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Research Paper

Equity in access to water supply and sanitation in Ethiopia: an analysis of EDHS data (2000–2011)

Selamawit Seyoum and Jay P. Graham

ABSTRACT

Significant efforts to improve water supply and sanitation (WS&S) in Ethiopia have been made over the past decade, yet it is unclear how progress has affected different segments of the population. This study used data from Ethiopia's Demographic and Health Survey (2000, 2005, and 2011) to assess trends in: 1) access to improved water supplies; 2) use of improved sanitation; 3) use of untreated surface water as a primary source for drinking water; 4) open defecation; and 5) water transport times greater than 30 minutes. Trends were assessed by urban/rural residence, administrative region and education. The study found increases in access to improved water supplies and reductions in open defecation; however, no progress was observed in the use of improved sanitation. Rural households that reported drinking untreated surface water went from nearly one-third in 2000 to one-fifth in 2011. No improvements were found regarding the reported time spent collecting water. Inequities in WS&S remained high across the country, highlighting the need to focus on these differences and target resources towards sub-populations that lack this fundamental necessity.

Key words | environmental health, Ethiopia, inequities, open defecation, sanitation, water

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INTRODUCTION

Access to safe water and proper sanitation are major determinants of preventable diseases in low-income countries, such as Ethiopia (World Bank 2014). According to the World Health Organization (WHO), diarrhea remains the second leading cause of death in children under five years of age – caused primarily by a lack of safe drinking water, poor sanitation and hygiene. Diarrhea is also an important cause of malnutrition in children under five years of age (WHO 2013). In a case-control study conducted in one district of Ethiopia, for example, a reduction in acute childhood diarrhea was found to be positively associated with access to basic sanitation, household water treatment, and the source of drinking water (Godana & Mengistie 2013). Other studies have identified similar associations in Ethiopia (Eshete *et al.* 2009; Anteneh & Kumie 2010; Gebru *et al.* 2014). One study estimated that diarrhea represented a quarter to three-quarters of all childhood

morbidity (Eshete *et al.* 2009), and one study estimated that diarrhea was responsible for about one-tenth to one-quarter of all deaths in under-five children (Shimelis 2008). This research in the Ethiopia context makes it apparent that expanding coverage for improved water and sanitation is the primary preventive measure for diarrheal diseases.

Ethiopia is one of the least economically developed countries globally and has been the recipient of significant donor support to assist the government of Ethiopia in achieving the Millennium Development Goals (MDGs), which ended in 2015 (USAID 2010). In 2015, the WHO/UNICEF Joint Monitoring Programme reported that Ethiopia had made significant progress in the provision of water and sanitation for its citizens (JMP 2014). There has been limited research, however, that has assessed a variety of water supply and sanitation (WS&S) metrics across different sub-populations in Ethiopia. Further, it is unclear if

gains have been equitable across these different segments of the population. Inequity in this analysis refers to differences in WS&S coverage levels among households in rural and urban areas, households in different administrative regions as well as across households with different educational attainment (One Wash 2013).

METHODS

The data used in this analysis were downloaded from the Demographic and Health Survey (DHS) Program website. Specifically, household datasets of the Ethiopia Demographic and Health Survey (EDHS) for the years 2000, 2005, and 2011 were downloaded (EDHS 2000, 2005, 2011). EDHS is nationally representative, and the household sample sizes of the surveys were 14,072, 13,721, and 16,702 in the 2000, 2005, and 2011 EDHS, respectively. In addition to English, the survey questionnaires were translated into three major languages – Amharigna, Oromiffa, and Tigrigna. The sample is representative at a national, residence (i.e., urban/rural), and regional level. For cities, the sampling frame is defined by that country’s census bureau. Sampling is typically based on a stratified two-stage cluster design. The first stage uses census files to identify enumeration areas (EAs), small administrative units with defined boundaries and a known population size. Most surveys select 300–500 EAs with the probability proportional to population size. In the second stage, an updated listing of households in each selected EA is used from which sample households are drawn (DHS Methodology 2012).

The study included five measures of access to WS&S, which were estimated based on EDHS data:

- % of households with access to an improved water supply
- % of households with access to improved sanitation
- % of households that report spending 30 minutes or more collecting water
- % of households reporting to engage in open defecation
- % of households reporting untreated surface water as the primary source of their drinking water.

Data from the EDHS were categorized as improved or unimproved based on WHO/UNICEF Joint Monitoring Programme definitions of improved WS&S (JMP 2014). Three

variables (% of households reporting open defecation; % of households reporting use of untreated surface water; and reported time spent collecting water) were selected to explore access for households facing the most extreme conditions in Ethiopia. Time spent collecting water was a separate question in the EDHS that asked, ‘How long does it take to go there [to the household’s water source], get water, and come back?’ Research has suggested that if total travel time to collect water is greater than 30 minutes, households tend to collect less than is needed to meet basic human needs (Howard & Bartram 2003). The prevalence of households reporting the use of untreated surface water was assessed using survey responses on the source of drinking water and on treatment of drinking water. Given that there is the possibility that households may treat their water to make it safe to drink, this study focused on households who use surface water – the worst form of unimproved water sources – without any treatment. The 2000 EDHS questionnaire did not include a question on whether water used for drinking was treated or not. Therefore, the percentages for households from the 2000 EDHS reflect surface water use and do not determine whether point of use treatment was carried out.

