Research Paper

Looking beyond headline indicators: water and sanitation services in small towns in Ethiopia

Marieke Adank, John Butterworth, Sam Godfrey and Michael Abera

ABSTRACT

This paper presents findings on water and sanitation service levels from 16 small and medium towns in four regions of Ethiopia. In these settlements, the proportion of people with access to improved water and sanitation services is found to be high and consistent with other major datasets and reports for urban Ethiopia. However, when service characteristics such as reliability, quality, quantity and accessibility (including travel and queuing time) of water are considered, and for sanitation, quality and use, a different picture emerges. Only a small minority of households, 9% for water and 3% for sanitation, were found to receive services that meet the standards set in the Ethiopian government's first Growth and Transformation Plan (GTP I). Under the second Growth and Transformation Plan (GTP II), standards for urban water services have been set higher and current performance levels are even lower. This paper illustrates the discrepancies between average coverage figures, actual service delivery levels and the increased demands of the GTP II. The paper illustrates the huge scale of the challenge faced in improving WASH service delivery levels in small towns in Ethiopia, which is an issue of wider relevance in the context of the Sustainable Development Goals.

Key words | Ethiopia, monitoring, sanitation, service levels, small towns, water supply

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INTRODUCTION

Ethiopia is one of the least urbanised countries in the world, but has one of the fastest urbanising societies. Like its neighbours in the wider east Africa region, the country's population is largely rural, with only 20% living in towns and cities according to an estimate for 2014 from Ethiopia's Central Statistical Agency (CSA 2013). Using CSA figures, the World Bank (2015) calculates that the number of people living in towns and cities will increase from 15.2 million in 2012 to 42.3 million by 2037, increasing at 3.8% per year, or will actually triple by 2034 based on their own higher growth rate projection (5.4% a year).

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Urbanisation is identified as an opportunity for economic growth around the new industries and services that towns, cities and their citizens can support (World Bank 2015). Ethiopia is currently pursuing a policy of rapid industrialisation, aiming to become a middle-income country by 2025, a goal set out in the latest Growth and Transformation Plan for 2016–2020 (FDRE 2015). Urban settlements need infrastructure to provide a high quality of life for their residents. The current lack of this infrastructure is identified as one critical gap, and a risk to the success of urbanisation policies (World Bank 2015). Basic domestic services such as water and sanitation are central to a healthy and happy industrial workforce.

Ethiopian institutions concerned with water and sanitation have only recently shifted their focus to include

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urban as well as rural areas. Out of the 882 urban settlements in Ethiopia, the vast majority (847) are small (2,000–20,000 population) and medium (20,000–50,000) towns (MoWIE 2014). These small and medium towns are considered strategic for water and sanitation improvement due to rapid population growth, the limited attention received to date by smaller towns compared to bigger urban areas, relatively low institutional capacities, and their importance as centres of local business and growth within their rural hinterlands. With a high concentration of people and inadequate services, such small and medium towns are considered to have high potential for serious disease outbreaks and negative health impacts.

More than half the population in Ethiopia is aged under 18 (CSA 2007). With such a young population, the implications of inadequate water and sanitation services for children's health and development are particular concerns. Urban children are vulnerable to sanitation-related illness. Bartlett (2003) highlights the need to go beyond what is considered 'improved provision' and provide infrastructure for water and sanitation services alongside investments in health education and health care.

Relatively high urban water and sanitation coverage figures are reported for Ethiopia by the WHO-UNICEF Joint Monitoring Programme (JMP 2015) based on national data collected by the CSA through household surveys. The JMP estimates 93% coverage with improved drinking water supplies (including 56% piped onto premises and 37% other improved sources). Urban water supply access of 84% is reported for 2014 using sector provider estimates (FDRE 2015). The use of improved and shared sanitation facilities is 67% according to JMP estimates (27% improved and 40% shared) with a further 27% using unimproved facilities and 6% relying on open defecation (JMP 2015). The initial impression is favourable, and clearly the country has made substantial progress in recent years to extend water and sanitation systems and facilities.

