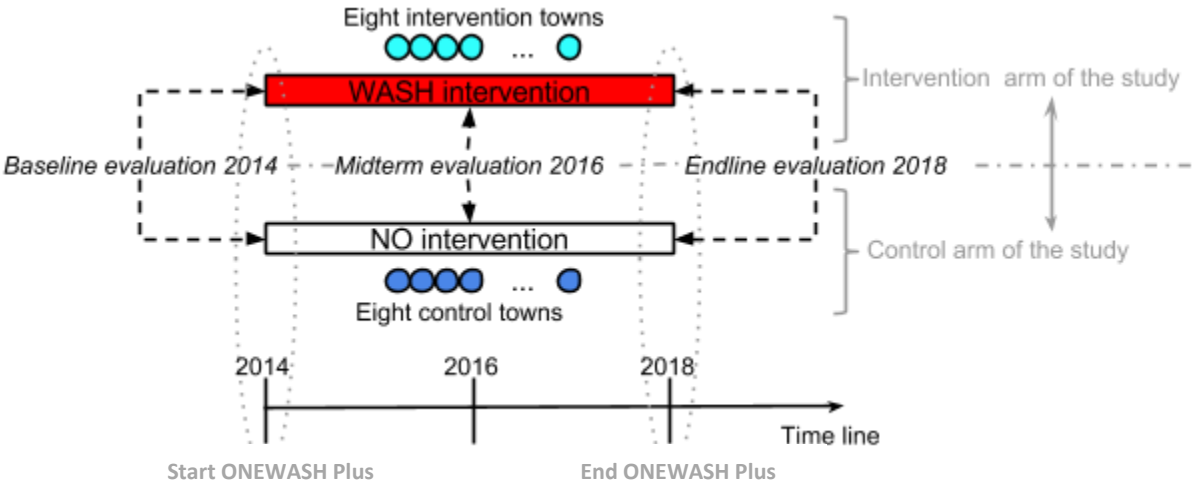
We will refer to the thematic task force and their specific achievements in the sections 4, 5 & 6.

2 Methodology

2.1 Midline study design and implementation

In order to assess the impact and outcomes of the ONEWASH Plus programme, a quasi-randomised control trial has been designed to include a baseline, midline and endline survey in the seven project towns (with interventions) and eight further 'control' towns (without ONEWASH Plus interventions). The baseline study executed end of 2014 provided insight into the baseline situation related to the provision of WASH services in the intervention towns and their satellite villages. The endline survey is to be executed in 2018 to assess the progress made in the intervention towns and villages in relation to the baseline situation and against observed changes over the same period in the control towns. The midline survey is intended to provide insight into progress made midway through the project (Figure 1).

Figure 1: Quasi-randomised control trial design with intervention and control groups



The design chosen for the study of programme impacts is a quasi-randomised control trial (RCT). A full RCT is not feasible, as the intervention areas had been selected before the design of the study and are therefore impossible to randomise. Another problem is that blinding of the intervention is difficult, but the study processes ensure blinding of intervention and control groups for the analysis.

2.2 Research questions

The midline survey has mainly been designed to answers questions related to the impact and the overall outcomes of the ONEWASH Plus project so far. It intends to answer the following questions:

Has there been (significant) change in the status related to diarrhoeal disease occurrence and time spending on collecting water in the intervention and control towns since the baseline?

- Prevalence of diarrhoeal disease
- Prevalence of diarrhoeal disease in boys and girls under 5
- Average time taken by different people (especially women and girls) to collect water

Has there been (significant) change in the status of water service provision in the intervention and control towns?

- Number and types of systems in towns and satellite villages

- Number of household connections and public water points
- Functionality rate and service level of different systems, including:
  - Number of days service provided (days/year)
  - Number of hours service provided (average number of hours service on days system functioning)
  - % of sources with low risk water quality (E. coli) at source and point of collection
- % of (vulnerable) households with access to adequate water services, including:
  - % of (vulnerable) households with access to an improved water source
  - % of (vulnerable) households with access to an improved water source within 500 m (urban) and 1500 m (rural)
  - Number of people with main access through household connections
  - Number of people in urban areas with main access through water points and kiosks, within and outside 500 m of home
  - Number of people in rural areas with access within and outside 1500 m of home
- User satisfaction with WASH services by different user groups (including the most vulnerable people)

Has there been a change in the status of sanitation and hygiene services and practices at household and community level in the intervention and control towns?

- Number of (vulnerable) people with access to sanitation services
  - % of people with access to at least latrine facilities
  - Number and % of households with household latrines, with and without hand washing facilities
  - % of people using improved sanitation facilities
- % of people practicing open defecation and number of ODF villages
- % of people that practise hand washing with soap at critical moments
- Number of towns with solid waste management systems in place (including facilities for sorting and recycling of solid waste)
- Number of towns with liquid waste management systems in place

Has there been (significant) change in the status of institutional sanitation and hygiene services and practices?

- Number and % of institutional (schools, health facilities) with (adequate, inclusive and sustainable) latrines
- Number and % of public institutions (schools, health facilities) declared ODF
- Number and % of schools with adequate facilities for menstrual health management

2.3 Data collection tools

In order to collect the data required to answer the above mentioned questions, seven surveys were developed (see Table 1).

The surveys enabled the collection of geolocations, photos and answers to free text questions, numeric questions and closed option questions.

Compartment Bag Tests were used to assess the water quality of selected water points, focussed on one critical microbiological indicator: *E.coli*. The compartment bag test is a new, relatively simple test that offers more robustness than membrane filter tests.

Table 1: Data collection surveys

Survey	Data
• Urban piped water system survey • Water points survey • Water quality testing survey	On water supply infrastructure, functionality and services provided
• Household survey	On level of water and sanitation services accessed, hygiene and sanitation practices, user satisfaction and health impacts
• Institutional WASH survey	On the level of water and sanitation services provided by public institutions hygiene and sanitation practices by these institutions
• Waste collector survey	On solid and liquid waste management

In addition, a number of focus group discussions were held in each of the project towns in order to triangulate the data collected through the surveys and in order to better understand reasons behind certain findings. In each town seven focus group discussions (FGDs) were held on different topics, each with different participants:

- **Accessing water,** with water consumers living in the poorest areas and/or least well served (with piped water supply) neighbourhoods
- **WASH in schools** with Education office at woreda level, school director/ principal (responsible for managing school budgets) and service users (WASH club members, PTA members, students and teachers, plus the regional coordinators and project officers who were trained to facilitate the dialogue sessions
- **Menstrual Hygiene Management** (MHM)with Female students over the age of 14[4]
- **Menstrual Hygiene Management** with Teachers and MHM facilitators; PTA members and MHM product suppliers/ distributors.
- **Solid and liquid waste management (collection and disposal)** with urban greenery and beautification process team in the municipality; service providers; service users (households and businesses), and the regional coordinators and project officers who were trained to facilitate the dialogue sessions
- **WASH in public places (markets and bus stops)** with Service authority (municipality), WASH services providers and citizens/users who participated in the social accountability dialogue sessions plus the regional coordinators and project officers who were trained to facilitate the dialogue sessions.
- **WASH behaviour change (CLTSH),** with Sanitation task force responsible for facilitating ODF triggering and verification together with Health Extension Workers (HEWs), project staff, sanitation and hygiene promoters.

2.4 Sampling

Data was collected on all piped water schemes and sources, communal water points, waste collectors and public institutions in the project and control towns and their satellite villages. Household data was collected from a sample of households, and water quality data from a sample of communal water points.

[44] Although girls start menstruating much earlier than age 14, a group of older girls will be easier to engage in focus group discussion.

2.4.1 Household sampling

For the midline household survey, it was decided to set a smaller sample size than the baseline, representative for the urban and rural project and control areas. The household sample size was set at 30 households per town and 10 from the villages surrounding each town. The project town Kebridehar and therefore the two selected control towns (Kebribeyah, Shinile) in Somali Region did not include surveys in satellite villages, bringing the total household sample size to 270 (project) + 300 (control) = 570 households.

The sample size in the midline was reduced, as compared to the baseline, due to resource limitations, with the intention to do a large survey instead during the endline period. However, while the sample size may be too small to make conclusions at the individual town level, the total sample size, putting the data from all the towns together, was adequate to make comparisons on findings between the baseline and midline. In the analysis, statistical tests that are appropriate for small sample size are used where needed. For example, while comparing proportions, Fisher's exact was used where this was needed due to the small size of the data on a particular variable.

Like in the baseline, a quasi-random sampling procedure was applied to select the sampled households (for an elaborate description of the procedure, please see Adank et al, 2015 or the midline guidelines presented as annex to this report). The actual number of households sampled can be found in Annex 4.

2.4.2 Weighting methodology for analysis

Since the household sampling is not proportional to the total number of households in each town, the probability of sampling a household in one town will be different to another. While this does not have a large impact on the analysis of the results of a single town, it may be significant when analysing the data across several towns, e.g. estimating proportion of households that have had a diarrhoeal incident in the last two weeks. In order to correct for the changing probability, sampling weights have been applied.

The weight for each record is the inverse of the probability of selecting the household, i.e. the number of households in the area divided by the number of households in the sample. The number of households in each sample is known but the number of households in the area had to be estimated. Secondary population data from the Federal Democratic Republic of Ethiopia Central Statistical Agency (CSA) has been used to estimate the population of the study areas. CSA publishes population projections per woreda for each year based on the 2007 census and provides urban and rural population figures. In the selected woredas, the town population is assumed to be the same as the CSA projected urban population as there are no other urban centres in these relatively small woredas. The final estimate of the number of households was calculated using the estimated urban population divided by the average household size found in each urban area.

As the population estimates were only possible on the basis of urban areas, the rural areas could not be included in the weighted analysis. As a result, the analysis uses both weighted and unweighted tests depending on the context. P-values are reported as weighted if the weights have been applied. Omission means that it is not a weighted test. Any analysis comparing rural and urban areas has not been weighted due to missing satellite village population figures.

In most cases, we found that weighting did not change the significance of the results when applying a 95% confidence level. When a difference was found, we only used the weighted test when comparing across project and control areas and we have only reported on urban households.

In order to examine the incidence of diarrhoea in children under five, it was again necessary to make some assumptions about the proportion of families with children under five in each town. It was

found that there was a significant difference between the proportions of families with children under five in Somali region compared to the rest of the country. For this reason, weighting based on the number of households with children under five was corrected for the difference with Somali region.

2.4.3 Water point sampling for water quality testing

The water quality testing focuses on points of supply rather than point of use / household consumption (these may be the focus of alternative studies). Five public water points in each town, five alternative urban water sources where these existed and five public water points in surrounding villages were randomly selected. The samples were collected after the water point surveys had been completed.

2.5 Data collection process

Data collection took place between mid-August and early October 2016. Primary data was collected by three teams consisting of three data collectors, supervised by a regional coordinator: one team collecting data from the three project and three control towns and their surrounding areas in Oromia region, one team collecting data from two project and two control towns and their surrounding areas in Tigray region and one project and one control town and their surrounding areas in Amhara region, and one team collecting data from one project town and two control towns in Somali region towns.

Table 2 gives an overview of the surveys, where they were administered and the procedure followed.

Table 2: Data collection procedure

Name of survey	Procedure
Urban water scheme	In towns, this survey was used first to get a good overview of the piped system and its components. The system manager, operators and finance staff were asked to respond to the survey questions. They were given the opportunity to look up answers in documents and provide relevant data.
Urban water source	Data was collected through discussions with the operational manager or someone else delegated by the utility and surveyor observations.
OWP water point • **Water point** • **Water quality test**	All public fountains connected to the piped scheme and the alternative communal water points were surveyed. Data was collected through discussions with the utility staff, WASHCO members / caretakers, measurements and enumerator observations. After general water point data had been collected, a number of water points were randomly selected for water quality testing.
Institutional WASH	All **schools** were visited. Data was obtained through discussions with the head master or his / her delegate and observations. All **health facilities** were visited. Data was obtained through discussions with the head of the facility or his / her delegate and observations. All **public latrine** blocks were visited. Data was obtained through discussions with the manager of the facility or his / her delegate and observations. All **other relevant public institutions** (e.g. prisons) were visited. Data was obtained through discussions with the head / manager of the facility or his / her delegate and observations.
Waste collector	All waste collectors active in the town were visited. Data was collected through talks with the manager.
Household	A sample of households was visited. The data collectors introduced themselves, stated the purpose of the household survey and asked for permission and time. It was recommended that the data collectors ask the questions to the lady of the house, or at least make sure she is present during the interview as women are mostly responsible and affected by WASH and are therefore in the best position to answer the survey questions.

Copies of surveys are included in Annex 3 and an overview of the administered surveys can be found in Annex 4.

Mobile phones with the Akvo FLOW application were used by the data collectors to collect primary data. Data from the mobile phones was transferred through the mobile phone network to an online database, accessible through the Akvo FLOW dashboard. The data collection teams received a two-day training in the use of the phones and the surveys prior to the start of the data collection.

2.5.1 Data management and quality control

Data management, quality control, and cleaning are all vital to both facilitate analysis and to ensure valid conclusions. While the previous section covered these procedures during data collection, this section describes how the collected data was managed and quality controlled thereafter, i.e. during cleaning and analysis.

During the midline data collection, data was exported manually from the Akvo FLOW dashboard to Excel sheets and then imported into the master SQLite database using an R script[5]. While manual export added some overhead, it was possible to export the dashboard data in several rounds without any problems. All downloaded datasets and the SQLite database are stored in the project Dropbox folder, which retains previous versions of each file for a year even after being deleted. For long term storage, we ensured that each time data was downloaded from Akvo FLOW, it was saved in a new folder with the date of download. These datasets were then imported into the SQLite database. Manual cleaning was done in Excel with data exported from the SQLite database. Changes made in Excel by the data collection supervisors and analysts were then imported into the database as separately stored clean data. The SQLite database keeps separate copies of raw data from Akvo FLOW and cleaned data to ensure that raw and clean data can be compared and changes tracked at any stage.

As new records were added during data collection, the user could easily differentiate records that had been cleaned from those that were not and the database also provided a list of records with common problems to facilitate the cleaning. Finally, the database also provided a final dataset with calculated indicators that could be used for analysis in Excel or R or SPSS. It was decided to calculate the majority of indicators in the database using standard SQL queries and the human-readable variable names because they are much easier to interpret than Excel formulas or R scripts. Some indicators and variables were calculated and formatted in R when that was required due to the limitation of SQLite queries.

During data cleaning, the whole team from the international and local analysts to the data collection supervisors were involved in checking both the raw data and the results of the analysis. Furthermore, the photos of water and sanitation infrastructure have also been used to double check the data entry by enumerators while in the field and ensure that they have not introduced systematic mistakes that might reduce the validity of the project evaluation.

During the midline, data analysis has been done using several tools. As mentioned, indicators and variables were calculated and reformatted in SQLite and R. Furthermore MS Excel was used for exploratory analysis and generating tables and charts. SPSS was the primary tool used for statistical tests during the mid-line.

The following are the statistical tests applied in the analysis. Pearson's Chi-square test is used to test significant differences while comparing proportions using categorical variables. Where Chi-square tests are not valid because of the small sample size, Fisher's exact test is used. Independent sample

[5] An automated link between Akvo FLOW and the SQLite database may be established in Phase 2 after the Akvo FLOW API has been tested and used by at least one other organisation. It is currently being tested in Ghana by the Community Water and Sanitation Agency to link data to DiMES.

T-tests are used to compare means. To test the strength of association between two variables Kendall's rank correlation is used. In some places, box plots are used to compare distributions.

3 Country and town context

3.1 Changes in the operating environment

The project interventions in 2015 and 2016 were carried out at the time of one of the biggest climate hazards that occurred in decades and one the most widespread social unrests experienced in the past 20 years. Both have affected the project regions and woredas and contributed to reducing the momentum the project has created in improving the WASH situation.

In 2015 and 2016, drought linked to El Niño and floods following the drought and major disease outbreaks, including an Acute Water Diarrhoea (AWD) outbreak, led to a humanitarian crisis. The situation triggered emergency response of water trucking, rehabilitation of boreholes, distribution of household water treatment materials, soaps and water storage containers, and behavioural communication on sanitation and hygiene that reached 10 million affected people nationwide. The emergency situation has affected the eastern part of the country and the project towns in Somali, Tigray, Oromia and Amhara regions to various degrees.