For this study, descriptive statistics were conducted using SPSS Version 22.0. The DHS household sampling weight to account for over- or under-sampling was applied in all analyses (DHS Methodology 2012).

RESULTS

Trends on use of surface water and access to improved water

Between 2000 and 2011, Ethiopia experienced significant reductions in the percentage of households consuming untreated surface water, including from rivers, dams, lakes, ponds, streams, canals, and irrigation channels. In 2000, 31% of households were using surface water, while the proportion of the population using untreated surface water reduced to 22.5% and 14.7% in 2005 and in 2011, respectively (Figure 1(a)). Use of water from other, safer sources increased consecutively in the corresponding years. There was a dramatic increase in the use of improved water in the first five years (from 25.3% in 2000 to 61.4% in 2005)

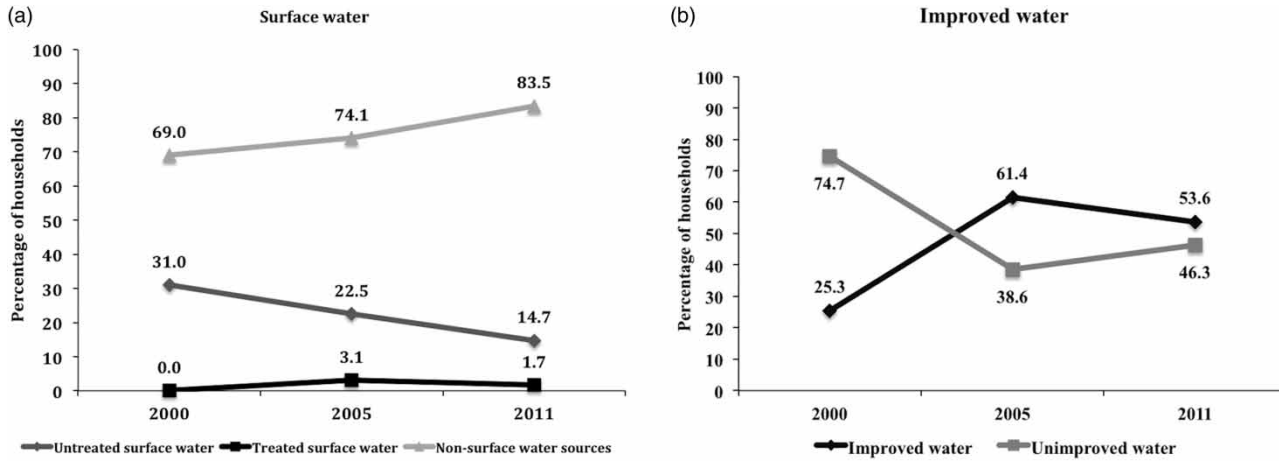


Figure 1 | Proportion of Ethiopian households using untreated surface water (a) and improved water (b) in the years 2000, 2005, and 2011.

(Figure 1(b)). However, this was reversed in 2011 and only 53.6% of the households reported access to improved water.

A major decline in the use of untreated surface water was observed among rural households, going from 35.7% in 2000 to 28.7% in 2005, and 20.6% in 2011 (Figure 2(a)). In urban areas, the percentage of households that used untreated surface water decreased from 7% in 2000 to 0.5% in 2005; however, it increased to 0.9% in 2011. Consumption of water from improved sources by urban households increased steadily from 86.1% in 2000 to 93.7% in 2005, and 94.3% in 2011 (Figure 2(b)). A much higher pace of progress was observed in the use of improved water by rural households between the years of 2000 and 2005, with a 42.5 percentage point increase in access. After 2005, however, a 14.3 percentage point decline occurred. Despite the improvement, over half of the rural

population (58.3%) still used unimproved water in 2011, while that is true only for 5.7% of the urban population.

A closer look into the various administrative regions revealed that Affar had much higher levels of its population using untreated surface water across the three surveys (Figure 3(a)). Use of improved water was high in Addis Ababa, Dire Dawa, and Harari compared to the other administrative regions. Among the regions, Tigray led with 68.8% of its households accessing improved water sources followed by Gambela, where improved water was accessed by 66.7% of the households (Figure 3(b)). In Somali, Affar, Oromia, and Southern Nations Nationalities and Peoples (SNNP), less than half of the households had access to improved water. The number of households with access to improved water in Afar, Somali, Gambela and in Addis Ababa increased between the years 2005 and 2011. A