However, concerns have been raised that these headline indicators may hide low levels of service (see, e.g., UN-Habitat 2014; World Bank 2015). This is a concern that is not unique to Ethiopia. In their study on global water coverage figures, Godfrey & Labhestwar (2010) concluded that safe water usage reduced by 20% when microbial water testing was included. Later studies by Bain *et al.* (2012) and Onda *et al.* (2012) utilise the WEDC/WHO/UNICEF Rapid Assessment for Drinking Water Quality (RADWQ) results to show how the global figures for the achievement of the Millennium Development Goals (MDGs) would have to be significantly reduced if water quality was taken into account. Such concerns have been driving interest in the development of service delivery indicators, going beyond simply counting facilities and tracking 'the haves and the have-nots' (Bartram 2008; Lockwood & Smits 2011) and combining indicators to assess the level of service provided and received (Kayser *et al.* 2013; De Albuquerque 2014). Assessing and monitoring service levels is of wider interest in gauging the impact of water and sanitation interventions on people's health and well-being (Lloyd & Bartram 1991), and in comparing life-cycle costs and benefits of different levels of service provision (Moriarty *et al.* 2011).

This paper focuses on actual water and sanitation service levels within small and medium towns in Ethiopia. The differences between having access to water and sanitation, and the realities of what it is like to receive and use water services and sanitation facilities in these towns, is an issue of wider global relevance. The Sustainable Development Goals (SDGs, see http://www.globalgoals.org/) recently adopted by the United Nations to supersede the MDGs will mean little for development prospects if the end-point is 'universal and equitable access' to poor quality water and sanitation services.

METHODS

Water and sanitation service levels were assessed in 16 small and medium towns across four regions in Ethiopia (Amhara, Tigray, Oromia and Somali) as part of a baseline study for the ONEWASH Plus programme funded by DFID, and implemented by UNICEF and the Government of Ethiopia (Adank *et al.* 2015). This programme aims to improve water and sanitation services in eight 'intervention' towns through an integrated package of water, sanitation and hygiene interventions including major infrastructure investments, innovations in management models, capacity building and behaviour change campaigns. A further eight 'control' towns were selected to include settlements with similar characteristics but without major planned developments to improve water and sanitation services. The towns

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were not randomly selected, which is a limitation of the study, so the findings should be used with caution beyond these towns. The 16 towns had populations (according to projections for 2014) of between 10,100 and 53,000 (CSA 2013).

The assessment included a household survey administered to a total of 1,203 urban households between 22 September and 12 December, 2014. The study design involved sampling 100 urban households per intervention town and 50 households in each control town. The survey included asking households about their access and use of a range of water and sanitation services and their related hygiene practices. This included questions on the quantity of water used by the household, as well as perceived water quality, reliability and accessibility. With respect to sanitation, questions addressed issues of latrine technology, latrine construction, privacy, cleanliness, safety and waste disposal. The survey also included observations by the data collectors, e.g., related to the cleanliness of sanitation facilities.

The sampling of the households used a variation of the method used by WHO in its expanded programme of immunisation (EPI) (Kish 1965; Bennett *et al.* 1991). Each town was divided into blocks using aerial images taken from Google Earth, with borders delimited by physical features on the ground such as streets and rivers. To approximate a self-weighted simple random sample (although some data weighting was applied to correct for sample errors and for analysis that aggregated towns with different population sizes) the number of samples required for each block was estimated based upon the number of dwellings (roofs) per block. Enumerators started at a central point in each block, moving in a randomly selected direction to identify the first household. Enumerators selected every seventh household to obtain a good spread of households within each block (Bostoen & Chalabi 2006).

Water and sanitation services used by households were assessed against the national norms and standards for WASH service provision as far as available. These norms and standards have become more ambitious over time, consistent with a vision of attaining lower middle income status by 2025. The second Growth and Transformation Plan (GTP II, 2016–2020; FDRE 2015) – the guiding strategic document for Ethiopia's development – has, for example, established much higher norms and standards than GTP I (2011–2015). There are also new targets to increase the continuity of water supplies, improve water quality and extend wastewater management systems.

The water quantity norm under GTP I was set at 20 litres per capita per day (lpcd) in urban areas. Under GTP II, the water use quantity norm depends on the population size of the town:

- Category 5 towns (<20,000 pop.): At least 75% population has access to 40 lpcd
- Category 4 towns (20,000–50,000 pop.): At least 75% of population has access to 50 lpcd
- Category 3 towns (50,001–100,000 pop.): At least 75% of population has access to 60 lpcd
- Category 2 towns (100,001–1,000,000 pop.): At least 75% of population has access to 80 lpcd
- Category 1 towns (>1,000,000 pop.): At least 75% of population has access to 100 lpcd.

Water quantity used was assessed through self-reporting by households, which was cross-checked with utility water production and sales figures from town water utility records.

The maximum distance to water points in urban areas was set at 500 m under GTP I, while under GTP II the norm is:

- Category 1–4 towns: At least 75% of population with private connections
- Category 5 town: Users within 250 m.