Social unrest in Oromia and Amhara regions, which started in November 2015 and July 2016, respectively, led to one month's work stoppage in both regions. Even though, normal business activities gradually resumed in October 2016, the situation diverted the attention of stakeholders and local government in Oromia and Amhara project towns and interrupted implementation of project activities.

On the other hand, the double-digit economic growth, experienced by Ethiopia since 2005, has continued in the past two years. In the 2014/2015 fiscal year, real gross domestic product (GDP) is estimated to have grown by 10.2%[6].

In the past two years several WASH interventions have been carried out at the national level with various projects also implemented in project and control towns, outside of the ONEWASH Plus project. Through the consolidated WASH account (CWA) project, WASH interventions are financed in woredas where control towns are located, namely, Sululta and Hawzen. Woredas where project towns are located, Amba Alage and Gonder Zuria, were also covered in the CWA project. The control town Kola Diba was covered under the CWA project, while the woreda where the town is located, Dembia received WASH financing under the Community WASH project supported by the Finland government. Sanitation and hygiene promotion activities are conducted through health extension workers using the CLTSH approach[7].

3.2 General information on the towns and their surrounding areas

3.2.1.1 Household size

The average household size in the urban areas of the 16 towns in the midline period was 5.0 persons, while in the baseline it was 4.9 (median: 5 persons midline and 4 persons baseline). The average household size in the surrounding rural areas of these towns amounted to 5.6 persons it the midline, while it was 5.4 in the baseline (median: 5 for both baseline and midline). Both in the baseline and midline, the average household size in Somali region was higher than in the other three regions, with an average of 7.3 persons per household (median: 7 persons).

[6] Ethiopia economic outlook, AFDB, 2016
[7] ONEWASH National Program Annual report, 2008 Ethiopian fiscal year

3.2.1.2 Livelihoods

In the urban areas of the 16 towns, livelihood strategies were diversified, including owning a small business, formal employment, daily labour and remittances. A few households in urban areas also relied on farming as their source livelihood, which is a result of inclusion of some rural satellite villages into towns in the past two years. In the rural areas, farming was the main livelihood strategy.

3.2.1.3 Vulnerable households

In order to differentiate between more vulnerable and less-vulnerable households, households were asked about their age and gender composition, whether they are male- or female-headed, and whether they have members with disabilities. Households were also surveyed regarding their economic situation.

Similar to the baseline study, the proportion of **female-headed households** was found to be relatively high. In the midline survey, 23% of rural households and 49% of urban households were female-headed. This is higher than the national figure 19% and 35% of households being female-headed in rural and urban areas respectively, as reported by the Central Statistical Agency (2014).

From the total of 542 households sampled in the midline survey, 35 households (6%) had at least one household member who has a **disability**. This is more or less in line with the findings of the baseline, which found 5.3% of households with at least one household member with a disability. In both the baseline as well as the midline survey, the proportion of households with a household member with a disability was higher in Shinile, compared to the total study area. The most common disability is a limitation in physical movement (57% of disabilities) and blindness (23% of disabilities).

To get an idea of the **economic situation** of households in the towns and their surrounding rural areas, information was collected on household income, as well as on the number of assets, livestock, agricultural land and type of house. The type of housing and the number of assets did not give a strong enough indication of the economic situation of these households. Here, we will limit ourselves therefore to presenting the analysis of the household income. It should, however, be noted that some of the households (15%) were not willing or able to provide information on their annual income. Missing values have been excluded in this preliminary analysis. A statistically significant difference (with significance level 0.05) was observed between the average income in the urban areas of the towns and the rural areas surrounding the towns.

Table 3: Annual household income

	Median	Mean (CI 95%)	Mean, weighted
Urban	24,000 birr	27,874 birr (25,944 – 29,803)	27,331birr
Rural	18,187 birr	21,133 birr (18,612 – 23,654)	NA

Comparing annual income between baseline and midline period shows some significant differences. An independent sample t-test revealed a statistically significant difference between baseline and midline annual incomes for rural and urban areas, ($t=-6.290$, $df=128$, $p<0$) and ($t=-7.400$, $df=839$, $p<0$) respectively. The mean annual income reported in the midline for rural areas (21,133) is considerably higher than the mean reported in the baseline for rural areas (12,721). Similarly the mean annual income reported in the midline for urban areas (27,874) is considerably higher than the mean reported in the baseline for urban areas (18,720). The difference between baseline and midline is in line with growth in per capita income nationally.

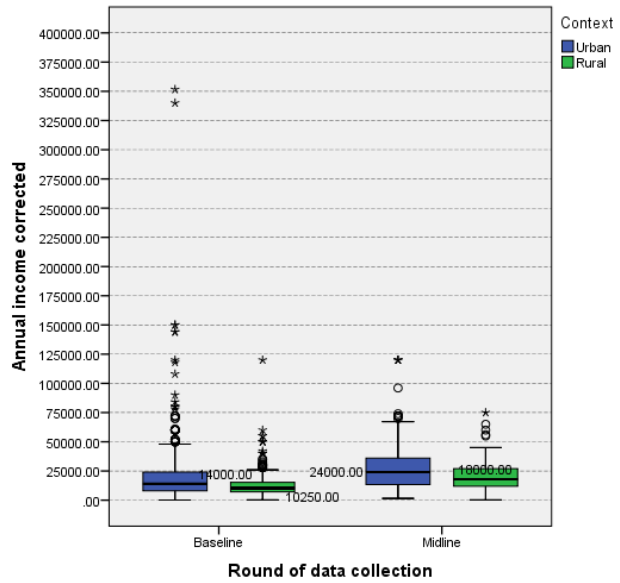
Annual household income is also compared between male- and female-headed households. An independent sample t-test was conducted to examine whether there was a significant difference between income of male- and female-headed households. Male-headed households (M=28,120, SD =

18,793) reported a statistically significant (t = 2.473, df = 482, p < 0.014) higher annual income than female-headed households (M=23,995, SD=17,184).

Table 4: Annual household income, female- and male-headed households

	Median	Mean (CI 95%)
Male-headed households	23,400 birr	28,120 birr (25,905 – 30,335)
Female-headed households	20,333 birr	23,995 birr (21,629 – 26,362)

Figure 2: Rural and urban boxplot of baseline – midline annual income



In order to compare household characteristics across different income groups, households were classified into the following two income groups:

- Income under the poverty line (below 75 USD per month),
- Income above the poverty line (75 USD per month or more),

Figure 3: Comparing household income categories between baseline and midline

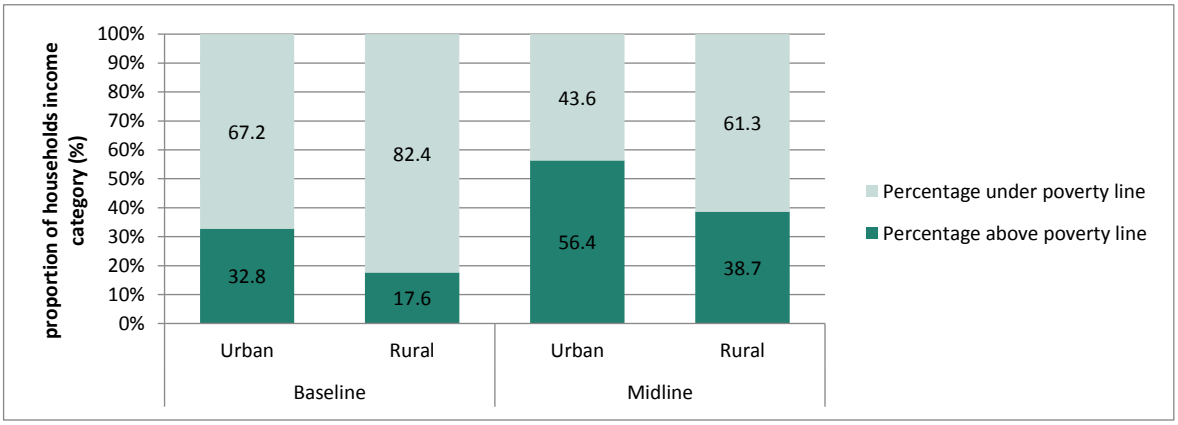


Figure 3 shows that the proportion of households living under the poverty line has significantly declined in urban and rural areas between the baseline and midline (p=.000 for both urban and

rural). However, there are higher proportions of households living under the poverty line in rural areas than urban areas.

Comparison between male- and female-headed households shows a higher proportion of female-headed households (77.5%) fell under the poverty line compared to male-headed households (69.7%) in the baseline. In the midline, the gap between male- and female-headed households have narrowed down with 50.2% of female-headed households falling under the poverty line, while 45.5% of male-headed households also fell under the poverty line. The difference between the two categories of households was statistically significant in the baseline, but not in the midline.

Of the 35 households with at least one household member with a disability, 11 households were not able to provide information on their household income. For the 24 households that did provide information on their household income, the income distribution was fairly similar to that for households without members with a disability.

3.3 Diarrhoeal disease occurrence

Table 5 presents an overview of the proportion of households with at least one household member who had suffered diarrhoea[8] over the last two weeks.

Table 5: Incidence of diarrhoea

	Project		Control		Difference between project and control, baseline	Difference between project and control, midline
	Baseline	Midline	Baseline	Midline		
Urban (weighted)	5.3%	2.6%**	5.3%	1.4%**	No ss	No ss
Rural	7.1%	4.8%	3.6%	5.0%	**	No ss

** = statistical significant difference between baseline and midline
No ss = No statistical significant difference

At the time of the baseline, the proportion of households with diarrhoea cases was highest in the project towns Kebridehar (13.9%), Maksegnit (10.8%) and Welenchiti (9.8%), and control towns Koladiba (12.1%) and Kebribayah (8.2%). At the time of the midline, the proportion of households with diarrhoea cases was highest in project towns Abomsa (7.3%) and Maksegnit (4.8%), and control towns Gobessa (5%) and Koladiba (4.9%).

No statistical significant difference was observed in incidence of diarrhoea between income groups.

The table shows a similar proportion of urban households with incidence of diarrhoea in the baseline. In the midline, this proportion decreased both in the project towns as well as in the control towns. In the midline, no significant difference was found between the proportion of households with incidence of diarrhoea between project and control towns. This suggests that the observed improvements in towns could be due to other contributing factors than the project interventions.

In baseline, a statistically significant difference in incidence of diarrhoea was found between rural project and control areas. However, over the past two years the incidence of diarrhoea had significantly decreased in the project areas, while it has increased in the control areas (though not statistically significant). The difference in incidence of diarrhoea between rural project and control areas is no longer significantly different. This could indicate that the project interventions have had a positive impact on incidence of diarrhoea in rural areas.

[8] Diarrhoea was defined as having three or more loose or liquid stools within 24 hours.

3.3.1 Incidence of diarrhoea in children under five

Incidence of diarrhoea on children under five years of age was 7.1% in project sites and 2.5% in control sites at the time of the baseline. The difference was statistically significant. In the midline, incidence of diarrhoea among children under five has declined to 2.5% in project sites and 2.1% in control sites. However, the decline in both project and control sites is not statistically significant. The reported midline results of 4.4% and 2.1% for project and control sites respectively, are also not significantly different.

The incidence of diarrhoea on children under five years of age has increased significantly in the rural control areas, while it has (not significantly) decreased in the rural project areas.

In the urban areas, a decrease was observed in both project and control towns, although this was not found to be statistically significant.

Table 6: Incidence of diarrhoea among children under five years of age

	Project		Control		Difference between project and control, baseline	Difference between project and control, midline
	Baseline	Midline	Baseline	Midline		
Urban	7.7%	4.3%	3.5%	0.9%	No ss	No ss
Rural	5.4%	4.8%	1.3%	6.9%**	No ss	No ss
Total	7.1%	4.4%	2.5%	2.1%	**	No ss

** = statistical significant difference between baseline and midline
No ss = No statistical significant difference

4 Water service provision

Water service highlights

- Water interventions had not been completed yet at the time of the midline survey and had therefore not contributed to significant improvements in the provided water services.

4.1 Water supply interventions

At the time of the midline survey, construction activities towards improving the town water schemes were ongoing, with the exception of Adishihu, where town level interventions focussed on sanitation. The remaining six towns differ in terms of progress made. Most progress related to infrastructural development of the town water schemes has been in Maksegnit and Wukro. However, since town water scheme infrastructural developments have not been completed in any of the towns, this is not expected to have resulted in improvements in the water supply situation yet.

4.2 Midline survey results

As water interventions have not been completed yet, we do not expect to see big (significant) changes in the project areas (compared to the change in the control areas) with respect to water service provision.

4.2.1 Town water schemes

The **number of household connections** connected to the town water scheme in the seven project towns has increased since the baseline, as has the number of household connections in the control schemes. As shown in table 7, overall the increase in household connections has been about the same in the project and control towns. The fact that the increase in household connections in the project towns has not surpassed that of the control towns is not surprising, as the water related interventions in the project towns have not yet resulted in improved water services.

Table 7: Overview of changes in number of household connections

Project town	Number of hh connections, baseline	Number of hh connections, midline	% increase from baseline	Control town	Number of hh connections, baseline	Number of hh connections, midline	% increase from baseline
Maksegnit	823	1,099	34%	**Kola Diba**	1021	1266	24%
Abomsa	1,928	2,068	7%	**Adami Tullu**	1500	1717	14%
Sheno	2,078	2,406	16%	**Chancho**	1853	2352	27%
Welenchiti	1,673	1,795	7%	**Gobesa**	1193	1558	31%
Kebridehar	300	600	100%	**Kebribeyah**	300	250	-17%
				Shinile	600	729	22%
Adishihu	687	752	9%	**Adi Gudem**	1480	1480	0%
Wukro	5,147	6,216	21%	**Hawezen**	895	956	7%
Total project	12,636	14,936	18%	**Total control**	8,842	10,308	17%

As shown in table 8 below, the overall proportion of **functional public standpipes** connected to the town water scheme has decreased slightly in both the project as well as the control towns. An

increase in the proportion of functional public taps was observed in Welenchiti, Chancho and Hawazen. Functionality rates remain lowest in the Somali region towns Kebridehar and Kebribayah.

Table 8: Public tap functionality

Project town	Number of public water points	% functional public taps, Baseline	% functional public taps, midline	Control town	Number of public water points	% functional public taps, Baseline	% functional public taps, midline
Maksegnit	10	70%	60%	**Koladiba**	32	81%	67%
Abomsa	29	100%	97%	**Adami Tullu**	16	73%[9]	31%[10]
Sheno	15	67%	33%	**Chancho**	18	47%	72%
Welenchiti	38	60%[11]	80%[12]	**Gobesa**	24	90%[13]	87%[14]
Kebridehar	22	27%	23%	**Kebribeyah**	39	10%	5%
				Shinile	4	75%	25%
Adishihu	11	82%	64%	**Adi Gudem**	14	93%	91%[15]
Wukro	4	75%	50%	**Hawezen**	7	67%[16]	86%
Total	**129**	**67%**	**65%**	**Total**	**122**	**55%**	**50%**

Reliability of piped water supply is a major challenge in the project towns. Six of the seven project town piped water schemes were reported to have year round water rationing, with rotation of water turns over different parts of the town. In Maksegnit, water rationing was practiced only part of the year. Year-round water rationing was practiced in only 3 of the 8 control towns and for part of the year in another 3 towns. Two control towns (Kola Diba, Shinile) reported not to practice water rationing.

The number of hours that public taps provide water services is overall lower in the project towns than in the control towns. The frequency of water turns in terms of the number of days in the months that water is supplied is lower in the project areas than in the control areas.

Table 9: Hours of water services per day and water service frequency of functional public standpipes connected to town water scheme

	Number of hours per day			Frequency of water turn			
	0-6	6-12	>12	Less than every 4 days	Once every 2-4 days	More than every other day	Every day
Project towns	70%	17%	13%	17%	58%	10%	14%
Control towns	21%	39%	39%	23%	7%	41%	30%

For an overview per town, see annex 5.