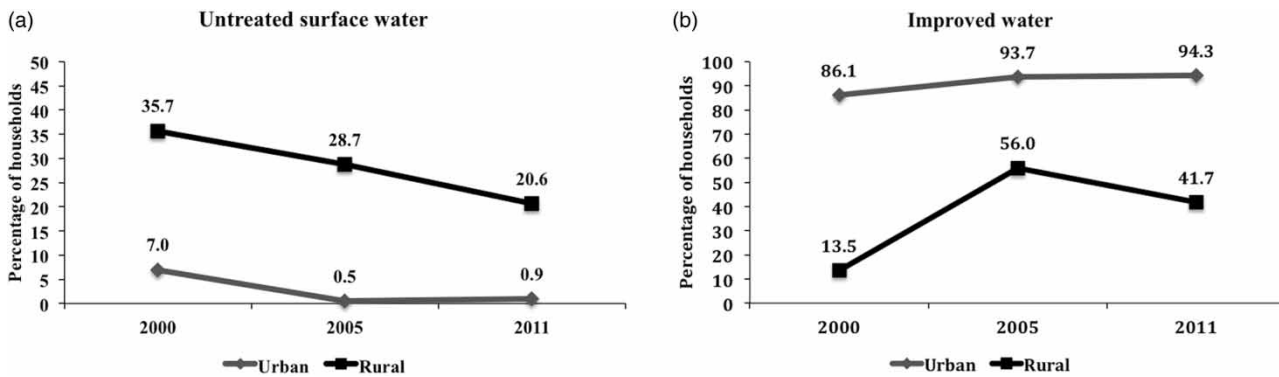


Figure 2 | Proportion of Ethiopian households, by urban/rural residence, using surface water (a) and improved water (b) in the years 2000, 2005, and 2011.

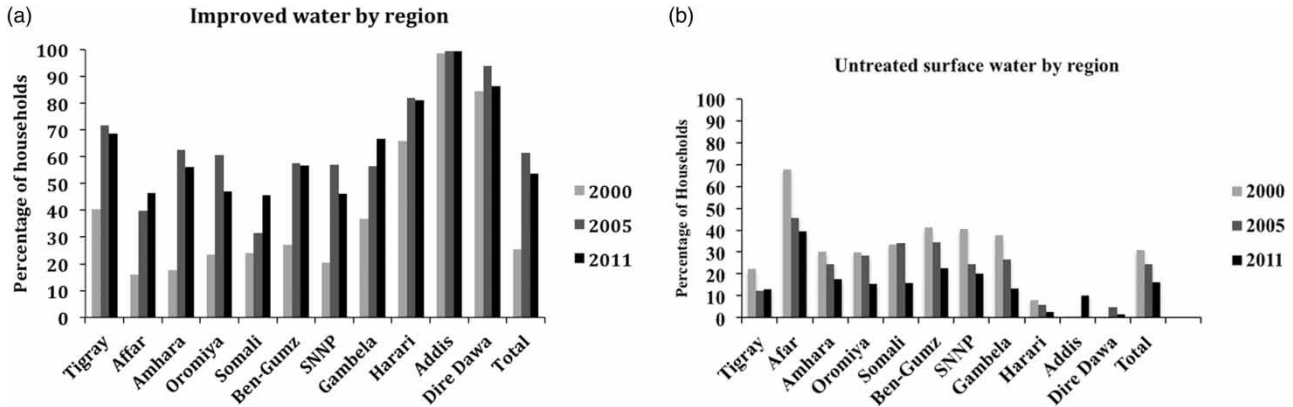


Figure 3 | Trends and inequities in use of untreated surface water (a) and improved water (b) among Ethiopian households in the various administrative regions.

decline in access to improved water was observed in the rest of the regions between 2005 and 2011.

Use of untreated surface water steadily declined across all administrative regions during the ten-year period. A small proportion of households in Addis Ababa used untreated surface water in 2000 (0.2%) and in 2005 (0.4%) and no one reported this source in 2011 (Figure 3(a)). In the first five years, Dire Dawa city administration went from zero in 2000 to 4.8% in 2005 and then to 1.6% in 2011. Harari came in third with only 2.6% of households using untreated surface water in 2011. Among the rest of the regions, Tigray had the lowest percentage of households (12.5%) reporting the use of untreated surface water in 2011, followed by Gambela (13.5%). A major decline in the use of untreated surface water between the years 2005 and 2011

was observed in Somali (18 percentage points), Gambela (12.3 percentage points), Oromia (12.3 percentage points), Ben-Gumuz (11.6 percentage points), Amhara (6.9 percentage points) and Afar (6.2 percentage points).

As shown in Figure 4(a), over 12.5% of Ethiopian households had water on their premises in 2011, implying a 12-percentage point increase compared to in 2000. The proportion of the households spending up to 10 minutes collecting water dropped from 21.1% in 2000 to 18.0% in 2011 despite the increase in 2005 (25%). The proportion of households spending 10–30 minutes to get water declined steadily from 42% in 2000 to 36% in 2005, and to 34% in 2011. There was a slight increase in the proportion of households that spent 30–60 minutes collecting water in the ten-year period. The rural/urban analysis of time to collect water