Continuity of water services was not considered in GTP I, but GTP II states that town water supply should be uninterrupted for at least 16 hours per day. In this study, a reliable water service was defined as one that is available year round, with outages of not more than 3 days.

User perceptions of water quality in terms of colour, odour and taste acceptability, as well as microbial contamination, were assessed. Households were asked about perceived water quality, and samples for water quality analysis were taken from randomly selected taps (sample size 59). The samples were taken from public standposts supplied by the main piped water schemes, or private connections where there were not enough standposts. Analysis focused on microbial contamination using the compartment bag test to test for *Escherichia coli*. These water quality tests

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were limited to a single sampling date and only provide a snapshot in time of potential water quality risks. Further risks include fluoride contamination, which is a known problem in some towns.

In addition, user satisfaction was assessed as part of the baseline study. User satisfaction questions were designed to measure whether the user felt very unsatisfied, unsatisfied, neutral, satisfied or very satisfied with different characteristics of water services (reliability, quality, quantity, accessibility).

Urban sanitation and its monitoring is a joint responsibility of the Ministries of Water, Irrigation and Electricity; Health; and Urban Development, Housing and Construction (IUSHS 2015). The official indicators in use by the Ministry of Health track access to latrine facilities including both improved (with slab, ventilation pipe and handwashing facility) and unimproved latrines, and the proper use of latrines.

The household survey questionnaire was administered by 12 trained enumerators supervised by three experienced supervisors. The data were collected using surveys loaded on smartphones using the application Akvo FLOW (Akvo.org). The data collected were verified in real time for possible errors and inconsistencies using the online data collection platform.

Further data cleaning, analysis and visualisation was done in Akvo FLOW, SQLite and 'R' (R Core Team 2015). All selected households could be interviewed within three return visits so the no-reply rate was zero. The proportion of missing values for various variables was below 1% (0–0.9%) with the exception of variables on travel and collection time (3%) and family size (6%). These no-reply and missing values made no significant difference to the analytical outcomes.

Based on estimated annual household income as reported by 935 households, these households were assigned to three wealth groups based on the poverty line and minimum wage levels set by the Government of Ethiopia: (1) income under the poverty line (500 birr per month or less); (2) income above the poverty line, but under minimum wage; and (3) income above minimum wage (1,000 birr per month or more). The percentage of households in these groups was 17%, 21% and 62%, respectively. There were a large number of female-headed households among the sample in these towns (48%). A total of 83% of households had children aged 17 years or under, and 66% of households included children aged under five. The average number of children within an urban household was 2.3.

RESULTS AND DISCUSSION

Water supply

All of the study towns have a piped water supply system that is managed by a town water utility. Groundwater is the most common water source, generally derived from multiple boreholes. Two towns (Adishihu and Gobesa) are supplied from springs. One of the towns, Gode, is supplied from a river diversion structure. The number of public standposts connected to the piped water supply schemes at the time of the survey ranged between 2 and 39 (median 13) and the number of household connections was between 300 and 5,147 (median 1107). There are alternative water sources in these towns, including wells with hand pumps, unprotected springs, vendors transporting water by small carts, and *birkas* (a traditional storage tank common in the Somali region).

Overall, the majority of the households (82%) in the 16 study towns reported using an improved water source as their main source of drinking water supply in the dry season. This is in line with the results of the household survey, which was part of the 2010/11 National WASH Inventory, and found that 82% of urban households had access to drinking water (Hailu Debela 2013). A total of 79% households in the 16 study towns used the town piped water supply scheme, either through private connections on premises or through public standposts supplied by the town water scheme (Figure 1). On average, just over half of the population accessed piped water on premises, and just under a quarter used public standposts. Almost a fifth of households (18%) used unimproved sources such as *birkas*, tanker trucks and carts, and surface water. Use of unimproved sources was most common in the Somali region, and exceeded all other sources in three of the four Somali towns. A relatively small number of households (4%) used alternative improved sources such as wells fitted with hand pumps (an important source in Maksegnit) and rainwater harvesting.