[9] Based on data from 10 standpipes
[10] Based on data from 13 standpipes
[11] Based on data from 30 standpipes
[12] Based on data from 30 standpipes
[13] Based on data from 21 standpipes
[14] Based on data from 23 standpipes
[15] Based on data from 11 standpipes
[16] Based on data from 6 standpipes

The annual **quantity** of water produced as well as sold was found to be lower at the time of the midline than at the time of the baseline for most towns, project and control, as shown in table 10. The average decrease in the project and control towns has been more or less the same.

Table 10: Water production and sales per town water scheme

Town	Production (m^3/year)		Sales (m^3/year)		Increase in production	Increase in sales
	Baseline	Midline	Baseline	Midline		
Maksegnit	46,281	120,528	42935	104,183	-7%	-14%
Abomsa	158,198	136,677	138,675	114,960	-12%	-16%
Sheno	152,145	158,176	138,448	156,448	-9%	-1%
Welenchiti	253,307	296,838	226,392	242,002	-11%	-18%
Kebridehar	93,312	unknown	47680	-	-49%	unknown
Adishihu	45,090	50,250	45000	45,770	-0.2%	-8.9%
Wukro	509,763	649,675	360533	551,512	-29%	-15%
Average project towns	**179,728**	**235,357**	**142,809**	**173,554**	**-17%**	**-12%**
Kola Diba	151,198	182,008	109,762	125,350	-27%	-31%
Adami Tulu Jido Kombolcha	113,999	unknown	Unknown	135,652	unknown	unknown
Chancho	134,328	123,908	Unknown	84,753	unknown	-32%
Gobessa	93,100	253,813	100,258	234,891	8%	-7%
Kebribeyah	72,000	unknown	50,000	259,632	-31%	unknown
Shinile	220,752	unknown	Unknown	68,196	unknown	unknown
Adi Gudem	105,454	102,355	91,589	97,943	-13%	-4%
Hawezen	70,589	79,175	58,527	72,785	-17%	-8%
Average control towns	**120,178**	**148,252**	**82,027**	**134,900**	**-16%**	**-17%**

4.2.2 Rural water facilities

In total 81 rural water points which had been visited as part of the baseline survey were revised in the midline survey. Of these 81 rural water points, 34 were found in the areas around the project towns and 47 in the areas around the control towns. The proportion of **functional** water points had increased slightly in the project areas and decreased in the control areas.

The proportion of rural point sources which were functional for at least 80% of the year and therefore considered "**reliable**", has decreased since the baseline in both the project areas as well as the control areas. In the project areas, the proportion of reliable water points was not found to be statistically significantly smaller than that in the baseline in the project areas (p=0.14). In the control areas, the midline reliability was found to be statistically significantly smaller in the midline than in the baseline (p=0.0169).

Table 11: Functionality and reliability of rural point sources

	Number of water points with repeat data	Functional water points		Reliable water points 2014 (At least 80% of the year functional)	
		Baseline	Midline	Baseline	Midline
Project area	34	82%	88%	74%	62%
Control area	47	85%	72%	70%	49%

For an overview per town, see annex 5.

4.2.3 Town and rural water quality analysis

At the time of the midline survey, a total of 171 samples were taken for analysis of microbial (E. coli) contamination: 94 from the town piped schemes, 18 from alternative urban sources and 59 from rural point sources. Sources to be sampled were selected randomly after urban and rural water points had been mapped. Guidelines were to sample up to five urban piped supplies (focussing on standposts, replacing with household connections where sufficient standposts were not available although this was not always done), up to five alternative supplies in urban areas where these existed and up to five supplies in the satellite villages.

When the E. coli count in the sample was found to be below 10 MPN/100 ml, the sample was considered to have passed the quality test. While zero levels are desirable and the ultimate standard, levels below 10 MPN/100 ml are considered low-risk (safe or probably safe) according World Health Organization Guidelines for Drinking Water Quality (2011).

Table 12: Microbial water quality test results: Number of low-risk samples / total number of samples (E. coli measured by Compartment Bag Test)

Location	Rural point sources		Town piped scheme		Alternative urban sources	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
Maksegnit	1/4	1/5	1/6	4/5	1/1	4/5
Abomsa	1/1	2/3	4/6	3/5		
Sheno	1/4	3/5	4/4	1/5		0/1
Welenchiti	3/3	3/3	3/6	6/10		
Kebridehar	NA	NA	1/1	3/4		1/6
Adishihu	5/5	4/5	3/5	1/10		
Wukro	4/5	1/4	3/3	9/10		
Total project towns	**15/22 (68%)**	**14/25 (56%)**	**18/30 (60%)**	**27/49 (55%)**	**1/1 (100%)**	**5/11 (45%)**
Koladiba	2/5	1/7	5/5	10/10		
Adami Tullu	3/3	3/3	3/3	5/5		
Chancho	3/5	3/5	2/2	6/6		
Gobesa	2/2	2/7	2/4	8/8		
Kebribeyah	NA	NA	4/4			
Shinile	NA	NA	4/4	2/2		1/3
Adi Gudem	5/7	3/7	5/5	6/6		2/2
Hawezen	5/5	2/5	4/4	8/8	2/2	2/2
Total control towns	**20/27 (74%)**	**14/34 (41%)**	**29/31 (94%)**	**45/45 (100%)**	**2/2 (100%)**	**5/7 (71%)**

For the project areas, both in the baseline as well as in the midline, the proportion of piped scheme connections with acceptable water quality is more or less the same as that of rural point sources. Considering microbial contamination, the piped water quality situation is worst in the project towns Sheno and Adishihu and best in Wukro and all the control towns.

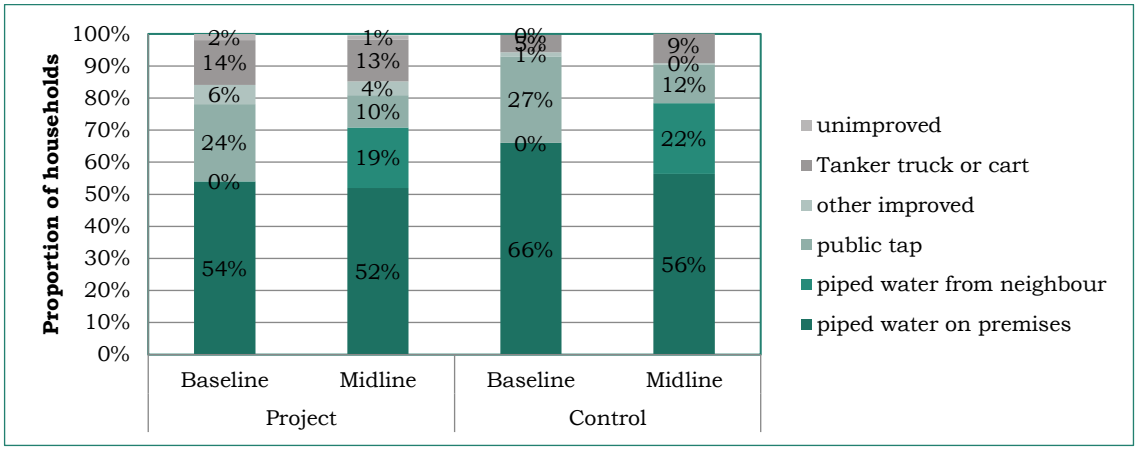
The proportion of rural water points with acceptable water quality (low risk, with E. coli count of <10 MPN / 100 ml) was found to be lower in the midline than in the baseline, in both the project as well as the control towns. This could be due to the fact that samples in the baseline were collected mainly during the dry season, while midline data collection mainly took place during the rainy season. The difference was, however, only statistically significant in the control rural areas.

4.2.4 Household access to water services

Household access to water is assessed by looking at the main sources of drinking water used by households during the dry season.

In **urban** areas, at the time of the baseline, a slightly higher proportion households in control sites used piped water on premises as their main source of drinking water, as compared to households in project sites. While none of the households in the control sites used unimproved sources, few households in project sites used unimproved sources as their main source of drinking water.

Figure 4: Urban areas, main source of drinking water in dry season



In the midline the proportion of urban households that use piped water on premises has slightly declined in the dry season. However, the changes observed between baseline and midline in the project urban sites are not statistically significant when examined with Fisher's exact test.

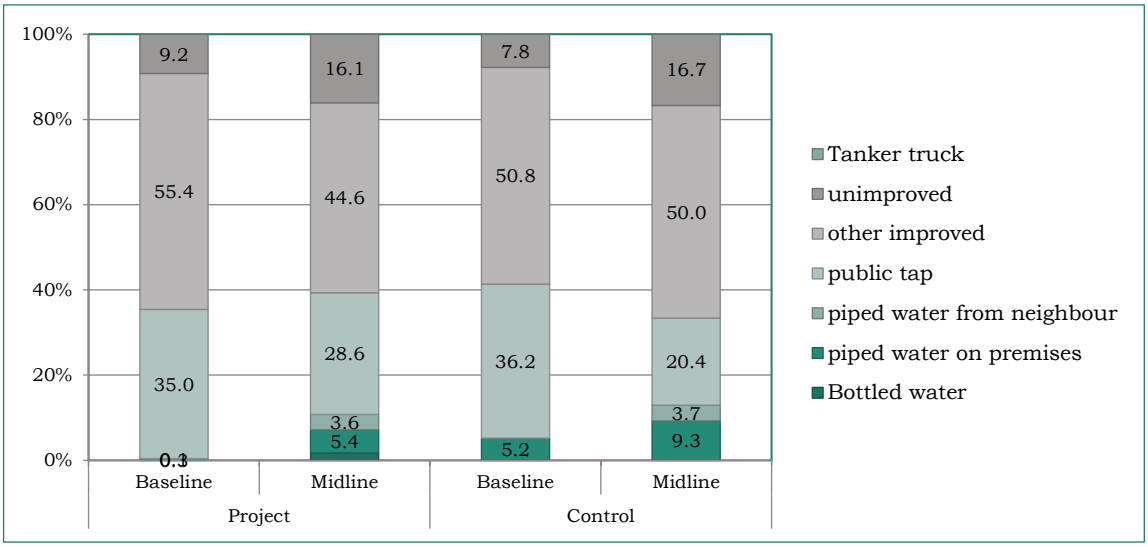
As in the baseline period, there are no reported urban households using unimproved sources in control sites in the midline. Reliance on tanker trucks increased in control sites. The changes observed between baseline and midline in urban control sites are statistically significant.

Similarly, in **rural** areas, a slightly higher proportion of households in control sites used piped water on premises as compared to households in project sites, and a slightly higher proportion of households in project sites used unimproved sources as compared to households in control sites. Pearson's Chi-square test showed the differences seen between control and project sites in the baseline, both for dry and rainy seasons, are statistically significant, with (X^2 (3, N=601) = 13.590, p= .004) and (X^2 (3, N=601) = 13.660, p= .003)

The midline data shows an increase in proportion of rural households using piped water on premises in project sites both in dry and rainy seasons. The proportion of households using unimproved sources has remained the same in the rainy season, while it has increased in the dry season in the project sites. However, the changes observed between baseline and midline in project rural sites are not statistically significant.

In control rural sites, the midline data shows an increase in proportion of households using piped water on premises during the rainy season and dry season. Households using unimproved sources, increased in the dry season and rainy seasons. The changes observed between baseline and midline in control rural sites are not statistically significant for both dry and rainy seasons ($P < 0.001$ by Fisher's exact test).

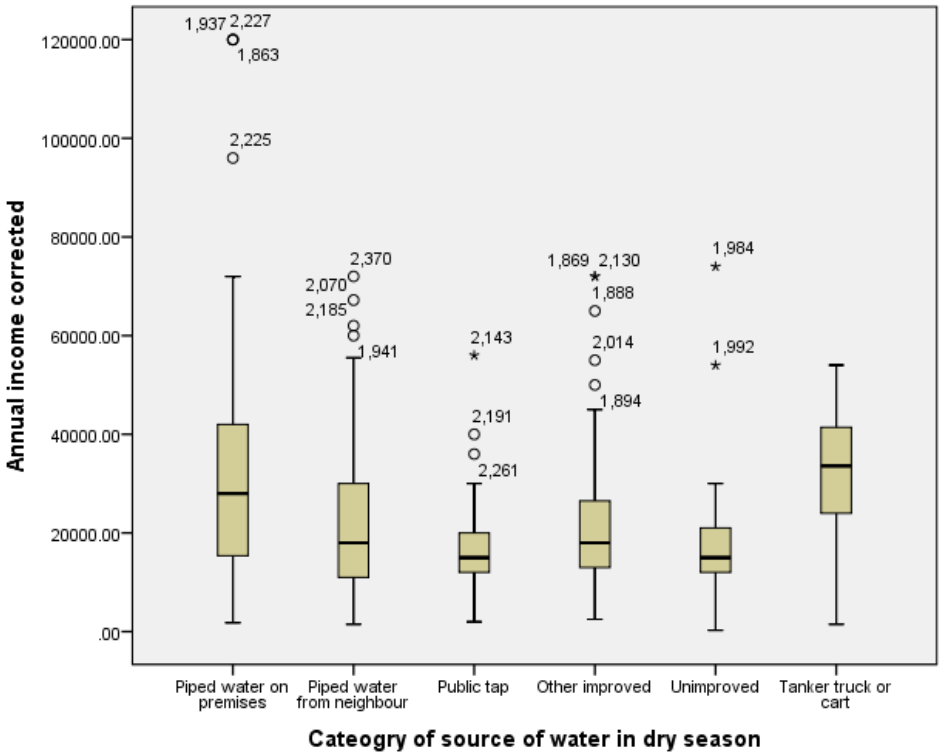
Figure 5: Rural areas, source of drinking water in dry season



Comparing level of income with access to water

Income appears to be correlated with the main water supply a household uses in the dry season. As figure 6 shows, households which use piped water on premises and those which use tanker trucks or carts[17] have a higher median income compared to those that use piped water from their neighbours or public taps. This was found to be the case in both the project as well as the control towns.

Figure 6: Annual household income and main source of dry season water supply



Comparing access to water between male- and female-headed households

In the baseline a larger proportion of female-headed households had piped water on premises as compared to male-headed households, in both control and project sites. Fewer female-headed

[17] As the main source of water supply in the dry season

households also used unprotected sources in control sites, while a slightly higher proportion of them used unprotected sources in project sites, when compared with male-headed households. The differences between male- and female-headed households in terms of access to water services are statistically significant in both project and control sites when examined using Chi-squared tests.

Similar to the baseline data, in the midline a larger proportion of female-headed households have piped water on premises and a smaller proportion used unprotected water sources, when compared with male-headed households. However, the midline data does not show statistically significant differences between male- and female-headed households examined using Fisher's exact test.

4.2.5 Water service levels

Service level of water accessed by households is ranked by bringing together three water service level indicators: perceived quality of water, accessibility and quantity. Reliability of piped schemes was found to be low in both the baseline and the midline. Water rationing with rotation of water service provision over different service areas within towns, was common practice year round in almost all towns.