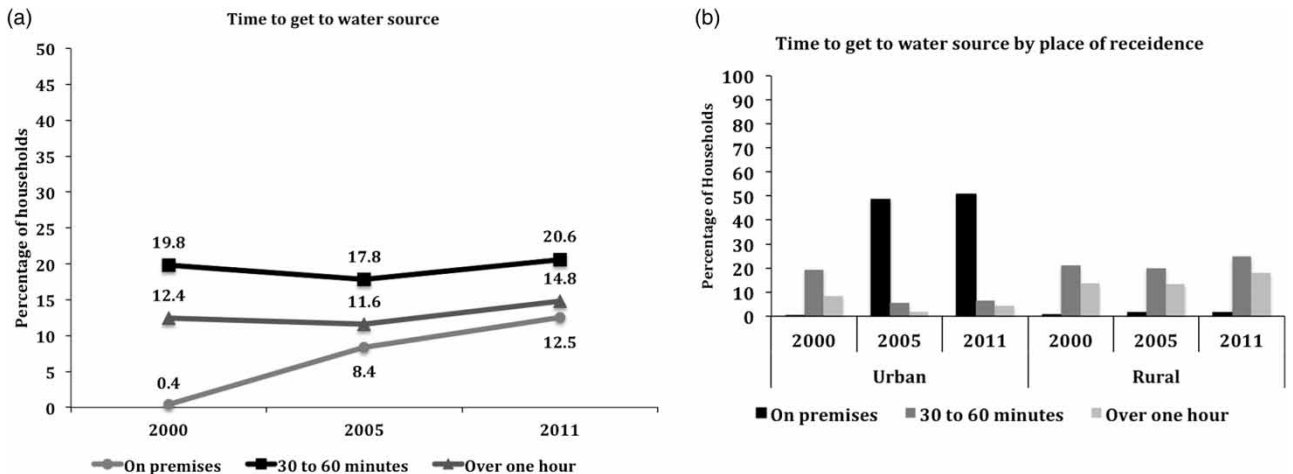


Figure 4 | The proportion of all Ethiopian households (a) and urban/rural households (b) spending different amounts of time to collect water.

revealed the most significant disparity in accessing water among the rural and urban households. Over half of the population in the urban households (50.7%) accessed water on premises in 2011, while only 1.4% of the households in the rural areas accessed water on premises (Figure 4(b)). Water access on premises increased significantly between 2000 and 2005 for the urban households and continued to improve steadily in the next five years. For the rural households, in contrast, progress in accessing water on premises was minimal. A slight regression was observed within the next five years, as the percentage of rural households reduced to 1.4% in 2011 from 1.6% in 2005. An increased trend of households spending 30–60 minutes and over an hour to get to the water source was observed both in the urban and rural communities.

There was a significant association (chi square, $p = 0.000$) observed between the use of untreated surface water and the level of household educational attainment. The proportion of households that consumed untreated surface water was higher among households with no education, with steady decreases from 33.1% in 2000 to 26.9% in 2005 and to 19.9% in 2011. Only 7.6% of the households with higher education in 2000 used surface water. In 2005, no household with higher education used untreated surface water. In 2011, however, almost 3% of households with higher education used untreated surface water. A steady decline was observed in the use of untreated surface water among households with no education, primary education, and secondary education during the ten-year period. The most progress was observed among households with primary education (18.7 percentage points), followed by households with no education or preschoolers

(13.2 percentage points) and households with secondary education (12.6 percentage points). The steady decrease in the use of untreated surface water across households with different educational attainment was consistent with the overall reduction in the use of untreated surface water in the country.

There was a significant association ($p = 0.000$) between level of education and use of improved water. Figure 5(b) illustrates the positive association between education and access to improved water as well as the trends from 2000 to 2015. Less than 50% of the households with no education had access to improved water in 2011, while 84.7% and 89.4% of the households with secondary and higher education, respectively, had access to improved water in the same year. Steady progress was observed in accessing improved water among households with no or preschool education, primary education, and secondary education in the ten-year period. The percentage of households with higher education and with access to improved water decreased from 95.1% in 2005 to 89.4% in 2011.

Open defecation and access to improved sanitation

The proportion of households practicing open defecation was reduced from 81.9% in 2000 to 61.9% in 2005, and to 38.3% in 2011. This represented a 43.6 percentage point reduction within ten years. The results show a slight decrease (18.0% in 2000 to 17.8% in 2011) in the use of improved sanitation. The decline was higher in 2005, with only 13% using improved sanitation. A reduction in the proportion of households using improved sanitation was observed in urban areas (Figure 6(b)).