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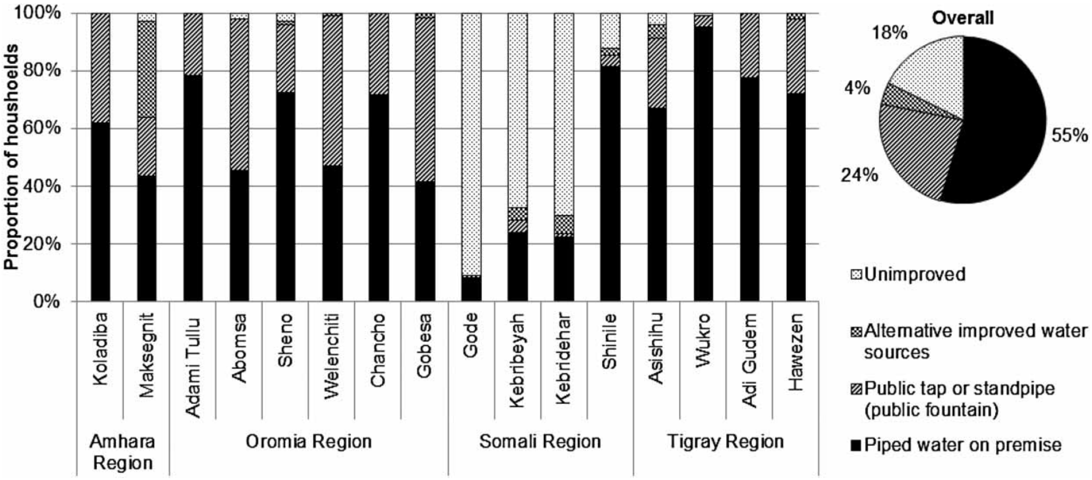

Figure 1 | Main dry season drinking water source reported by households.

Water service levels

The reliability, accessibility and quality of water are all aspects of a water supply service. The quantity of water supplied or used is not only a dimension of the water supply service, but is also a function of demand and consumer behaviour.

Quantity of water used

Overall, 60% of households using an improved water source reported using less than 20 lpcd, therefore missing the GTP I standard. The volume of water used is known to be a critical factor in health outcomes (Esrey *et al.* 1991; Howard & Bartram 2003; Stelmach & Clasen 2015) and it is a serious concern that services for most households are failing in this respect. When a higher standard of service is considered (using the GTP II standards), the picture deteriorates further, with only 12% of households receiving services that meet the specified standard. There was an overall pattern of underperformance with respect to the quantity of water used. No correlation was found between the reported quantity of water used by households and the type of water source, the reliability of water supply or the wealth status of the household.

Estimates of the quantity of water used based on household survey questions are subject to uncertainty, especially when based on volumes reported by households rather than on measured use. Utility sales data provide another source of information. In the study towns, the amount of water sold through piped connections on premises was found to be similar to household survey estimates. However, water use quantity estimates from households relying on public standposts were consistently much higher than standpost water sales from utility records. This could indicate that either households overestimate their water use from public standposts, or that not all water sales from public taps are recorded, leading to lower water sales records. However, if the amount of water used as estimated by households was accurate, the total water sales would exceed the reported production at the source, which is impossible. This suggests that households using water from standposts may have overestimated their water use quantity and that the proportion of households meeting GTP I and GTP II quantity standards may be even lower than presented above.

Reliability of service

Regardless of the type of water supply accessed, less than a third of households (32%) reported that their main source of (dry season) water supply provided reliable water services throughout the year, with breakdowns generally repaired within 3 days.

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Accessibility and water collection

Collecting water from shared water sources is a burden, especially for women and children (Sorenson *et al.* 2011; Pickering & Davis 2012). Overall, 85% of households using an improved water supply source reported travelling 10 minutes or less to fetch water (single leg). This is taken as a proxy for a distance of 500 m, in line with the GTP I standard. A much smaller proportion of the households depending on public taps (56%) and alternative sources (50%), report a travel time of 10 minutes or less. Similarly to the effect with water quantity, the adoption of GTP II standards has a major effect on reported performance. With the halving of the maximum distance standard from 500 m to 250 m, the proportion of households that are considered to have access to communal sources within an acceptable distance goes down considerably, to 21% and 29% for public taps and alternative improved sources, respectively.

Time spent on water collection from communal water sources depends upon queuing times as well as distance. Only one fifth of households depending on public taps and less than a third of households depending on alternative improved sources reported queuing times below 10 minutes.

Quality of water supplied

Quality was not perceived as the most serious issue by households using improved water sources, with only about 10% of households perceiving the taste, colour or odour of their piped water supply as not acceptable. Greater numbers of households using alternative improved water supply options (20%) and unimproved sources (35%) considered the quality of their water supply as unacceptable.

Measurements of water quality however, albeit for a single snapshot in time, suggest that contamination is a serious problem. Out of 59 samples taken for analysis of microbial (*E. coli*) contamination, 16 (27%) had levels of contamination >10 MPN/100 mL. Levels below 10 MPN/100 mL are considered low risk (safe or probably safe) according to World Health Organization Guidelines for Drinking Water Quality (2011). This finding is poor compared to other known studies. While the indicator is different, being total thermotolerant coliforms (TTC), only 9% of samples of utility piped water supplies exceeded 10 TTC/100 mL in the national RADWQ study.