Figure 7: Urban water service level indicators

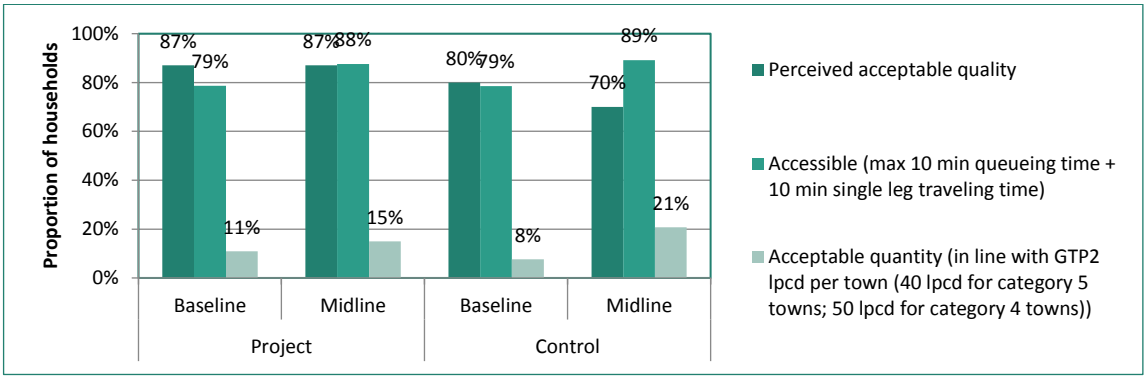
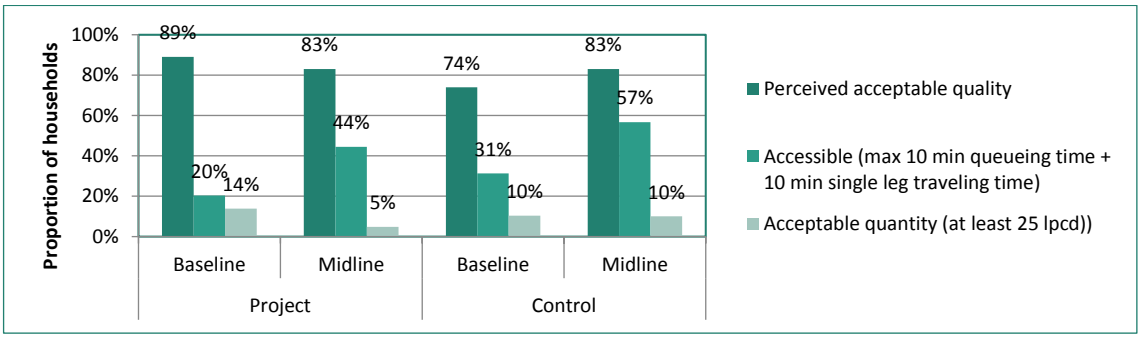


Figure 8: Rural water service level indicators



Perceived quality of water represents households' response to acceptability of taste, colour and smell of water they access from their main source. If they replied all the three are acceptable, perceived quality of water was considered acceptable. The proportion of households which consider their main source of water supply of acceptable quality has in the project towns remained the same since the baseline (87%). In the control towns, it decreased from 80% to 70%. In the rural areas, the proportion of households which perceives the water quality to be acceptable decreased slightly in the project areas (from 89% to 83%), while it increases slightly in the control areas (from 74% to 83%).

Accessibility represents the time households spend on average to fetch water from their main source, including the time it takes to travel and queue to get water. If households replied the travel time

(single leg) and queue time were each less than ten minutes, water services were perceived as accessible, as this gives a maximum round trip time of 30 minutes (which is taken by JMP as the SDG indicator for accessible services off premise). Accessibility has improved in both project and control sites for urban and rural areas. In project urban sites, proportion of households reporting less than 10 minutes queueing and travelling time to fetch water increased from 78.6% in baseline to 87.6% in midline. In project rural sites, the proportion increased from 20.4% in baseline to 44.4% in midline. The similar trend is observed in control sites, where the proportion of households spending less than 10 minutes queueing and travelling to fetch water increased from 78.5% in baseline to 89.2% in midline in urban areas; and from 31.3% in baseline to 56.7% in midline, in rural areas.

In the GTP II targets of the water sector, if rural households used 25 lpcd or more liters, the **water use quantity** was considered to be acceptable. In urban areas, towns are categorized based on the size of their population and a minimum standard for acceptable water use quantity per person per day is set for the different categories of towns. Four of the project towns: Abomsa, Kebriderhar, Welenchiti and Wukro fall under category four towns with a minimum water service level standard of 50 lpcd. The rest of the project towns are in category five, where a minimum of 40 lpcd is set as a minimum standard service level. Household access to the standard amount of water in the project sites is calculated by taking into account the standards set for the different towns and rural areas.

The proportion of households using at least a reported 40 or 50 lpcd per day has increased in the project urban sites from 10.9% in baseline to 15% in midline, though the change is not statistically significant. In urban control sites, this has increased from 7.6% to 20.7%, showing a statistically significant increase with P value .000.

In rural areas, the proportion of households using 25 lpcd or more liters declined in project sites from 13.5% in the baseline to 4.8% in the midline and the decline is statistically significant with P value, .044. In rural control sites it remained the same (10%) between the baseline and midline.

Bringing the **three level indicators** together, in urban and rural areas, a slightly larger proportion of households accessed higher service levels in the project sites as compared to the control sites, in the baseline. Pearson's Chi-square test for urban and rural areas revealed these differences between the control and project sites are statistically significant (p=.015 for urban & p = .007 for rural).

In the midline, service levels have remained slightly better in project urban sites, compared to control sites, while in rural project sites service levels have declined, compared with service levels in rural control sites. However, there is no statistically significant difference in service levels in urban and rural areas between project and control sites in the midline.

Comparing service levels between project baseline and midline shows service levels have improved in urban and rural sites, however, with statistical significance observed only for urban sites, with p=.028 using Fisher's exact test. Similarly, comparison between baseline and midline in control sites shows changes in service level standards met that are significant both in urban and rural areas, with p= .001 and p = .008 respectively.

The findings indicate services have slightly improved in urban project and control sites, in the past two years. Similarly, rural services have improved slightly in project sites as well as the control sites, with a statistically significant improvement in the control areas only. While project towns have started with slightly better service levels compared to control towns during the baseline, at the time of the midline, service levels in project sites were similar to that of control sites.

Figure 9: Service level standards (lpcd, accessibility, perceived quality) met in towns

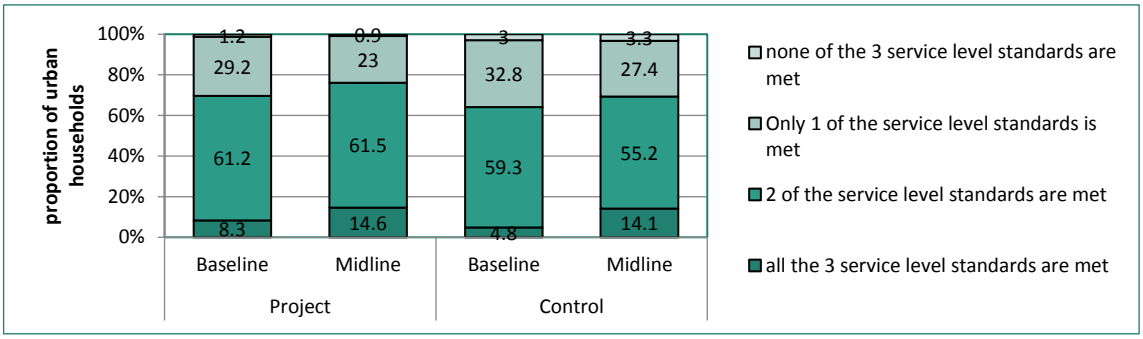
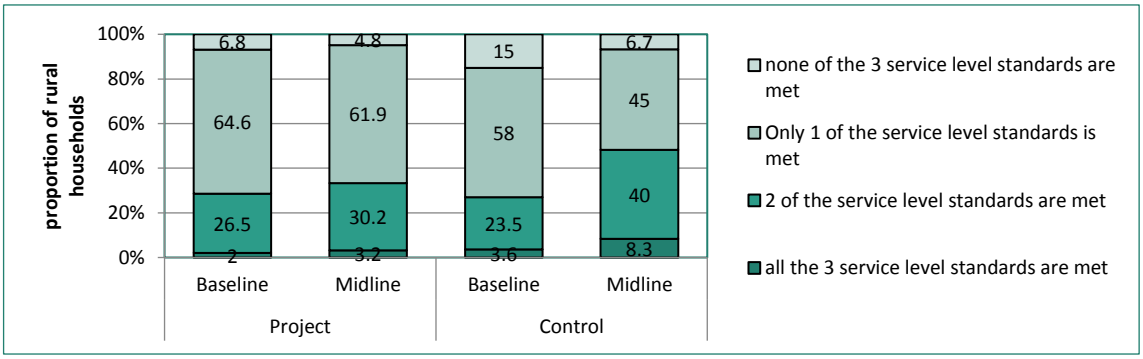


Figure 10: Service level standards (lpcd, accessibility, perceived quality) met in satellite villages



Box 2: Expenditure on water services and affordability

Table 13 gives an overview of the average amount of water reported to be used per capita per day and the monthly annual expenditure on water. It shows there is not a big difference in the amount of water used between households using piped water from neighbours, public taps, other improved sources or tanker trucks. The amount of water used by households with piped water on premises is considerably higher.

Although households depending on water from neighbours use less water than households with water on premises, the reported average amount of money spent on water per month is almost the same. Households using piped water on premises or public taps pay about 10 birr per m^3, while households fetching water from neighbours pay more than twice as much. However, households fetching from neighbours save time, as they generally do not have to queue as long as households fetching from public taps (75% of households fetching from neighbours queue for less than 10 minutes, while only 37% of households using public taps queue for less than 10 minutes).

Households using piped water on premises or from neighbours reported to spend an average of 4% of their income on water, while households depending on public taps or other improved sources (e.g. communal handpumps) are reported to spend about 1% of their income on water.

Table 13: Average monthly household expenditure on water supply (at the time of the midline)

	Average amount of water used from main source (lpcd)		Average monthly expenditure (birr)	
	Project area	Control area	Project area	Control area
Piped water to dwelling, yard or plot	39	41	42	53
Piped water from neighbour	16	14	43	47
Public tap	16	22	19	17
Other improved	15	13	10	20
Tanker truck or cart	14	10	382	215

4.2.6 User satisfaction with water services

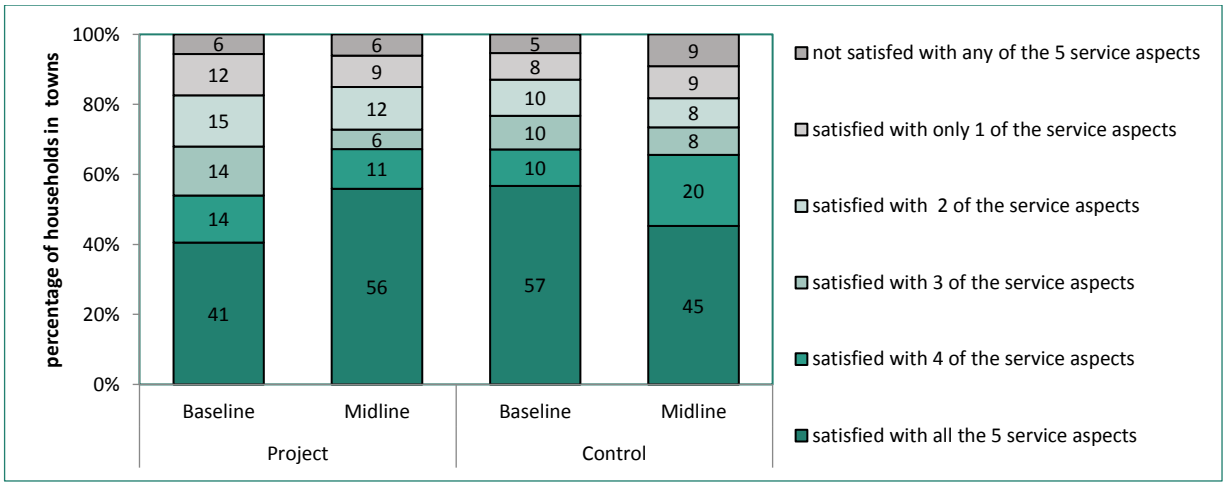
User satisfaction with water services is assessed by asking for the level of satisfaction with reliability of the source, distance travelled and the time it takes to get water as well as their satisfaction with the quality and quantity of the water they get. If users are satisfied or at least are neutral with a particular aspect of the service, then their perception is considered as "satisfied". User satisfaction is ranked based on the number of service aspects households are satisfied with.

In the baseline, a larger proportion of **urban** households reported satisfaction with all five service aspects in control towns, as compared to project towns with statistical significance tested with Chi-squared (X^2 (5, N=1203) = 29.805, p = .0).

However, in the past two years the proportion of urban households satisfied with all five service aspects increased in the project towns with 15 percent points from 41% to 56%. The increase is statistically significantly tested with Pearson's Chi-square test (X^2 (5, N=1020) = 21.363, p = .001). In the control sites on the other hand, the proportion of households reporting satisfaction with all five service levels has declined from statistically significantly with (X^2 (5, N=637) = 19.239, p = .002).

In the midline situation, the proportion of households satisfied with all five service aspects is 56% compared to 45% in control sites. The proportion of households not satisfied with any of the service aspects is slightly higher in control areas, 9% compared to the project area 6%. The difference in satisfaction level between project and control towns is statistically significant with (Chi-square (X^2 (5, N=454) = 12.217, p = .032

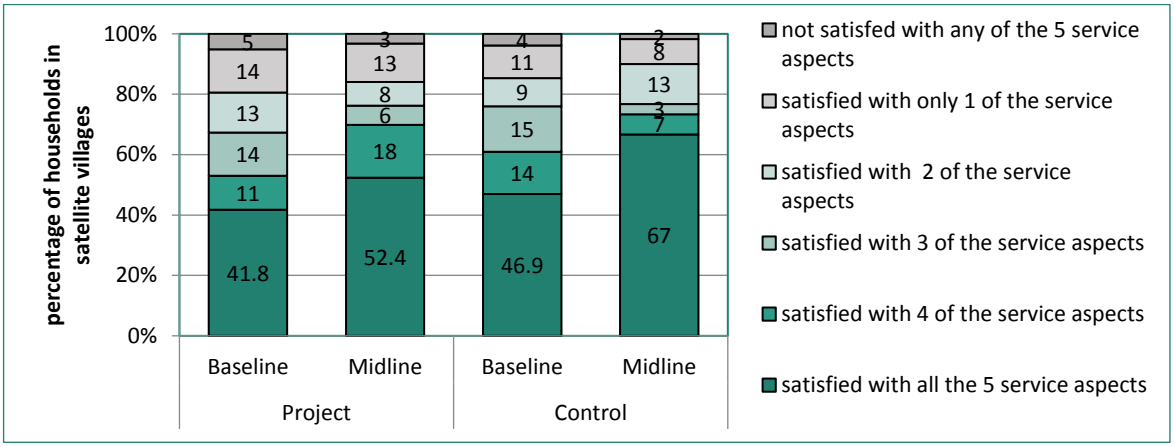
Figure 11: User satisfaction with water supply service aspects (quantitiy, quality, time, distance, reliability) in towns



The proportion of **rural** households satisfied with all five service aspects was found to be higher in the control areas than in the project areas in both the baseline as well as the midline. However, no statistically significant difference in satisfaction level between project and control sites was found here (X^2 (5, N=601) = 5.755, p = .331) for baseline and tested with Fisher's exact test, P=.275 in the midline).

In both the project areas as well as the control areas, the proportion of rural households satisfied with all five service aspects has increased: with 10 percent points, from 42% to 52% in the project areas and with 20 percent points, from the baseline of 47% to 67% in the midline in the control areas. Tested with Fisher's exact test, the increase in project and control rural sites is not found to be significant.

Figure 12: User satisfaction with water supply service aspects (quantitiy, quality, time, distance, reliability) in satellite villages



4.3 Summary on water services

- In (most of) both the project as well as the control towns there has been an increase in the number of household connections since the baseline. However, this has not translated into an observed increase in the proportion of households using piped water on premises.
- Both in the project as well as in the control towns, the annual amount of water produced and sold have decreased since the baseline.
- Functionality and reliability of public taps connected to the town water scheme have not changed considerably.
- Reliability of rural water points (assessed in terms of the proportion of water points which are functional for at least 80% of the year) has decreased in both the areas around the project towns, as well as around the control towns.
- Water quality has not changed significantly in the project and control towns. The proportion of water points with acceptable quality has been observed to be considerably higher in the control towns than in the project towns. However, the proportion of urban households which consider the water quality to be acceptable was found to be lower in the control towns than in the project towns.
- In the project areas, no statistically significant difference was found between access to water services in the baseline and midline. In the control sites, however, an overall statistically significant deterioration of access was found, especially in the urban context. While at the time of the baseline access was significantly poorer in project sites than in the control sites, in both urban and rural areas, at the time of the midline, no significant difference was found in access to water between project and control sites. The same was found to be true for the proportion of households accessing a certain level of water services.
- Although there do not seem to have been significant improvements in the levels of urban water service provision in the project towns, *user satisfaction* with water service has significantly increased in project towns over the past two years. In the control towns, user satisfaction levels with urban water supply have actually gone down. In rural areas user satisfaction has improved in both the project as well as in the control areas. However, these improvements are not statistically significant for project sites.