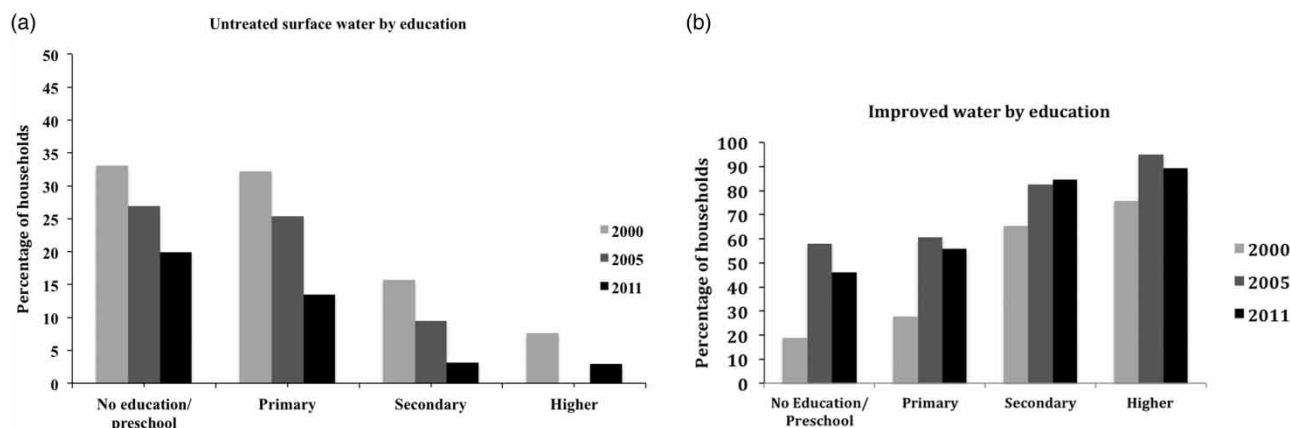


Figure 5 | Use of untreated surface water (a) and use of improved water (b) by level of education in Ethiopia in the years 2000, 2005, and 2011.

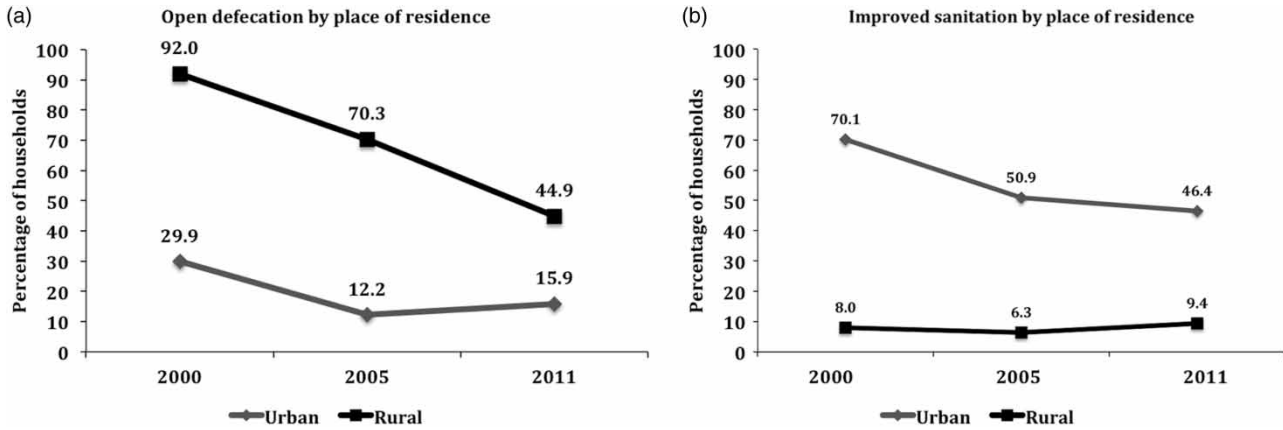


Figure 6 | Proportion of urban/rural households practicing open defecation (a) and using improved sanitation (b) in Ethiopia in the years 2000, 2005, and 2011.

There was a 4.5 percentage point decrease in urban households that used improved sanitation in the years 2005 and 2011, while there was a 3.1 percentage point increase in the proportion of rural households that used improved sanitation in the same time period. In 2011, 82.1% of the population used unimproved sanitation, of which 90.6% was in rural areas and 53.6% in urban areas. The urban/rural analysis showed the prevalence of open defecation was much higher in rural areas. Even though the results showed a lower prevalence of open defecation in urban areas in general, the proportion of households practicing open defecation increased to 15.9% in 2011 from 12.2% in 2005.

While there was a remarkable reduction in the practice of open defecation in most of the administrative regions, the two city administrations, Addis Ababa and Dire Dawa,

observed increases in the practice between the years of 2005 and 2011. There was a 1.7 percentage point increase in the households who practiced open defecation in the capital city Addis Ababa in the years between 2005 and 2011.

In the country’s second city administration, Dire Dawa, the prevalence of open defecation went down very slowly, with a 0.4 percentage point change between 2000 and 2011. The most significant improvement in shrinking the number of households practicing open defecation was observed in the state of SNNP, where there was a 56.5 percentage point difference between 2000 and 2011. As shown in Figure 7(a), among the rest of the regions Tigray made the most improvement with a 31 percentage point reduction in the proportion of households that practiced open defecation between 2005 and 2011. Other reductions