All of the significantly contaminated urban supplies were found in five of the eight intervention towns. Microbial contamination is expected to be strongly seasonal, and might also vary substantially on shorter timescales. Most of the systems in these towns supply water on an intermittent basis, and contamination can be expected to vary as water is supplied to different zones and then pipes lie empty and unpressurised for periods of days. Further research is proposed to collect additional baseline data on seasonal and shorter-term water quality fluctuations, again with a focus on microbial contamination. Contamination between source and point of use, fluoride contamination (a known problem in some towns) and pollution from emerging industries are further areas of concern.

Overall performance

While an overall 82% of households reported using an improved water source as the main source of drinking water supply in the dry season, less than half of these households (43%) estimated usage of at least 20 lpcd in line with the GTP I standard. Combining these two indicators (Figure 2) results in an estimate of 35% of households using 20 lpcd from an improved source. When reliability is also considered, defined as a year-round supply with breakdowns repaired within 3 days, only 10% of households are estimated to have access to at least 20 lpcd from an improved and reliable source. Most of these households have access to these services within 500 m of their house and perceive the water quality to be acceptable, so there is little change to the estimates when distance and perceived quality are included. The overall picture is of a serious crisis in water service delivery, with nearly all households (91%) receiving and using services that fall short of the required standards.

For households enjoying access to a piped water supply on premises, the main limiting factor is the reliability of the water supply, while both reliability and accessibility are key constraints for households depending on communal sources. Households depending on alternative improved water sources face the additional problem of unacceptable water quality. The Supplementary Information (available in the online version of this paper) includes further details on water supply service levels.

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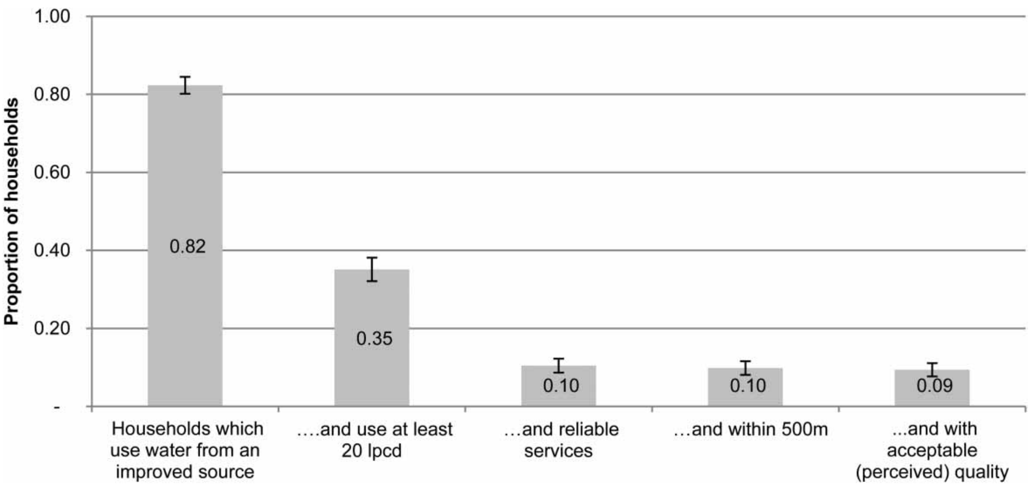

Figure 2 | Water supply service delivery levels according to multiple criteria (as defined by the Ministry of Water, Irrigation and Electricity for GTP I).

Service levels and user satisfaction

In the towns there is an appreciation of water services. Generally, levels of user satisfaction were found to correlate with the level of service that households receive. Households with the best services reported the highest levels of user satisfaction (Figure 3). However, most households fall within groups with water supplies that fail on one or more of the service level indicators. There is clearly considerable work for town water utilities to do to satisfy their customers. The scale of the challenge, and the current low level of services provided through piped systems, is also illustrated by the relatively high proportion of households using unimproved water sources that report being satisfied with the reliability, quantity, quality and accessibility of their water supply. Levels of satisfaction for these unimproved sources are even higher than families getting poor services from the piped network. These alternative water sources mainly consist of private *birkas* and truck and tanker services. This suggests that people value the water services provided through these private systems and are prepared to pay for these services.