This suggests that, as expected, that the water interventions have not resulted (yet) in measurable improvements in water services at the moment of the midline survey. This is not surprising considering that the water related interventions have not been completed yet. As the midline situation of the project areas are considered to be similar to the midline situation in the control areas in terms of access to water services and service levels, the midline provides a good basis against which to assess the end-line situation.

5 Sanitation and hygiene services and practices at household and community level

Sanitation and hygiene highlights

- After two years of sanitation interventions, including triggering of CLTSH and hygiene education by health extension workers, a significant reduction in open defecation has been observed in the project towns and especially in the surrounding satellite villages, while open defecation levels have not significantly changed in control sites.
- Households with higher income levels tend to have more access to improved sanitation. Poorer households are more likely to practice open defecation than wealthier households in urban areas, while no association was found between open defecation and wealth in rural areas.
- Although access to sanitation facilities has improved in project sites, service levels of sanitation facilities have not improved.

5.1 Sanitation and hygiene interventions

In all seven project towns activities have been undertaken related to improving the sanitation situation. Initially, a Knowledge-Attitude-Practice (KAP) analysis and formative research was carried out and the results were used to inform the development of Behavioural Change Communication materials and selection of communication media for hygiene and sanitation promotion in each of the project towns. A skill and knowledge gap assessment of urban health extension workers was also carried out and the result was used as input for the development of a refresher training manual for urban health extension workers. Health extension workers in all the project towns were trained on urban sanitation and hygiene packages and CLTSH. The training topics covered included: behaviour change communication, WASH promotion approaches, household safe water management, food hygiene and handling practices, MHM and legal frameworks.

Hygiene and sanitation promotion in communities included triggering using the CLTSH approach. Orientation was provided to community representatives selected from sub-kebeles by World Vision and health extension workers. CLTS triggering transect walks were conducted in places where open defecation was being practiced widely. Households with latrines and without were identified and mapped. An action plan was developed with task force members. Community representatives considered as role models were included in the task force membership. Following the triggering, hygiene education was provided by health extension workers during various community gatherings or cascaded down through women development army members. Posters and sign posts communicating sanitation and hygiene messages have been put up in public places. Task force members conducted house-to-house visits monitoring construction of latrines, hand washing facilities and solid and liquid waste (grey water) disposal facilities. Incentives and sanctions in the form of public recognition and shaming were used to get households to construct latrines. Community bylaws have been developed to fine open defecation in Sheno and Maksegnit. Bylaws also extended to fining households without latrines in Maksegnit and preventing houses without latrines from being rented out in Sheno.

Local artisans that supply products for sanitation, such as slabs, were trained and supported by the project. A training package has been developed for local artisans on construction and marketing of sanitation facilities and training was provided to micro and small enterprises in project towns. Artisans have been formed in groups and trained to produce products and provide services to improve household sanitation facilities, such as, the production of slabs for latrines. The training package

provided covered topics such as: sanitation technology options, design, construction and operation and maintenance of sanitation facilities, health and safety measures and legislation framework requirements.

5.2 Midline survey results

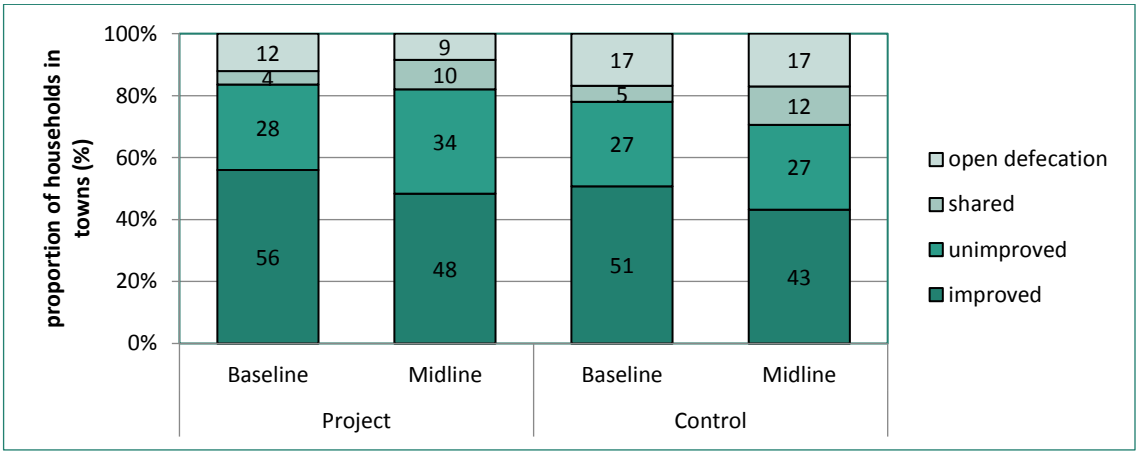
As a result of the above mentioned activities in the seven towns and the surrounding rural areas, we expect to see a (more) positive change in access to latrines, sanitation and hygiene practices and the quality of latrines (in terms of cleanliness, privacy, separation between users and excrements) in the project areas (than in the control areas).

5.2.1 Access to sanitation services

Household access to sanitation in the project and control towns and surrounding satellite villages is categorized into four: improved, unimproved, shared and open defecation. Improved sanitation facilities included: flush toilets, piped sewer system, septic tank, flush/pour flush to pit latrine, ventilated improved pit latrine (VIP) and pit latrine with slab. Unimproved sanitation facilities included: pit latrine without slab and bucket.

Figure 13 gives an overview of the access of **urban** households to sanitation services.

Figure 13: Access to sanitation in towns



Comparing changes between baseline and midline in project towns shows a decline in open defecation, an increase in shared and unimproved sanitation facilities and a decline in improved sanitation facilities. The changes are statistically significant when checked with Pearson's Chi-square test (X^2 (3, N=1018) = 13.950, p = .003).

Comparing change between baseline and midline in control towns shows open defecation has remained the same. Shared sanitation has increased, while unimproved sanitation has remained the same. Improved sanitation has declined. Person's Chi-square shows the difference in sanitation access in control towns, between the baseline and midline, is statistically significant (X^2 (3, N=637) = 12.256, p = .007).

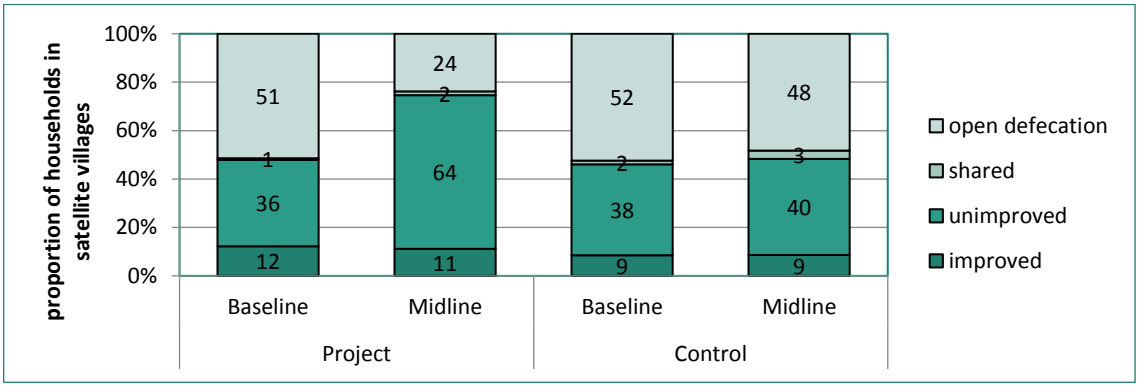
In the midline, open defecation in urban sites has remained the same in control sites (17%), while it has declined in project sites with 3 percent points from 12% to 9%. However, the proportion of households with improved sanitation has declined in both project and control sites with 6 percent points and 8 percent points respectively. Person's Chi-square test reveals the differences observed

between project and control sites in the midline are statistically significant (X^2 (3, N=452) = 9.217, p = .027), while no statistical significant difference had been observed between project and control towns in the baseline.

The decline in proportion of households with improved sanitation facilities in project towns could be explained by a surge in unimproved and shared sanitation facilities following the project interventions, which reduced the proportional share of improved sanitation facilities.

Figure 14 gives an overview of **rural** households with access to sanitation services in the rural areas around the project and control towns. It shows that the sanitation situation in the rural project and control areas were very similar at the time of the baseline. Fisher's exact significance test shows indeed that the differences between the project and control areas were not statistically significant.

Figure 14: Access to sanitation in satellite villages



In the midline situation open defecation has significantly declined (with 27 percent points) in project areas while it has only slightly declined (with 4 percent points) in control areas. The proportion of rural households with access to improved sanitation has remained more or less the same for both control and project sites.

The changes observed in the project areas are statistically significant when tested with Fisher's exact test ($P < 0.001$ by Fisher's exact test). In the control areas, Fisher's exact test shows there is no significant change in sanitation access in the satellite villages between the baseline and midline.

According to World Vision's seventh quarter report (May 2016) a total of 24 satellite villages around Abomsa, Sheno, Welenchiti, Maksegnit, Adishu and Wukro have been declared and certified as ODF.

5.2.2 Open defecation

In this section, we have a closer look at open defecation practices by different household members. Table 14 and 15 present the proportion of households with adult male, female, boy or girl family members practicing open defecation in towns and rural areas respectively. The proportion of households with men, women, boys or girls practicing open defecation has statistically significantly changed (reduced) in the project towns, while this has not happened in the control towns. In both urban as well as in rural areas, the proportion of households with men, women, boys or girls practicing open defecation was in the midline about half of that in the baseline.

Table 14: Open defecation practice, urban

	Project		Control	
	Baseline	Midline	Baseline	Midline
Men in household	14.40%	7.2%**	10.70%	11.70%
Women in household	13.90%	6.7%**	13.90%	14.3
Boys in household	13.90%	7.80%	12.80%	8.70%
Girls in household	13.20%	5.6%**	10.90%	9.30%

** = statistical significant change between baseline and midline

Table 15: Open defecation practice, rural

	Project		Control	
	Baseline	Midline	Baseline	Midline
Men in household	57.80%	29.3%**	55.70%	50.90%
Women in household	54.70%	21%**	53.80%	48.30%
Boys in household	59.70%	25.5%**	55.30%	51.20%
Girls in household	56.70%	19.6%**	54.50%	46.20%

** = statistical significant change between baseline and midline

Comparing access to improved sanitation and open defecation with level of income

The relationship between household annual income and access to sanitation is assessed by looking at two variables: access to improved sanitation and open defecation, in urban and rural areas, during the baseline and midline.

The results show households with higher income levels tend to have access to improved sanitation facilities both in urban and rural areas. Using Kendall's non-parametric test a positive weak correlation is observed between household income and access to improved sanitation facility in urban areas both in the baseline (Kendall's r = .226, p = .01) and midline (Kendall's r = .239, p = .01). Similarly, a positive, but very weak, correlation is observed in rural areas, in the midline (Kendall's r = .175, p = .05) and baseline (Kendall's r = .086, p = .05).

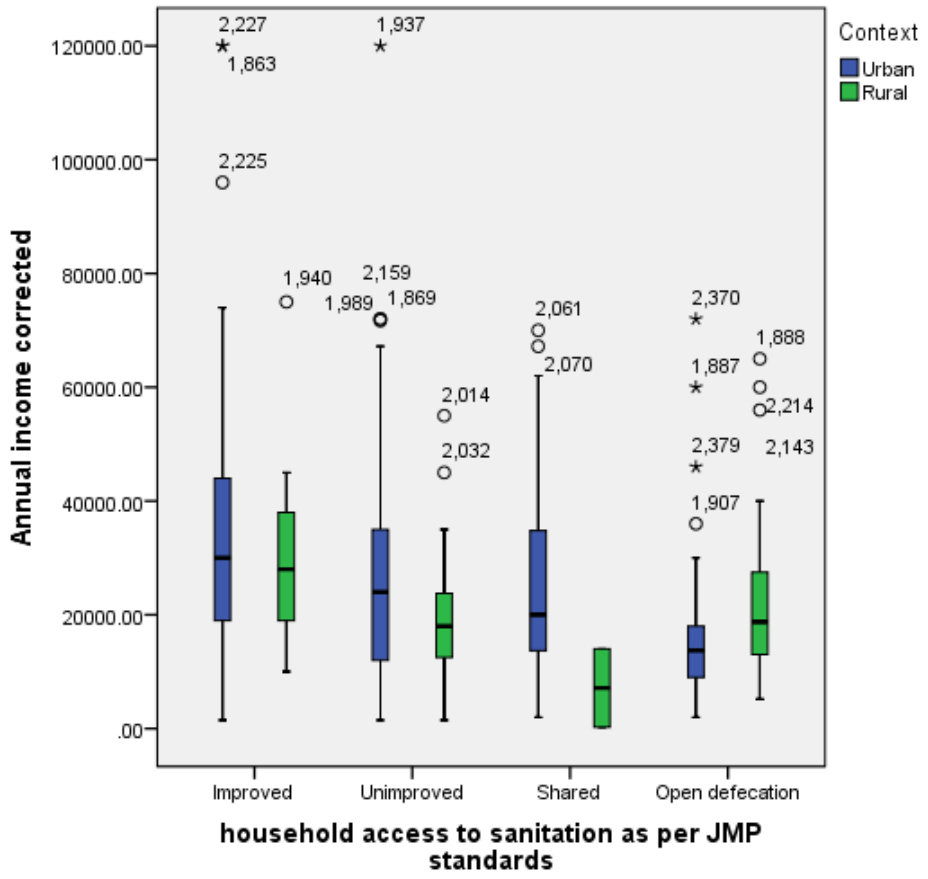
In urban areas, households with higher income levels also tend to practice less open defecation, while in rural areas, open defecation is not associated with the income level of households. Comparing households using open defecation with income level shows the existence of a weak negative correlation in urban areas both in the midline (Kendall's r = -.238, p = .01) and baseline (Kendall's r = -.090, p = .01). However, in rural areas no correlation is observed between income and open defecation.

Looking at how access to sanitation changed in project sites for households of different income categories over the past two years shows interesting results. In project sites, the proportion of households with access to improved sanitation has declined in both households above the poverty line and those below the poverty line. However, open defecation has declined among both households above and below the poverty line. In control sites the proportion of households using improved latrines has remained the same among those above the poverty line, while it has declined among those below the poverty line. In control sites, the proportion of households using open defecation has increased for those under the poverty line, while it has declined for those above the poverty line.

Figure 15 shows that household access to sanitation in urban areas is closely linked to their income level. Lower income level households tend to use open defecation more, followed by shared sanitation facilities, while those with higher income level use improved facilities followed by unimproved

facilities. In rural areas, a similar pattern is observed in access to improved and unimproved facilities. However, open defecation is not associated with income in rural areas.

Figure 15: Box plot of access to sanitation and annual income in the midline



Comparing access to improved sanitation between male- and female-headed households

Comparing access to improved sanitation between male- and female-headed households in the baseline shows no significant difference in both project and control sites. In the midline, there is no significant difference in control sites, while in project sites, a statistically significant higher proportion of female-headed households have access to improved sanitation compared with male-headed households. The proportion of female-headed households with access to improved sanitation in project sites during the midline is 61%, while it is only 39% for male-headed households. The difference is statistically significant, tested with Pearson's Chi-square test, with p=.036.

Sanitation service levels

Service level of sanitation facilities is ranked by looking at the following indicators: privacy, cleanliness, separation of faeces from human contact and safe treatment. Figure 16 and 17 present the proportion of households meeting the benchmark on these indicators in urban and rural areas respectively.