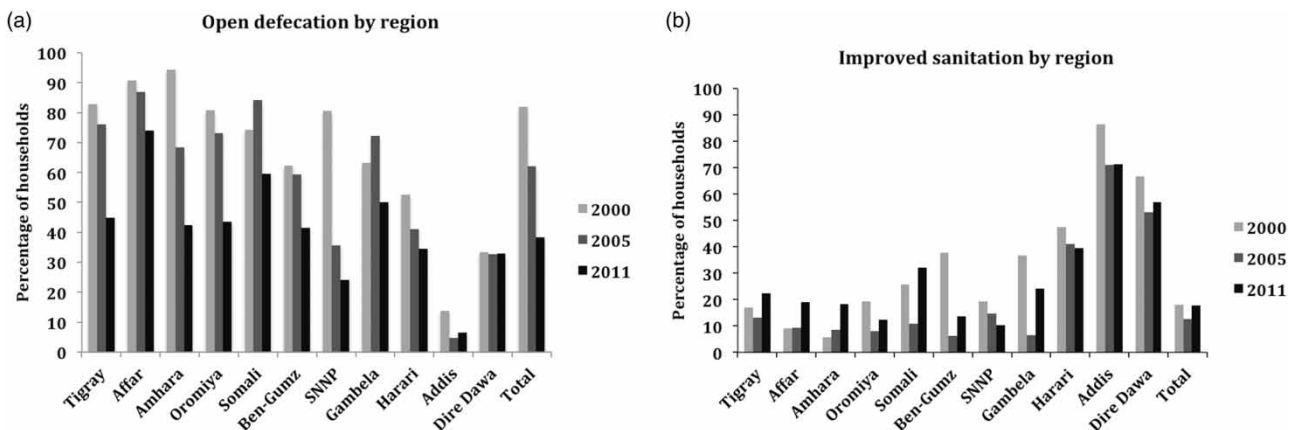


Figure 7 | Trends and inequities in the prevalence of open defecation (a) and improved sanitation (b) among Ethiopian households in different regions in the years 2000, 2005, and 2011.

were observed by: Oromia (29.7 percentage points), Amhara (26 percentage points), Somali (24.7 percentage points), and Gambela (22.3 percentage points) – all of which made improvements by reducing the households practicing open defecation in the five-year time frame. Affar, one of the two states with a higher prevalence of open defecation (e. g., over 90% of the population practiced open defecation in 2000), had a much slower pace in reducing the open defecation. Affar and Somali are the two states where over 50% of the population practiced open defecation in 2011.

While the households in the Somali region (a 21.3 percentage point increase) and Gambela (a 17.8 percentage point increase) observed increased access to improved sanitation in the years 2005 and 2011, SNNP and Harari regressed within the five-year timescale (Figure 7(b)). The other states with a relatively higher proportion of households accessing improved sanitation in 2011 were Tigray (22.3%), Affar (19%), and Amhara (18.2%), each with over 9 percentage point increases between 2005 and 2011.

The practice of open defecation decreased with the increase in educational attainment level of the households (Figure 8(a)). In the year 2011, only 5.5% of households with higher education practiced open defecation. The largest decline in the practice of open defecation was observed among households with primary education, with a percentage point difference of 44.7 between 2000 and 2011, followed by households with no education with 42.8 percentage points and households with secondary education with 25.8 percentage points.

A positive association was observed between educational attainment levels and access to improved

sanitation (Figure 8(b)). Households with higher education had better access than those with no education or primary education (Figure 8). In 2011, there was a 43.7 percentage point difference between the proportion of households with improved sanitation among those with higher education and those with no education. There was a moderate increase (more than 4 percentage points) in access to improved sanitation among households with no education, primary education, and secondary education between 2005 and 2011.

DISCUSSION

In the year 2000, Ethiopia faced high levels of open defecation and use of untreated surface water – a scenario that puts the public's health at risk and can affect economic development. This analysis showed that during the time period from 2000 to 2011, the most consistent gains for Ethiopia and public health were reductions in the use of untreated surface water and the practice of open defecation. Between the year 2000 and 2011, Ethiopia halved the proportion of the population using untreated surface water. Almost all states experienced a reduction in the use of untreated surface water. Major improvements were observed in Gambela, SNNP, and Somali, where the percentage of households using untreated surface water more than halved between 2000 and 2011. Another big achievement was the eradication of the use of untreated surface water in one of the city administrations, Addis Ababa. Even though there are a few households (0.5%) still without access to improved

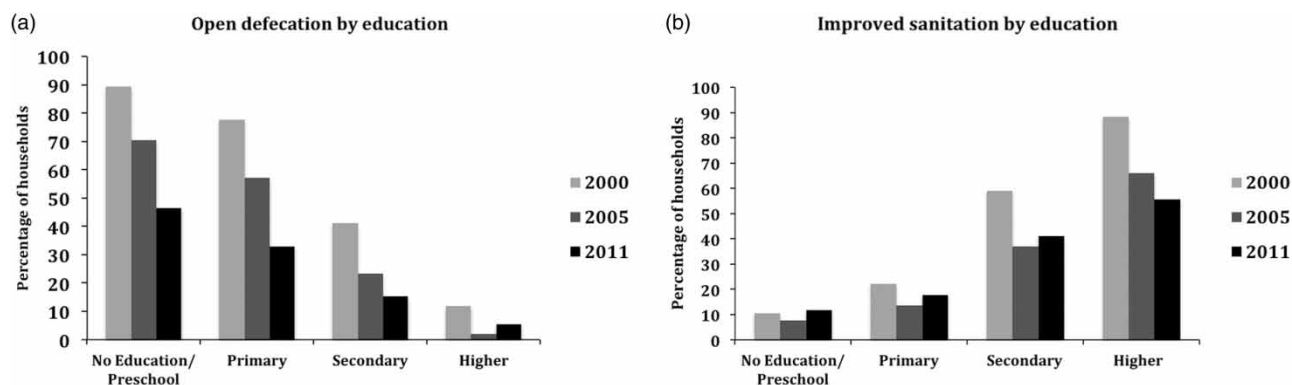


Figure 8 | Relationship of educational attainment with prevalence of open defecation (a) and improved sanitation (b) in Ethiopia in the years 2000, 2005, and 2011.