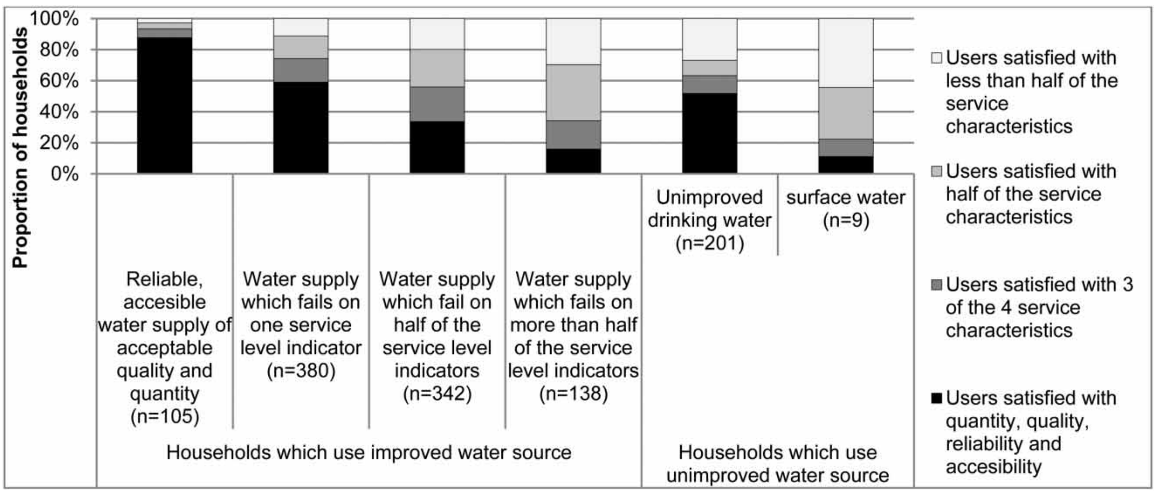

Figure 3 | Service level and user satisfaction.

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Inequalities in access to water supplies

Access to services by households in these towns was further examined with respect to wealth, by male- and female-headed households, and by households with disabled members.

There was a statistically significant relationship between wealth group and the type of water supply used (as the main drinking water source in the dry season) by urban households (*P*-value <0.001; see Table 1), with the richest (above minimum wage) group making more use of unimproved sources (23% of households at or above minimum wage) and other groups making more use of public standposts. This relationship may partly relate to the purchase of water from tanker truck vendors by better-off families, and will be investigated through further research.

Table 1 | Proportion of households in each wealth group according to main drinking water source (dry season)

	Richest (above min. wage)	Middle	Poorest (below poverty line)
Piped water on premises	0.59	0.49	0.57
Public tap or standpost	0.13	0.27	0.27
Alternative improved water sources	0.03	0.09	0.07
Unimproved	0.23	0.14	0.07
Do not know	0.01	0.02	0.01

Male-headed households were more likely to have piped water on the premises (60%) than female-headed households (48%). More female-headed households depend on unimproved water sources (23%) than male-headed households (12%). Relations between these variables were also statistically significant (*P*-value <0.001). We found no significant relation between disability and type of water supply, and no significant difference in the reported quantity of water used by households in different income groups.

Sanitation

Across the towns and regions, there was considerable variation in sanitation coverage (Figure 4). Analysing the data following JMP definitions shows overall that more than half of the households have access to improved sanitation (57%), 25% to unimproved sanitation, and 13% defecate in the open. A small percentage of households use facilities that are shared with other households (4%). The finding that 87% of households, on average, have access to sanitation facilities in these 16 study towns is consistent with the results of the household survey under the 2010/11 National WASH Inventory, which estimated that 80% of urban households in Ethiopia have latrines (Hailu Debela 2013).

While 87% of households have access to some type of latrine according to indicators and definitions used by the Ministry of Health, only 3% have access to a private