Figure 16: Sanitation service levels in urban areas

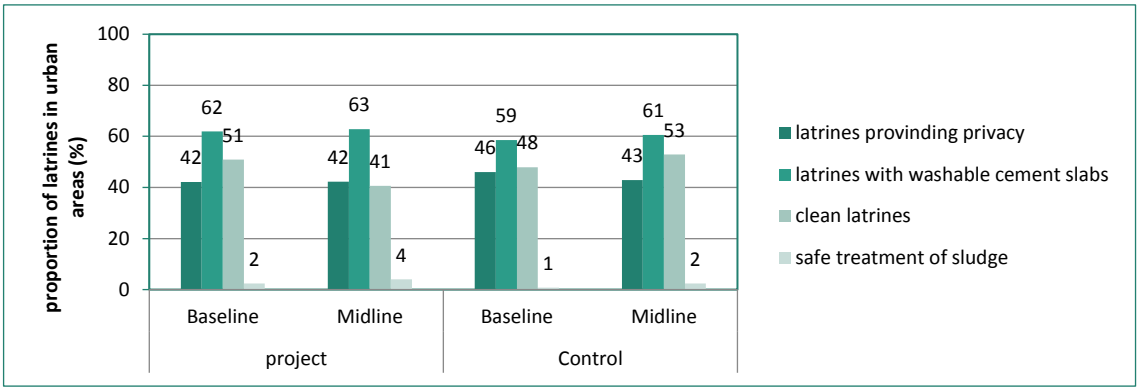
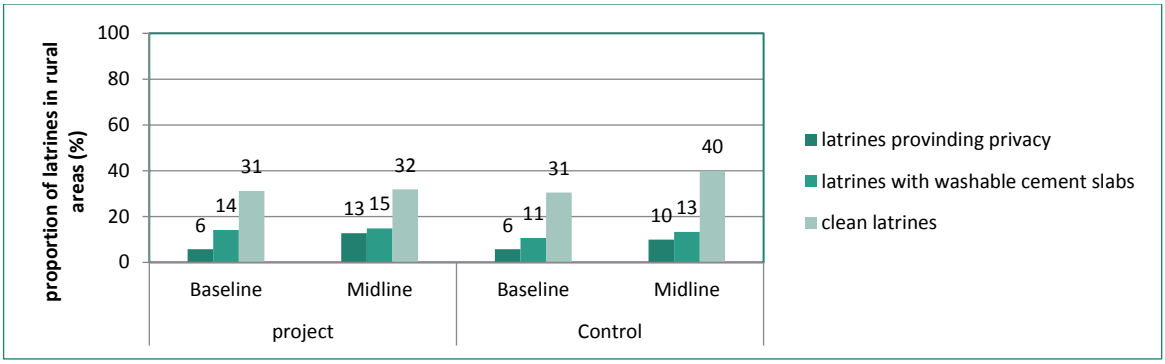


Figure 17: Sanitation service levels in rural areas



Privacy refers to the existence of a latrine wall and door that provides privacy. The proportion of latrines that provide privacy remained the same, in urban project sites, 42%, between the baseline and midline, while in control towns, it declined from 46% in the baseline to 42% in the midline. In rural areas, privacy of latrines improved slightly between the baseline and midline, in both project and control sites, from 6% to 13% for project sites, and 6% to 10% in control sites.

Cleanliness indicates the absence of faeces or paper on slab or around the slab at the time of the survey. Cleanliness of latrines has declined in project towns from 51% in the baseline to 41% in the midline, while it has improved in the control sites from 48% to 53%. In rural areas, the proportion of latrines that are clean remained the same, 31%, in the project sites, between the baseline and midline, while in control sites, it is creased from 31% in the baseline to 40% in the midline.

Separation of faeces from human contact refers to the existence of a washable cement slab without any cracks. The proportion of latrines that have a washable slab hasn't changed much between the baseline and midline for both project and control sites, in urban as well as in rural areas. In urban project towns the proportion of latrines with a washable slab was 62% in the baseline and 59% in the midline, while in control towns it was 63% in the baseline and 61% in the midline. In rural project sites only 14% of the latrines had a washable slab in the baseline and 15% in the midline. In rural control sites, 11% had a washable slab in the baseline, which became 13% in the midline.

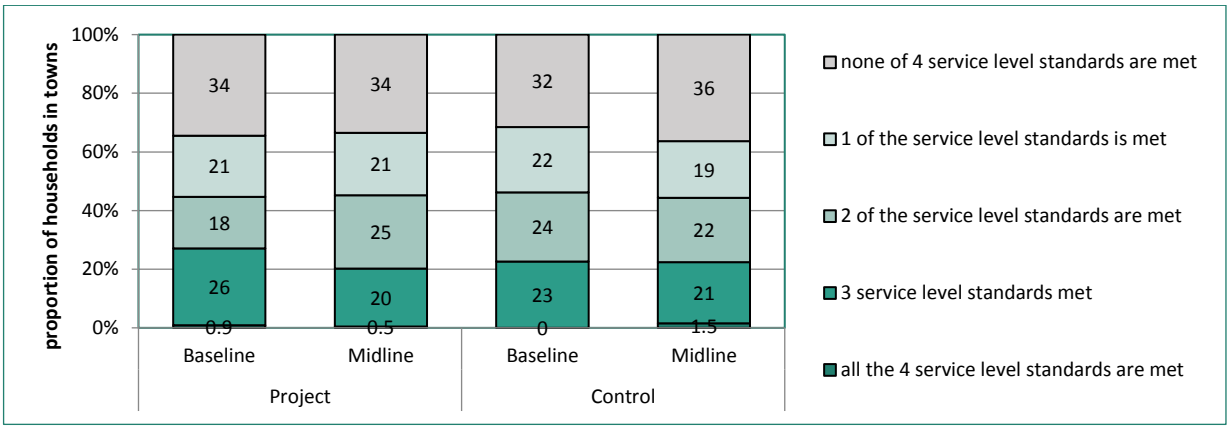
Safe treatment of sludge indicates that the pit is emptied regularly, at least once in five years. The treatment indicator is used only for urban sites. In the project sites, safe latrine sludge management increased from 2.4% in the baseline to 4% in the midline, while in control sites, it increased from 0.7% in the baseline to 2.4% in the midline.

One general sanitation service level indicator was developed from the four service level sub-indicators. The score given to the sanitation service level indicator represents the number of service level sub-

indicators (privacy, cleanliness, separation & treatment) met by each household. Figure 18 and 19 below show sanitation service levels in project and control towns and satellite villages, during the baseline and midline.

As shown in figure 16, the situation related to the **level of sanitation services** accessed by people (in terms of cleanliness, privacy, separation from faeces and treatment) has stayed more or less the same in both the project and the control towns. Indeed no statistically significant differences were found in sanitation service levels between project and control areas and between baseline and midline.

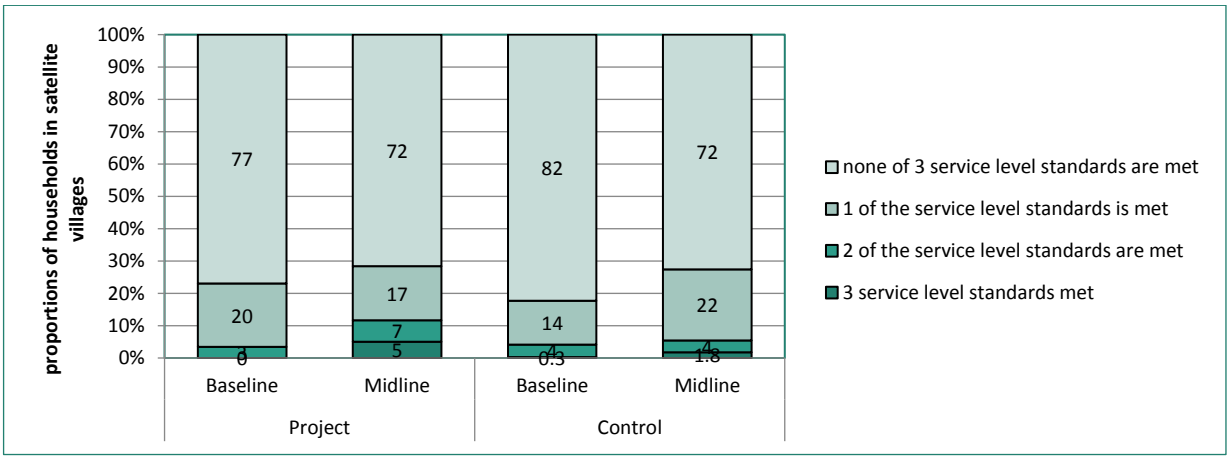
Figure 18: Sanitation service level standards (privacy, cleanliness, separation of faeces from human contact, safe treatment) met in urban areas



As shown in figure 19, also little difference between project and control areas and between baseline and midline was found in the rural areas surrounding the project and control towns.

In the project satellite villages, a slightly better sanitation service is observed in the midline, when compared with the baseline, though the difference is not statistically significant.

Figure 19: Sanitation service level standards (privacy, cleanliness, separation of faeces from human contact, safe treatment) met in rural areas



The findings show there hasn't been any significant change in sanitation service levels in the past two years in both the project and control areas and the service level in project sites has remained similar to the control sites.

5.2.3 Household sanitation challenges

Some challenges for households to construct latrines were identified during the focus group discussions. The challenges are similar across towns and they mainly relate to lack of space, lack of land titles, tenancy problems and affordability. Households living in congested slum areas in towns do not have the space to construct a latrine. Their need can be addressed through construction of a communal latrine. However, the lack of budget and land allocated by the municipality hinders the construction of communal latrines.

Households living in informal housing, who haven't acquired legal titles to their land, are not willing to invest in construction of a latrine for fear of possible eviction from the land. Households living as tenants in houses owned by others, mostly living in rural areas, can't construct latrines and the home owners can't easily be reached.

Poor households in Sheno, Adishu, Maksegnit and Abomsa reported to consider the price of improved latrines as unaffordable. The relationship between access to improved sanitation and level of income is explored in the section above.

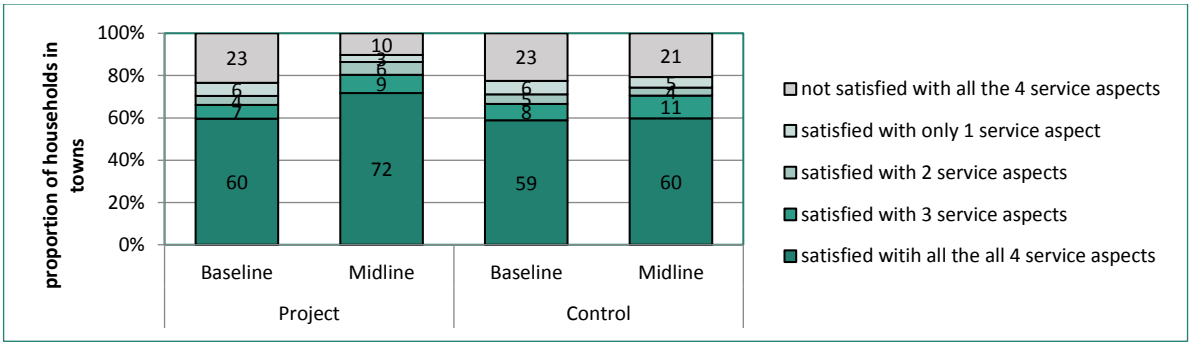
In some towns like Wukro, households living in public rental houses don't have a functioning latrine, because of poor management of the latrine. For example the latrine gets filled and is not emptied on time. There is only one publicly owned vacuum truck in Wukro and it often breaks down and stops providing services for months at a time. Private service providers brought in from other towns charge more and households can't afford it. Lack of timely emptying of latrines is a challenge in most of the other project towns as well. Municipalities usually wait until demand is aggregated before bringing in a vacuum truck from a nearby town to provide a service, which might be once a year.

5.2.4 User satisfaction with sanitation services

User satisfaction with sanitation services is assessed by asking their level of satisfaction with cleanliness, comfort, privacy and safety of their sanitation facilities. If users are satisfied or at least are neutral with a particular aspect of the service, then they are considered to be "satisfied" with that aspect. User satisfaction is ranked based on the number of service aspects they are satisfied with.

Figure 20 gives an overview of user satisfaction with sanitation services in the **urban** areas.

Figure 20: Household satisfaction with sanitation facilities (cleanliness, comfort, privacy, safety) in towns

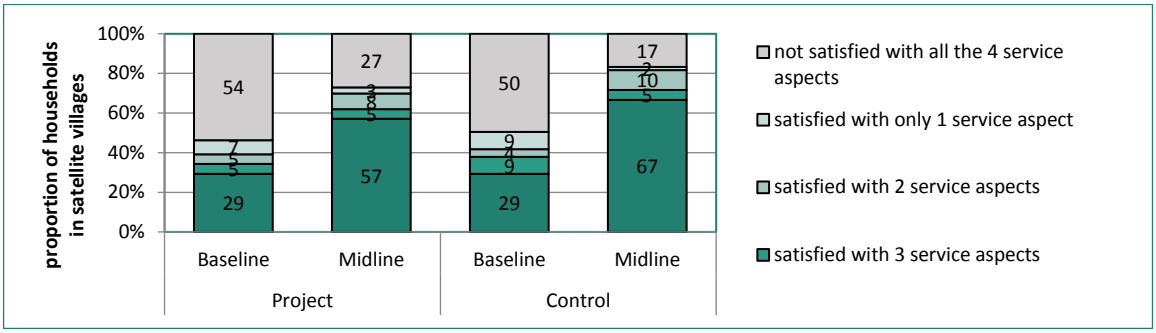


In the baseline, users in towns reported higher satisfaction levels in both control and project areas with nearly 60% reporting satisfaction with all the four service criteria. In the midline, the proportion of users satisfied with all four service aspects had increased even further in the project towns (12 percent points), while it had only increased slightly (1 percent point) in the control towns. Where there was no statistically significant difference between the situation in the project and control towns in the baseline, in the midline a statistically significant difference was observed between project and control towns with (X^2 (4, N=454) = 12.982, p = .011).

Comparing baseline and midline results, user satisfaction with sanitation facilities has increased in project towns, which was statistically significant (X^2 (4, N=1020) = 22.733, p = .00). In control sites, comparing baseline and midline data on user satisfaction with sanitation facilities shows no significant difference in towns.

Figure 21 gives an overview of user satisfaction with sanitation services in the **rural** areas surrounding the project and control towns.

Figure 21: Household satisfaction with sanitation facilities (cleanliness, comfort, privacy, safety) in satellite villages



There is no significant difference in satisfaction level between rural project and control sites in the baseline. User satisfaction has significantly increased in the midline when compared with the baseline in both the project as well as control areas, tested with Fisher's exact test (P < 0.001 by Fisher's exact test). However, this increase is larger in the control areas than in the project areas, with an increase of 38 and 28 percent points in the proportion of households satisfied with four service aspects in project and control areas respectively.

The results show an increase in user satisfaction with sanitation facilities in project towns and rural sites over the past two years. Similar changes are observed in rural control sites.

5.2.5 Hygiene and hand washing

Household knowledge and practice of hand washing was assessed by asking when they wash their hands, to understand if they know all the critical times for hand washing: before eating, before preparing food, before feeding a baby, after cleaning a baby's bottom and after defecation. The results show a significant increase in knowledge about hand washing in project towns (from 76% to 84%) and surrounding rural areas (from 46% to 75%) in the project period. However, a similar change has taken place in control sites (with an increase from 68% to 82% in the towns and from 59% to 78% in the surrounding rural areas). The change can therefore not be directly attributed to project interventions alone.

Regarding **safe disposal of faeces of children under five,** the results show similar improvements have taken place in project and control towns and satellite villages over the past two years. Both in project as well as control towns the proportion of households which report practice of safe disposal of faeces of children under five, has increased: from 56% to 86% in project towns and from 41% to 81% in control towns. In satellite villages, the proportion of households practicing safe disposal of faeces of children under five increased slightly more in the control areas (from 12% to 38%) than in the project areas (from 12% to 33%). This change can therefore not be directly attributed to the project interventions alone.

5.3 Summary on sanitation and hygiene

- In the past two years, significant gains have been made in project sites in reducing open defecation and in putting households on the sanitation ladder, in urban towns, but especially in rural areas surrounding the towns. In the control sites sanitation access levels have worsened in the towns, while they have remained more or less the same in rural areas.
- However, no significant change has been observed yet in terms of access of households to latrines which provide privacy, that separate users from excrements (by means of a washable slab) and that are clean. The proportion of urban households which practice regular latrine emptying remains very low as desludging services are not yet operational. A greater change in terms of improved access to liquid waste services is expected once the sanitation infrastructures and desludging equipment become available as part of the ONEWASH Plus minimum sanitation package. The regular desludging of latrines, expected to commence in 2017, may be expected to help in improving the cleanliness of the latrines.
- The triggering activities in the project towns seem to have contributed to decreased levels of open defecation, especially in rural areas. However, there is still work to be done on ensuring that people have access to latrine facilities which provide privacy, separate users from excrements and are clean. While the first two require changes in the infrastructure, an increase in cleanliness of latrines can only be achieved through behaviour change.
- Surprisingly, despite the lack of improvement in service levels provided by sanitation facilities, more users reported satisfaction with their sanitation facility in the project towns when compared with the baseline, while it stayed more or less the same in the control towns. In the rural areas, user satisfaction increased in both the project areas as well as the control areas.
- Hygiene behaviour including hand washing and safe disposal of children's faeces has improved more or less equally in both the project and the control sites.