water, the practice of using untreated surface water basically ended in 2011 for residents in the capital city. Likewise, the proportion of the population practicing open defecation was more than halved within the ten-year period.

The analysis revealed the country's struggle to increase access to improved water and improved sanitation, as defined by the WHO/UNICEF Joint Monitoring Programme (JMP 2014). While the reduction in open defecation should greatly reduce exposure to fecal pathogens and reduce environmental contamination, it is unclear how unimproved toilets will be sustained over time. This is critically important if these unimproved sanitation systems are not able to break the fecal-oral route of disease, which could lead to epidemics of diarrheal diseases (Cabral 2010). A case in point was the 2006 outbreak of *Vibrio cholerae* 01 in Oromia region (Bartels *et al.* 2010).

The positive changes in open defecation are likely attributable to the nationwide intervention of health extension workers (HEWs), whose major tasks include working with households to improve water quality, sanitation and hygiene (Mehta & Bongartz 2009; CNHDE 2011). An evaluation study of the HEW program, for example, attributed the coverage of 'improved toilets' for 64.4% of the population to the intervention of HEWs. However, the same report defined 'improved toilet' as 'having any toilet facility that at least provides containment of the feces so that it could not be washed down by surface run-offs and also denies open access to flies as in open field defecation' (CNHDE 2011, p. 29). This definition is equated to the category of 'unimproved sanitation' as defined by WHO/UNICEF. Furthermore, the same evaluation study noted that hygienic utilization of toilets, which includes the practice of defecating on the slab or floor of the latrine or outside around the latrine, was very low (13.3%). Apart from the nationwide intervention to reduce open defecation, administrative regions like SNNP have conducted aggressive programs driven by the local government and the community, as well as by non-governmental organizations (NGOs). SNNP's universal sanitation campaign, initiated by the local health bureau in 2003, gained momentum in the mass construction of latrines for households (Mehta & Bongartz 2009). This initiative was later followed by PLAN Ethiopia, which launched its community-led total sanitation (CLTS) program in several kebeles (the lowest

administrative structure) in SNNP in 2007, which resulted in open-defecation-free communities across the region (Mehta & Bongartz 2009; Sah & Negussie 2009). This is consistent with the finding of our EDHS analysis, which revealed the lowest prevalence of open defecation in the SNNP compared to the other eight administrative regions.

According to the current EDHS analysis, the reduction of open defecation neither decreased the prevalence of unimproved sanitation nor increased access to improved sanitation. Unimproved sanitation remained almost the same between the years 2000 (81.9%) to 2011 (82.1%). Thus, Ethiopia did not meet the MDG sanitation target. This signifies the need to fine-tune approaches like CLTS to also target increasing improved sanitation and creating more resilient sanitation systems.

In contrast, access to improved water increased substantially over the ten-year period. The JMP reported that 52% of the population had access to improved water in 2012 (JMP 2014). This is somewhat similar to the finding of this study, where 53.6% of households reported using improved water in 2011. There has been a major effort since 2000 in expanding coverage of improved water, and remarkable progress towards achieving the water-related MDG target. The overall decline of access to improved water between the years 2005 and 2011 is mainly a result of disparities among the various regions to access improved water. The regions where a decline in access to improved water occurred during the last five-year time period included Oromia (with a 13.5 percentage point difference), SNNP (with a 10.8 percentage point difference), and Amhara (with a 6.4 percentage point difference). Particularly in SNNP and Oromia, less than half of their respective populations had access to improved water. In addition to the low coverage with improved water, significant variability in institutional capacities has been documented in woredas (the third level administrative units) and kebeles across Oromia and SNNP (Social Assessment 2013). For Oromia, with the majority of its population being rural (87.8%), and SNNP having largely pastoralist communities, water supply coverage to remote areas and informal settlements has been minimal. Cognizant of the inequities among the regions and communities within regions, the One Wash National Program (OWN-P), a program established to focus on expansion of WS&S, conducted a social

assessment in three regions to learn about existing inequities and draw strategies to address them (Social Assessment 2013). As the OWN-P was intended to be implemented in two phases starting in 2013, the impact of this national program was not captured in this EDHS analysis as the latest EDHS data were collected in 2011.