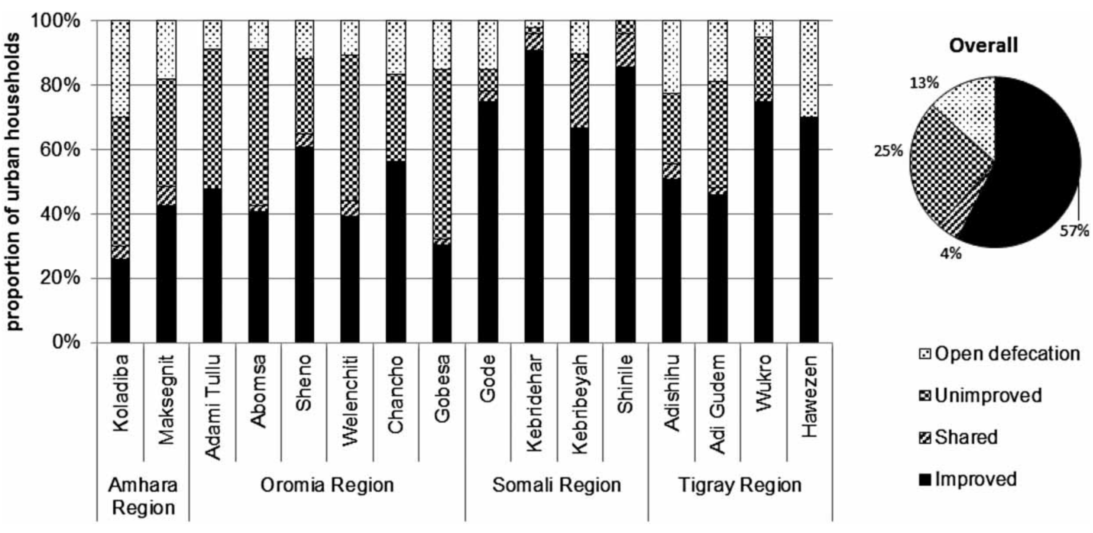

Figure 4 | Access to sanitation by town and for all 16 towns (according to JMP definitions).

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improved latrine with a handwashing facility, slab and ventilation pipe (Figure 5). Three per cent still have access and use the latrine properly when cleaning and maintenance are also included.

None of the households using a latrine with slab, a place for handwashing and a ventilation pipe reported emptying their pit latrine or septic tank from time to time (at least every five years). Overall, only 2% of the households with a latrine reported emptying their latrine pits or septic tanks. Where collected, the human waste was mostly dumped in designated areas without further treatment. The policy agenda is moving towards consideration of the full sanitation chain to manage associated environmental and health risks, and this is clearly a further major challenge beyond the delivery of services to households.

Households were asked about their satisfaction with respect to the cleanliness, comfort, privacy and safety of their sanitation facilities. Combining these into a single satisfaction score using the minimum score across these variables shows a clear trend towards improved satisfaction with improved access and with use of facilities (Figure 6). This appears to show a demand for sanitation.

Inequalities in access to sanitation facilities

As was the case with water supply, access to sanitation facilities by urban households was found to be significantly related with wealth group (P-value <0.001; see Table 2). Access to improved latrines was highest among the richest urban families. In this group, 70% of households had

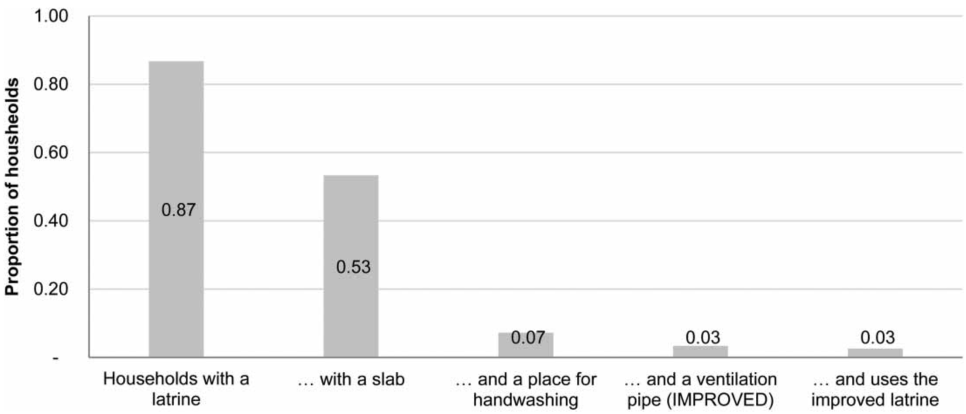

Figure 5 | Sanitation service levels according to multiple criteria (using Ministry of Health definitions).