6 Solid (and liquid) waste management

Solid and liquid waste management highlights

- The project has facilitated the (re-)establishment of micro enterprises for collection of solid waste in all towns.
- As improvements in solid waste collection practices are ongoing, significant improvements in the number of households that have their solid waste collected and taken have not (yet) been observed in the project towns.

6.1 Solid and liquid waste management interventions

In collaboration with the micro and small enterprise development agency the project established solid and liquid waste collection micro enterprises or re-organized existing enterprises in each of the project towns. A training manual was developed and training was provided to the enterprises on safe solid waste collection and disposal, and business development. The training topics covered included: solid waste management, public private partnership, administration management and control of landfills, health and safety requirements, and legal framework requirements. Experience-sharing exchange visits were also organized. Equipment such as dustbins and carts were distributed to the enterprises.

A task force on solid waste collection was also established at kebele and town level composed of the municipality, kebele administration, micro and small enterprise agency and the microenterprises. The task force reviewed existing problems around solid waste collection in the town and developed action plans to improve them. For example, the introduction of a log sheet for monitoring the service provided by the solid waste collectors to households. Sensitization and awareness raising activities on solid waste management were conducted through local media, road shows, and sanitation campaigns. Task force members also conducted house-to-house visits to monitor disposal of solid waste and grey water by households.

In Kebridehar, Adishu, Wukro, Maksegnit and Welenchiti bylaws that made the dumping of solid waste in open spaces, sewers and streets illegal, have been developed and enforced in collaboration with the municipality. Weekly cleaning campaigns have been introduced in towns such as Adishu, Wukro and Maksegnit, where people go out and clean their neighbourhoods once a week.

In tandem with the capacity building and awareness raising activities, solid and liquid waste facilities, sludge drying beds and landfill sites are under construction by the project. However, the construction activities have encountered delays, mainly due to land issues.

6.2 Solid and liquid waste results

At the time of the baseline survey, micro enterprises were involved in solid waste collection in only three towns (Sheno, Wukro, Welenchiti). At the time of the midline, micros involved in solid waste collection were found to be in place in all project towns. With the exception of the micro in Abomsa, which reported to dump solid waste at an unofficial site, all other micros reported to dump at official dumping sites. However, in some towns, like Sheno and Maksegnit, selected temporary solid waste disposal sites are filled and new sites have not yet been identified.

In all project towns, clients contribute to the costs of solid waste collection by paying monthly fees or fees per service. However, in some cases, the municipality subsidises the collection of solid waste. In

Wukro, for example, the municipality was reported to subsidise solid waste collection to the tune of some 1.3 million birr per year.

The micro in Kebridehar, the HAWL-WADAAG beautification & sanitation co-operative, is also involved in collecting liquid waste, which it reported to dump at an official site. It charges 1500 birr per liquid waste collection service.

Table 16 gives an overview of the number of staff and main clients of the micros at the time of the midline survey.

Table 16: Solid waste management

Town	Status Micro	Number of staff (baseline -> midline)	Number of residential clients (baseline -> midline)	Number of commercial clients (baseline -> midline)
Maksegnit	Newly established	12	52	20
Welenchiti	Existed at time of baseline	3	400 -> 318	70 -> 10
Sheno	Existed at time of baseline	3-> 5	80 -> 300	0 ->2
Abomsa	Newly established	17	unknown	Unknown
Kerbidehar	Newly established	50	2712	787
Adishihu	Newly established	9	1700	150
Wukro	Existed at time of baseline	24	7180 -> 9432	150 -> Unknown

In some towns like Wukro and Adishu, focus group discussion participants mentioned solid waste collection service coverage has improved. More areas in the town are covered by the service, it has become more regular and the schedule of waste collectors is well known. In Wukro, focus group discussion participants reported that households have also started separating organic waste from other waste for reuse by an organisation.

Focus group discussion participants in Abomsa expressed some concerns related to the organisation of the micro and small enterprises on solid waste collection by the local authorities. The selection of elderly and disabled people for the micro enterprises, requiring them to do a strenuous job was not considered effective. Daily labourers, who used to do the job informally, were on the other hand not employed by the micro enterprises. As a result in Abomsa, people preferred to hire daily labourers, who are easily available and cheaper, instead of using the services of the solid waste collection micro enterprise.

The survey results across all towns reveal the proportion of households which have their solid waste collected and taken away on a regular basis has not changed (yet). This is not very surprising as improvements in the solid waste management system are ongoing and have not been completed yet. As shown in table 17, the proportion of households disposing of their solid waste in the urban control areas has increased, while in the project area it has stayed more or less the same. Around a third of households reported that their solid waste is collected and taken away on a regular basis, both in project and control areas and both in the baseline as well as the midline. With the newly established and strengthened solid waste collectors in the project towns, this is expected to change in the years to come.

Table 17: Solid waste management practices

Row Labels	Project area		Control area	
	Baseline	Midline	Baseline	Midline
Safe disposal	**68%**	**69%**	**71%**	**80%**
Collected and taken away on regular basis	35%	35%	39%	35%
Burned	31%	28%	30%	40%
Compost/ put in garden	3%	7%	2%	5%
Unsafe disposal	**32%**	**31%**	**29%**	**20%**
Pit or garbage pile within household compound	10%	5%	6%	2%
Pit or garbage pile outside household compound	18%	23%	19%	17%
Scatter/ litter on ground	4%	3%	3%	1%

7 Institutional WASH services and practices

Different institutions can be found in the seven project towns and eight control towns. These include schools, health facilities and prisons. As ONEWASH Plus interventions have focussed on health facilities, schools, and public latrines, this midline report will focus on these institutions, which were found to be present in all study towns. For the schools and health facilities, a paired analysis was done, focussed on institutions which were visited in both the baseline and the midline survey.

Institutional WASH highlights

- A significant increase in the proportion of project schools meeting schools WASH indicators has been observed since the baseline. Improvements have been observed especially in latrine use, cleanliness, presence of hand washing facilities and presence of separate toilets for boys and girls.
- Menstrual hygiene management in schools has received a lot of attention under the project. This has led to an increase in menstrual hygiene facilities in schools and has been reported to have had a positive effect on reducing girl school absenteeism.
- Interventions related to WASH in public places are ongoing within the framework of the project.

7.1 School WASH

7.1.1 School WASH interventions

Interventions in schools included efforts to improve access and service levels of school WASH facilities, sanitation and hygiene awareness raising and sensitization activities targeting the school community and menstrual hygiene management (MHM).

Initially, school WASH committees involving woreda education officers, school directors, teachers and representatives of students were set up. Sanitation and hygiene training packages were developed and school WASH committee members were trained on school WASH, WASH clubs management, menstrual hygiene management, and operation and management of school WASH facilities. Following the training, the committee members identified and prioritized sanitation and hygiene problems in schools and developed action plans to address them. New school WASH clubs were set up or existing ones were revitalized. The club members met regularly and actively engaged in various sanitation and hygiene awareness raising activities, such as, organizing school plays. They also organized bi-weekly school cleaning campaigns. Posters communicating messages about sanitation and hygiene were put up in the school compound. Schools also prepared solid waste disposal facilities and set up hand washing facilities next to latrines.

In addition, financed by the project, construction of new school latrines has been ongoing in the seven project towns. In this way the programme intends to trigger replication of additional school latrine construction within the pilot schools and beyond.

Another important focus of the project so far has been interventions on **Menstrual Hygiene Management (MHM)**. An assessment was made to identify cultural issues and taboos that affect MHM and it was used to develop IEC/BCC materials and interventions on MHM in schools. MHM facilities such as separate MHM rooms equipped with pain medicine, sleeping mat, washing basin with waste water system, and hygienic disposal facility for used pads along with a supply of sanitary pads were set up in schools. Education on MHM has been provided to boys and girls, teachers and PTA members, and sign posts were put up in the school compounds. Brochures and other communication materials were also developed and disseminated for awareness raising. In some towns

like Adishu and Sheno, micro enterprises were organized and trained to produce reusable sanitary pads. Where these already existed, for example in Wukro, World Vision is building their capacity, supporting them to get registered as a formal business in order to sell reusable sanitary pads to schools. In some schools in Maksegnit and Adishu, schools provided clubs working on MHM with materials and training for the production of reusable sanitary pads.

World Vision reports that MHM awareness creation activities have been conducted and MHM clubs established in 48 schools and MHM facilities have been set up in 17 schools (World Vision, 2016).

7.1.2 School WASH results

In the project areas, 42 schools which had been visited and assessed in the baseline were revisited during the midline survey. In the control areas, 53 schools were revisited.

The proportion of project schools meeting the institutional WASH services benchmarks has significantly increased on all indicators in both the project schools and the control schools, with the exception of the indicator related to the maximum number of students per hole (see figure 22 and 23). Many schools scored especially better on the indicators related to the use of latrines, cleanliness of latrines[18], presence of separate latrines for boys and girls, and presence of hand washing facilities at latrines.

Figure 22: Project school WASH, baseline and midline situation

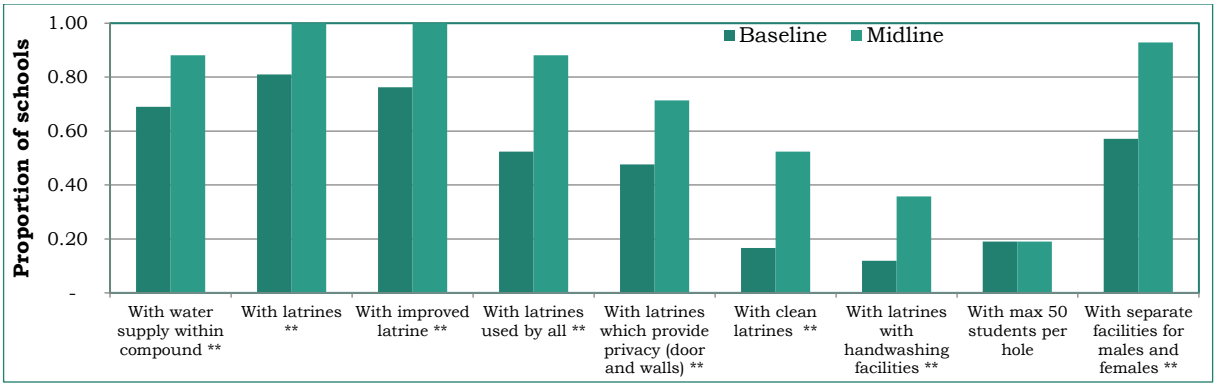
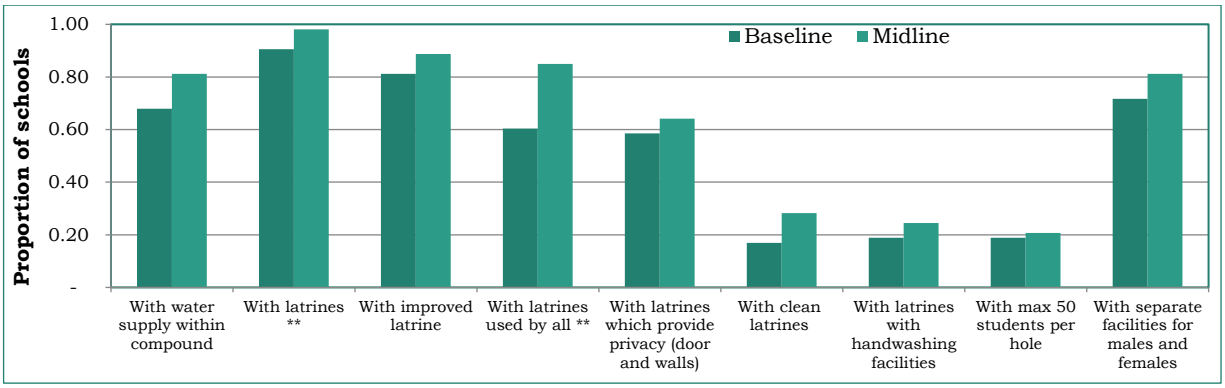


Figure 23: Control school WASH, baseline and midline situation



** = Midline proportion is statistically significantly higher than the baseline proportion

[18] Data collection took place in a summer holiday when schools were closed and latrines were not in use by students. Therefore, this could influence the result. However, where is significant change has been observed between baseline in midline in project schools, no significant change has been observed in the control schools.

For the control schools, however, a significant increase in the proportion of schools with latrines and with latrines used by all was observed. On the other indicators, no significant change was observed between the baseline and the midline situation.

This shows that the school WASH situation has improved more in the project towns than in the control towns, in line with the expectations of the ONEWASH Plus project interventions.

World Vision reported that ODF verification has been undertaken in project intervention schools and 20 schools in Tigray, 11 schools in Amhara, 36 schools in Oromia and 6 schools in Somali have been declared ODF (World Vision, 2016). This is in line with the result of the midline survey, which found that latrine facilities are used by all in the majority of the schools (re)visited.

The midline survey found that the proportion of schools with clean latrines has increased significantly. However, still almost half of the schools were found not to have clean latrines. Also, many schools were still found to have latrines which do not provide privacy. This was confirmed by focus group discussions with school girls in Sheno, Adishu and Maksegnit, who mentioned latrines are not clean and do not provide privacy. In Kebridehar high school, the absence of separate toilets for boys and girls was mentioned by participants of the focus groups. While the project has clearly led to improvements, these will need to be built on by schools and supporting agencies to further improve access and sustain provide of WASH in schools.

In some schools in Welenchiti, the school management has raised money from students' contributions to pay for regular cleaning of latrines. While in some towns, the schools hired cleaners, in others such as Welenchiti and Sheno, poor students were paid to clean the latrines. The sensitization activities influenced Parent Teacher Associations (PTAs) and school management to allocate budget for cleaning, improvement and construction of new latrines from the school improvement fund in towns, such as Adishu, Wukro and Welenchiti. On the other hand, in Sheno and Abomsa, focus group participants mentioned that sanitation is not prioritized by the school management, and budget allocation is required to improve facilities.

Focus group discussions also revealed unreliable water supply as a huge problem. Hand washing facilities that are set up next to latrines often don't have water. Water supply is available only part of the week as presented in section 4. There are no water storage tanks available in schools to make up for gaps created by the intermittent water supply.

The **MHM** intervention according to FGDs has resulted in reported reduced absenteeism of girls associated with menstruation, across the towns. It has helped to raise awareness of students and teachers alike and helped to change attitudes towards menstruation, enabling girls to continue their school activities unhindered. Girls in most schools freely access and make use of the MHM facilities provided and the subject has become less of a taboo within the school. The intervention has also led to attitude changes within the school management and PTAs in some schools, for example in Wukro, Adishihu and Maksegnit, they have started allocating budget for improvement of MHM facilities and girls latrines from the school improvement fund or other sources. In other towns, such as Abomsa, Kebridehar and Welenchiti, schools tried to raise money for the purchase of sanitary pads from students and fund raising activities conducted by school WASH clubs, for example from selling coffee and tea in the school.

However, there are exceptions to achievements seen in MHM. In some towns like Abomsa and Kebridehar, the MHM rooms are less used by girls, who feel the rooms don't provide enough privacy for them to use, either because they are located close to classrooms or faraway from latrines. In Abomsa and Kebridehar, sanitary pad disposal facilities are also not available within the MHM rooms. FGD participants in the two towns report girls do not want to be seen using the MHM room indicating the taboo associated with the subject has not changed that much in the intervention schools of these towns.

The achievements of the MHM interventions are also hindered by unreliable water supply to the schools and absence of water in the MHM rooms in towns, such as: Wukro, Welenchiti and Abomsa. There are no sanitary pad disposal facilities within the latrines.