Even though the country showed commendable progress in the reduction of open defecation nationwide, there is a significant disparity observed in the pace of reducing the practice among the different regions. Particularly, the results show worse conditions growing in the state of Affar, where alongside the Amhara region the highest prevalence of open defecation was recorded in 2000. Affar and Somali are the two states that need more attention in their efforts to reduce open defecation. As shown in Figures 3(a) and 7(a), the prevalence of open defecation and use of untreated surface water is high in Affar compared to the rest of the administrative regions. Socio-cultural and geographical characteristics of Affar are likely to adversely affect the progress of WS&S in the region. With predominantly a pastoralist population, the Affar community has unique norms of managing water and other resources (OWNP 2013; Social Assessment 2013). A high prevalence of drought and water related conflicts are also likely important factors in the poor WS&S coverage in the region. Lack of coordination between government and NGO interventions and integration of the community's unique norms have potentially limited the success of interventions in the area (Social Assessment 2013).

Despite the urban characteristics of Dire Dawa, there is a high prevalence of open defecation (32.9%) compared to Addis Ababa, where 6.5% of households practice open defecation. This reflects the proportion of urban slums, where the poorest and the most disadvantaged households with no access to WS&S exist (Social Assessment 2013). There was almost no progress in the ten-year time period in reducing the practice of open defecation in Dire Dawa. This needs further studies in terms of the factors that influence the WS&S characteristics of the city. Even though the highest percentage of the population in the two administrative cities had a moderate level of access to improved sanitation, there was minimal progress between 2005 and 2011 compared to progress made in other states. This lack of progress is likely attributable to rapid urban population

growth due to the influx of rural populations, which has likely overwhelmed municipal governments (Mosello *et al.* 2015).

The trends showed increased access to improved water in urban areas, where already the majority of the population (93% and 94% in 2005 and 2011, respectively) used improved water; whereas in the rural areas access actually declined, leaving 58.3% of the population out of the reach of improved water in 2011. The pace of improved water coverage in rural areas was encouraging between 2000 and 2005, however it gradually dropped in the following five years.

Disparities among the urban and rural households was more evident in the results on the time households spent collecting water. Over half of the urban population accessed water on premises in 2011, while this was true only for 1.4% of the rural households. Similarly, inequity of access to improved sanitation across urban and rural households remained almost constant through the ten-year period. Less than 10% of rural households relied on unimproved sanitation, while nearly half of urban households (46.4%) had access to improved sanitation. Among the urban households, the majority accessed improved water both in 2005 and 2011; this was not the case for the rural population. Potential drivers for this urban/rural disparity are multifaceted, including technical challenges, barriers in reaching remote areas, high costs, climate change that results in increased rainfall variability and frequent drought, conflicts within some regions, informal settlements in pastoralist communities, the growing population along with competing water demands for agricultural purposes and household use, limited governance, NGOs and private sector involvement, and lack of community management of WS&S that targets sustainability (Bartels *et al.* 2010; Social Assessment 2013; Mosello *et al.* 2015).

Other researchers have documented the association between household education and access to WS&S (Hulland *et al.* 2015). This EDHS analysis also showed similar associations. As educational attainment is generally highly correlated with wealth levels (Howe *et al.* 2015), the association observed between educational level and access to WS&S is also indicative of a positive association between socio-economic status and access to improved WS&S.

Declining access to WS&S among households with higher education, in the years between 2005 and 2011,

could indicate the expansion of education in areas where improved water and improved sanitation are still out of reach, or the relocation of those households with higher education to areas without access to improved water and sanitation during the five-year time period.

Apart from the spatial, socio-economic disparities, population growth and climate variation that disadvantaged some communities in accessing WS&S, institutional capacities, funding, and limitations of monitoring and evaluations are factors that need to be reviewed in order to address the equity and sustainability of WS&S in the country (United Nations 2014; Mosello *et al.* 2015). Since the last EDHS data collection in 2011, there have been governmental, NGO, international, and bilateral initiatives to increase WS&S coverage and address inequities. There have been a number of new programs established to address the problem of WS&S and reduce inequities in access (Mekonta *et al.* 2015; WHO 2015). As an example, the OWN-P, launched by the Ethiopian government in 2013, aims to promote coordinated, cost-effective, and innovative approaches towards WS&S service delivery in order to reduce inequities and expand universal coverage (One Wash 2013). Future analyses, such as an analysis of the next EDHS data, will be beneficial to learning about the change in trends of WS&S coverage in the country and equity status.

CONCLUSION

The findings of this WS&S trend analysis show that Ethiopia has made significant progress in reducing the use of untreated surface water as a primary source of drinking water and reducing the practice of open defecation. The country, however, has not been able to effectively expand access to improved sanitation. The study also highlighted inequities in access to WS&S in the various regions of the country, as well as by residence. The majority of rural households continued to rely on unimproved water sources and unimproved sanitation. The prevalence of open defecation in the city of Dire Dawa remained high during the ten-year time frame of the study, while the practice was eradicated in the other city administration, Addis Ababa. Moving forward, the focus should be on ensuring that programs and

approaches adequately address the spatial and socio-economic inequities in the WS&S sector through improved monitoring and evaluation. Ending the worst WS&S practices, including the practice of open defecation and use of untreated surface water as a source of drinking water, as well as long water collection times, will be essential for health and development in the country.

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