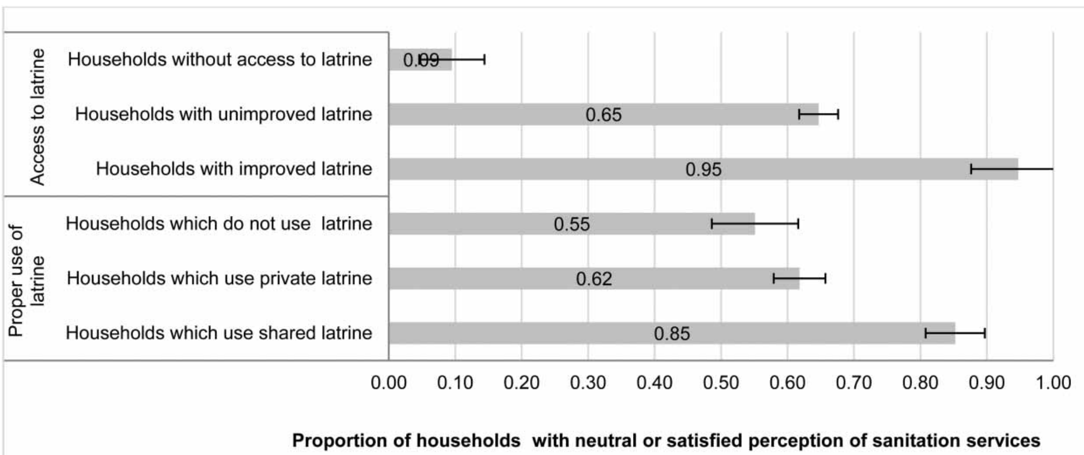

Figure 6 | User satisfaction related to sanitation access and use.

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Table 2 | Proportion of households in each wealth group according to sanitation access

	Richest (above min. wage)	Middle	Poorest (below poverty line)
Improved	0.70	0.53	0.44
Unimproved	0.16	0.26	0.32
Shared	0.03	0.06	0.07
Open defecation	0.10	0.14	0.16

access to improved latrines. Access was lowest among poor families under the poverty line. Only 44% of households in this group had access to improved latrines. The poorest households are also more likely to have unimproved latrines. Open defecation was practised by households within each group, but was most common with the poorest group. Although slightly more male-headed households reported access to improved sanitation facilities, the relationship between gender of the household head and sanitation access was not statistically significant for the total urban sample. There was also no significant relationship between disability and type of sanitation access.

CONCLUSIONS

The high levels of access to water and sanitation in urban Ethiopia reported through both household surveys and sector provider data are found to be consistent with the observed access levels in 16 small and medium towns across four regions. In these towns, 82% of households report using an improved water supply as their main dry season drinking water source (compared to estimates of 84% and 93% reported by JMP and government, respectively), and 61% use improved and shared sanitation facilities (compared to the 67% reported by the JMP).

However, these high official coverage figures based on simple indicators of access provide a limited picture of the realities of service provision for households and (have the potential to) hide poor services.

Actual service levels in these 16 small towns, when assessed against indicators that go beyond potential access to improved sources, are very low and often not meeting norms and standards in terms of water quantity, reliability, accessibility and quality. When GTP I norms are considered, only 9% of households were found to use water supplies that meet standards. When sanitation service characteristics, such as a proper latrine slab, ventilation and handwashing were considered, only 3% had access to or use facilities that meet standards.

It is therefore considered vital that policy-makers look beyond simplistic indicators of water access and consider the quality of services people actually receive. There are risks that public advocacy will be misleading if it is too reliant on basic access data only. At the same time as extending basic services to people that lack access to services, our findings point to a critical need to improve the quality of services provided by existing systems in small towns.

With the adoption of GTP II in 2016, with its higher service norms and standards, there will be an even larger gap between elevated standards and measured service levels. The new standards may be unrealistically high. While 43% of households using an improved water supply source used more than 20 lpcd (the GTP I standard), only 12% of households were found to use an amount meeting the higher GTP II water quantity standards. In sanitation, the policy agenda is embracing the full sanitation chain. However, as shown in this paper, ensuring basic sanitation for all, let alone ensuring the safe treatment and disposal of human waste, remains a massive challenge.

While newer, more ambitious targets can help to focus efforts on improving service levels, together with a range of developments in the enabling environment such as a first national urban sanitation policy, monitoring is currently lagging behind. To track and act upon the kind of service delivery indicators used in this paper, the water and sanitation sectors in Ethiopia will need to develop their indicator frameworks and make more use of a range of different data sources and research, including making more use of household surveys and impact evaluation studies.

While public water supply services in the studied towns were found to be poor for everyone, the poorest households were found to be more reliant upon public standposts. Richer households were found to make more use of unimproved sources, purchasing more water from local private vendors, than poorer groups. Male-headed households were more likely to have piped water on premises. Poorer

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households were also less likely to have latrines, more likely to have unimproved latrines and more likely to rely on open defecation. These findings point to the need to improve services for all households, and to track the services that poorer households and disadvantaged groups receive in order to ensure that gaps in service provision narrow rather than widen as new infrastructure is developed and services are improved.

These gaps between headline performance and the realities of service delivery that people experience need much greater attention if the world is to take its SDGs for water and sanitation seriously.

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