Despite the changes taking place in schools, in towns like Maksegnit, Abomsa and Kebridehar, menstruation is still a taboo topic at home that girls will not discuss freely with their parents, for example to ask them to buy sanitary pads.

While the organisation of micro enterprises to produce reusable sanitary pads is an opportunity for sustainability, they haven't yet started producing and selling to schools and need support in developing their business.

7.2 WASH in public places

7.2.1 Public latrine interventions

Interventions to improve WASH in public places within the ONEWASH Plus Programme focussed on rehabilitation or construction of WASH facilities in bus stations and market places along with awareness raising efforts to improve sanitation and hygiene in these locations.

Initially, task forces composed of stakeholders responsible for sanitation and hygiene in market places and bus stations were formed. These included representatives from the municipality town beautification and greenery directorate, health, micro and small enterprises, trade and industry and the transport authority offices at woreda level. The task forces also included representatives of traders working in the market place, representatives of drivers and bus attendants and public latrine attendants, as users and service providers, respectively. The task forces were trained on participatory planning, sanitation and hygiene and solid and liquid waste management.

The task forces started their activity by identifying and prioritizing WASH problems in market places and bus stations. The prioritized problems were similar across towns and included: open defecation and unsafe disposal of solid waste in these locations, lack of functioning public latrines or lack of water where public latrines exist, lack of hand washing facilities, poor management of public latrines, absence of guards and cleaners, lack of timely emptying of pits etc. The task forces developed action plans to address identified problems along with identification of responsible stakeholders for carrying out the action plans. As part of wider awareness raising efforts, posters and signposts communicating sanitation and hygiene messages were put up in market places and bus stations.

Through World Vision's support, a number of public latrines were rehabilitated in towns such as Adishu, Wukro and Maksegnit. World Vision also supported construction of hand washing facilities next to public latrines, and water storage tanks were bought for the public latrines in Wukro. Town water utilities in collaboration with the municipalities reconnected public toilets to town water pipe systems in Wukdro and Maksegnit. In Wukro, the dialogue group was instrumental in facilitating cross sector coordination and joint action between town water utilities and the municipality to reconnect public latrines to town water supply systems.

To improve management of public latrines, latrine cleaners and guards were hired with contributions from the municipality, kebeles and users. In Maksegnit, for example, traders working in a market place provided monthly contributions for salaries of cleaners and guards, while the kebele took responsibility for managing a public latrine located in a bus station. Weekly cleaning campaigns have started to collect and dispose of solid waste in market places and bus stations.

Through the project's finance, new public latrines are also being constructed in market places and bus stations in the seven project towns.

7.2.2 Public latrines results

Information obtained from World Vision's report shows eight targeted market places and seven bus stops in the project sites have been declared ODF as a result of the project's interventions (World Vision, 2016).

Table 18 below gives an assessment of the WASH situation of the public latrines assessed at the time of the midline survey. It shows that although all public latrines in the project towns had access to water supply, this was only the case for 6 out of 11 public latrines in the control towns. All public latrines in both the project as well as the control towns provided safe separation between users and faeces by having washable or cement slabs in place and many latrines were found to provide privacy. However, not all public latrines were found to be clean, have hand washing facilities in place and have separate facilities for males and females.

Table 18: Public latrines

Town	Number of public latrines assessed in midline	Water available	Privacy (presence of walls and doors)	Clean latrines	With HandWASHing facilities	Separate facilities male / female
Maksegnit	1	1	-	-	1	1
Abomsa	1	1	1	1	1	1
Sheno	1	1	1	-	-	
Welenchiti	1	1	1	1	1	1
Kebridehar	2	2	1	2	-	
Adishihu	2	2	2	2	2	1
Wukro	2	2	2	-	1	2
Total project towns	**10**	**10**	**8**	**6**	**6**	**6**
Gobesa	3	-	3	-	-	
Hawezen	2	2	2	1	-	2
Kebribeyah	5	3	4	4	-	
Kola Diba	1	1	1	-	1	
Total control towns	**11**	**6**	**10**	**5**	**1**	**2**

However, despite efforts made several **challenges** remain. Unreliable supply of water in towns makes the management of public latrines difficult and it reduces the revenue that can be earned from public showers, which is a substantial income of the public toilets. Lack of functioning vacuum trucks owned by the municipality makes timely emptying of latrines difficult, as private service providers charge more. The management of public latrines, especially how to finance operation costs, such as salaries of guards and cleaners, cleaning materials and latrine emptying services ,is still not clear and would need further support in business development plans.

7.3 Health facilities

7.3.1 Heath facility WASH interventions

The WASH intervention in health facilities included the set-up of a task force, promotional activities and communicating sanitation hygiene messaging and the declaration of ODF of a number of health posts. Reports obtained from World Vision indicate 20 health facilities have been targeted by the project, six in Tigray, five in Amhara, six in Oromia and three in Somali and all were declared ODF (World Vision, 2016). There hasn't been any WASH facility construction in health facilities.

7.3.2 Health facility WASH results

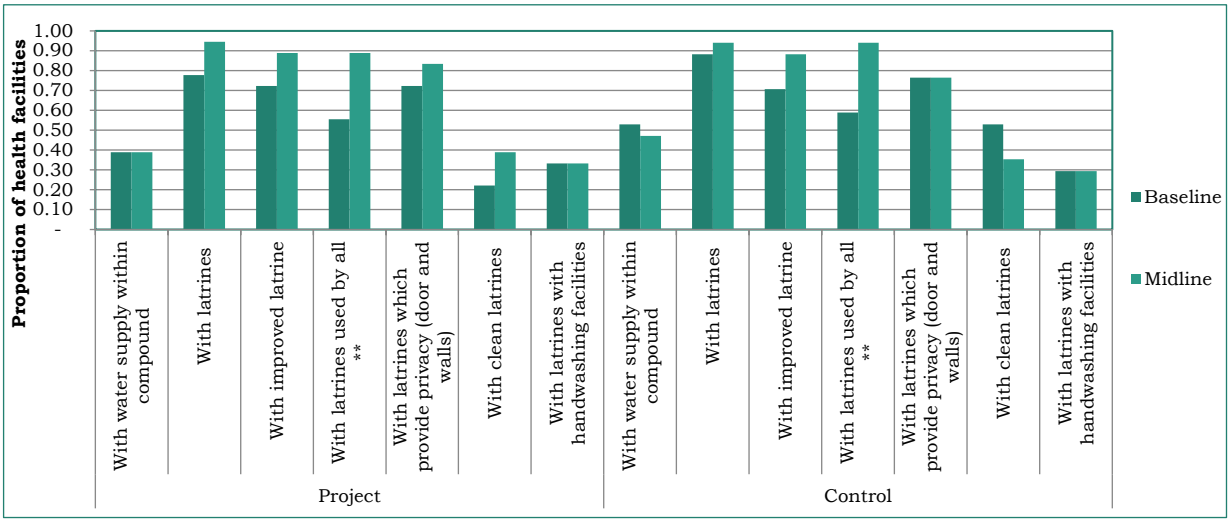
As part of the midline survey, 18 health facilities assessed in the project areas in the baseline were revisited. Figure 24 presents an overview of the proportion of health facilities which meet the different institutional WASH sub-indicators.

For the 18 revisited health facilities in the project areas, the proportion of health facilities with water supply within the compound has remained the same, as has the proportion of health facilities with latrines with hand washing facilities. On the other indicators related to institutional sanitation, the proportion of health facilities meeting the benchmark has increased. The largest difference between baseline and midline (statistically significant with p = 0.008) was observed in the proportion of health facilities where all users make use of latrines.

For the 17 revisited health facilities in the control towns, the proportion of health facilities with latrines used by all was also found to be statistically significantly higher in the midline than in the baseline (p = 0.03). Like the health facilities in the project towns, the proportion of health facilities in the control towns meeting the benchmark on the other indicators was not found to be statistically significantly higher than the baseline proportion.

This suggests the project has not (yet) resulted in a significant change in the WASH situation in health facilities related to the indicators presented here.

Figure 24: Health facility WASH, baseline and midline situation



** = Midline proportion is statistically significantly higher than the baseline proportion

8 Conclusions

- Over the past two years, packages of integrated WASH interventions in the project towns and satellite villages have included sanitation and hygiene interventions at household and institutional levels. Towards improved water supply, initiated service delivery improvement measures have not yet been completed. The findings of the midline survey therefore can indicate the progress made and provide suggestions for further interventions on sanitation and hygiene, while providing only additional baseline information on the status of water supply services.
- At the broader context level some significant changes have taken place over the past two years. There was a major drought involving WASH responses to 10 million people, and the project and control towns in Somali, Tigray and Oromia have been affected to different degrees. Social unrest has disrupted governance and development activities in Oromia and Amhara regions and slowed down the momentum of the project in the towns. In both project and control sites, mean annual income has grown significantly in urban and rural areas, which is in line with growth of per capita income at the national level. There is also a narrowing gap in wealth between urban and rural households and more households have been lifted up from under the poverty line. However, female-headed households, as a group, continue to have a lower mean annual income.
- As expected, little (relative) change has been observed in the project areas related to water service provision.
- The project interventions have resulted in a significant decrease in open defecation practices in the project towns and their surrounding rural areas. However, while triggering increased latrine construction, the project interventions have not (yet) resulted in latrines that provide privacy, separate users from excrements and are kept clean. Liquid waste management is still a challenge. Interventions related to improving liquid waste management have not been completed yet. The proportion of urban households which practice regular latrine emptying has remained very low.
- In informal settlements there is often insufficient space to construct latrines and landlords who sublet their properties are not present, difficult to reach and may not directly invest in the well-being of their tenants. The lack of latrines in public spaces is a constraint to providing temporary solutions to these problems and to achieving open defection free status in towns. Where public latrines exist poor management affects functionality.
- The project has been active in establishing and strengthening solid waste collectors. However, this has not yet translated in an increase in households making use of these services. This can be due to the fact that the solid waste collection enterprises haven't yet started operating with a full set of facilities which will be provided by the project.
- There have been slight improvements in some hygiene indicators; knowledge of critical moments for hand washing and safe disposal of faeces of children under five in the project sites. However, similar improvements have also taken place in control sites, which makes it difficult to attribute the change to the project interventions alone. National efforts through the health sector and health extension programme and other projects could have contributed to the results observed.
- Both in the project and control areas, the proportion of schools and health facilities which meet WASH benchmarks has increased, although challenges remain for such institutions with respect to ensuring cleanliness and access to hand washing. Improvements in health facilities could not be attributed to ONEWASH Plus activities, while improvements in schools can be. The lack of reliable water in schools makes it difficult to promote and practice hand washing and safe hygiene. While it makes some sense for software and awareness creation to lead to hardware provision, unless water supply is improved soon, the behaviour change gains are at risk of being lost.
- Progress has been made in the area of Menstrual Hygiene Management and has been reported to have contributed to reduced absenteeism of girls associated with menstruation. However, a gap remains to reach out to parents and encourage open discussion around menstruation at home. Girls' latrines should be designed to accommodate MHM, putting in place used pad disposal facilities and water for hand washing.

- Social accountability groups/ sanitation and hygiene task forces have facilitated horizontal coordination across sectors that enabled joint action to address focussed WASH problems. Going forward one of the key issues that needs to be addressed is with respect to the leadership of this initiative.

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Annexes

Annex 1. Quantitative information on sanitation and hygiene interventions

Table a. IEC/BCC materials produced and disseminated on school WASH

No.	Type of communication materials	Total no. of communication materials distributed to 8 towns	Topics covered by the promotional materials
1	Poster	4000	Hand washing, waste management, MHM, latrine utilization
2	Brochures	40,000	Waste handling practice, hand washing, MHM taboos
3	Banner	200	Hand washing, waste management, MHM, latrine utilization
4	Sign posts	144	Hand washing, waste management, MHM, latrine utilization

Annex 2: Midline data collection guidelines

See attached document

Annex 3: Surveys

See attached document

Annex 4: Number of administered surveys

		Urban water scheme	OWP water point	Water quality test	Institutional WASH (repeat surveys only)	Waste collector	hh urban	hh rural	hh Total
Project area	**Total**	**7**	**175**	**86**	**65**	**7**	**213**	**63**	**276**
Amhara Region	Maksegnit	1	24	15	10	1	31	11	42
Oromia Region	Welenchiti	1	35	13	12	1	30	10	40
	Sheno	1	24	11	7	1	30	10	40
	Abomsa	1	33	8	10	1	30	11	41
Somali Region	Kebridehar	1	26	10	6	1	30		30
Tigray Region	Adishisu	1	18	15	8	1	30	11	41
	Wukro	1	15	14	12	1	32	10	42
Control area	**Total**	**8**	**181**	**91**	**72**	**3**	**241**	**60**	**301**
Amhara Region	Koladiba	1	24	17	11		31	10	41
Oromia Region	Adami Tullu	1	22	8	11		30	10	40
	Gobesa	1	33	15	11	1	30	10	40
	Chancho	1	33	11	10		30	10	40
Somali Region	Kebribeyah	1	25	4	4	1	30		30
	Shinile	1	7	6	2	1	30		30
Tigray Region	Hawezen	1	15	15	12		30	10	40
	Adi Gudem	1	22	15	9		30	10	40
Grand Total		**15**	**256**	**177**	**137**	**10**	**454**	**123**	**577**

Annex 5: Details on water points per town

Hours of service per day for functional public taps connected to town water scheme

	0-6 hours per day	6-12 hours per day	>12 hours per day
Project area	**70%**	**17%**	**13%**
Abomsa	100%	0%	0%
Adishihu	86%	0%	14%
Kebridehar	80%	20%	0%
Maksegnit	17%	0%	83%
Sheno	40%	60%	0%
Welenchiti	54%	38%	8%
Wukro	0%	0%	100%
Control area	**21%**	**39%**	**39%**
Adami Tullu	0%	50%	50%
Adi Gudem	0%	40%	60%
Chancho	44%	22%	33%
Gobesa	25%	60%	15%
Hawezen	0%	33%	67%
Kebribeyah	100%	0%	0%
Kola Diba	0%	30%	70%
Shinile	0%	100%	0%
Grand Total	**47%**	**28%**	**26%**

Days of service per month for functional public taps connected to town water scheme

	Less than every 4 days	Once every 2-4 days	More than every other day	Every day
Project area	**17%**	**58%**	**10%**	**14%**
Abomsa	29%	71%	0%	0%
Adishihu	14%	29%	14%	43%
Kebridehar	0%	100%	0%	0%
Maksegnit	0%	50%	0%	50%
Sheno	0%	100%	0%	0%
Welenchiti	17%	42%	29%	13%
Wukro	0%	0%	0%	100%
Control area	**23%**	**7%**	**41%**	**30%**
Adami Tullu	25%	0%	0%	75%
Adi Gudem	20%	10%	10%	60%
Chancho	61%	11%	28%	0%
Gobesa	0%	0%	70%	30%
Hawezen	0%	0%	50%	50%
Kebribeyah	0%	100%	0%	0%
Kola Diba	20%	0%	60%	20%
Shinile	0%	0%	0%	100%

Rural water points

Row Labels	Number of water points with repeat data	Functionality baseline	Functionality midline
Project area	**34**	**82%**	**88%**
Maksegnit	9	78%	89%
Abomsa	2	100%	100%
Sheno	4	100%	100%
Welenchiti	2	100%	100%
Adishihu	6	83%	100%
Wukro	11	73%	73%
Control area	**47**	**85%**	**72%**
Kola Diba	13	62%	38%
Adami Tullu	9	89%	56%
Chancho	7	100%	86%
Gobesa	5	100%	100%
Adi Gudem	9	89%	100%
Hawezen	4	100%	100%

Proportion of rural water points

Row Labels	Reliable water points 2014 (At least 80% of the year functional)	Reliable water points 2016 (At least 80% of the year functional)
Project area	**74%**	**62%**
Maksegnit	78%	67%
Abomsa	50%	0%
Sheno	100%	75%
Welenchiti	50%	0%
Adishihu	83%	67%
Wukro	64%	73%
Control area	**70%**	**49%**
Kola Diba	46%	31%
Adami Tullu	44%	11%
Chancho	100%	57%
obesa	80%	100%
Adi Gudem	89%	56%
Hawezen	100%	100%