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A study of water and sanitation access trends in Peru: where do inequities persist?

Betsy Eagin and Jay P. Graham

ABSTRACT

Peru has made significant progress in increasing access to water supply and sanitation (WS&S). It is unclear, however, if improvements have been equitable and whether certain sub-populations are making equivalent progress. This study explored trends in access to WS&S throughout Peru using data from Demographic and Health Surveys. The study focused on the worst forms of household-level WS&S access, including use of untreated surface water and the practice of open defecation (OD). The prevalence of access and the average annual percentage point change in access were analyzed by quintiles of wealth, urban and rural residence, political regions of Peru, and language for the years 2000, 2004, and 2008. The findings indicate that significant progress in access to WS&S has been made in Peru, but that several sub-populations remain underserved. Regions experiencing high levels of OD made dramatic improvements between 2000 and 2008. The poorest urban populations showed an increasing prevalence of OD, and in some cases surpassed poor, rural populations. The use of untreated surface water was reduced between 2000 and 2008, and remained below 5% for the country. An increased focus on targeting high risk populations to improve equity in access is recommended.

Key words | demographic and health survey, hygiene, Peru, inequity, sanitation, water

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INTRODUCTION

While much of the focus in development has been on moving people higher up the water supply and sanitation (WS&S) ladder, a small but significant proportion of the population has yet to start the climb. Equity is an important aspect of improving access to WS&S in a country, but is rarely documented. Measures of equity in WS&S may consist of the prevalence of access by location (e.g., urban versus rural populations), wealth, gender, education, disability, religion, and ethnicity (Trevelt & Luyendijk 2010; WHO/UNCIEF 2011). Equity can also be noted in the rate of change between two points in time for these same sub-populations. Post-2015 Millennium Development Goal (MDG) discussions have emphasized the importance of monitoring equity, given that progress at the regional or country level may not reflect the reality of vulnerable or marginalized populations (WHO/UNICEF 2012a).

Peru has experienced positive economic growth and made great strides in improving health and development statistics in the last decade. Peru, like many countries in South America, is on track to meet the MDG of reducing by half the population lacking access to improved water supplies. Peru has made progress in improving access to improved water supplies, with more than 7 million people, or 21% of the population, having gained access to an improved source since 1995 and only an estimated 1.2 million people (4.5%) still rely on collecting surface water for their household water supply (WHO/UNICEF JMP 2010).

Peru is also on track to reach the improved sanitation target with nearly 23% of the population (6.8 million people) having gained access to improved sanitation since 1995 (WHO/UNICEF JMP 2010). Despite this, access to sanitation in Peru seriously lags behind access to water and many of the disparities in access to water exist to a greater extent for

measures of sanitation. The 2010 WHO/UNICEF Joint Monitoring Program (JMP) estimated that more than 2.8 million people, or 7% of the population, in Peru still practice open defecation (OD) (WHO/UNICEF JMP 2010).

A small number of studies have analyzed access to WS&S in Peru beyond geographic disparities. Demographic and Health Surveys (DHS), for example, often include access levels at the regional and urban/rural levels. A 2006 environmental health survey of Peru reported inequities in WS&S access by wealth, education level, and region (Rutstein & Klescovich 2009). A more limited number of studies, however, have documented changes in access over time (Rutstein & Klescovich 2009). In the one study we found that characterized changes in WS&S access over time, from 2007 to 2011, the data were analyzed based on quartiles of poverty only (INEI 2012). While cross-sectional studies are able to show those with improved access, an analysis of trends over time, within different social and economic groups can help to highlight where more attention is needed.

While national-level statistics indicate that Peru has met the MDG for increasing access to water and for sanitation, it is less clear how improvements in WS&S vary among different sub-populations. This study aimed to explore access to water and sanitation throughout Peru, with a focus on trends among sub-populations that may be making differential progress.

METHODS

Data were extracted from the United States Agency for International Development and Instituto Nacional de Estadística e Informática (INEI) supported DHS. The DHS in Peru is a nationally representative household survey with large samples of households that included: 28,900 in 2000; 20,440 in 2004–2006; and 25,633 in 2007–2008. The surveys were conducted in Spanish using DHS phase IV and phase V Questionnaires. Descriptive statistics and trend analyses were conducted using STATA SE[®] and maps were created using ArcGIS[®].

Drinking water

The prevalence of households reporting the use of untreated surface water was assessed using survey responses to

questions on the households' source of drinking water and whether they report treatment of drinking water. While the focus of the MDGs is typically on access to an 'improved' source of drinking water, many public health interventions have focused on point-of-use water treatment for those whose access to improved water sources may face economic and/or political barriers. Furthermore, this category of households likely represents the worst scenario in terms of exposure to microbiologically contaminated water. Therefore this study analyzed those who use surface water without any treatment.

Sanitation

Household sanitation status was defined using the DHS question on the type of toilet facility typically used by the household. The worst form of sanitation, OD, was used as the main outcome variable as it potentially impacts not only the health of an individual but that of the community. Neither shared sanitation nor traditional latrines were included in the analysis, as their quality (improved/unimproved), was not consistently reported in the DHS surveys used.

Wealth and ethnicity

Household wealth was defined using the DHS wealth index. The index is a composite measure of a households' living standard and is calculated using data on household ownership of selected assets (e.g., housing construction materials) and is created by principal component analysis (Measure DHS 2013). No variable for ethnicity was available. Instead, language spoken by females in a household was used as a proxy for Peru's ethnic groups. As non-Spanish speaking households are a minority, they were grouped into one category, and compared to the Spanish speaking majority.

RESULTS

Drinking water

The consumption of untreated surface water – generally considered the worst scenario – among the poorest groups of

Peruvians has decreased since 2000. Among the poorest quintile of households, the use of untreated surface water decreased from 12.1 to 8.9%, while all other quintiles observed limited, if any, change. The gap between the poorest and poor quintiles was most significant, while the poor, middle, richer, and richest quintiles were all close in prevalence (Figure 1(a)).

The prevalence of consuming untreated surface water in rural areas was halved from 7.2% in 2000 to 3.3% in 2008. The prevalence in urban areas was also halved, remaining close to zero (Figure 1(b)). The use of untreated surface water by Spanish speakers was cut in half since 2000, and a similar decrease was seen among non-Spanish speakers; however, 1.6% of the non-Spanish speaking population continued to use untreated surface water, compared to less than 0.6% of the Spanish speaking households (Figure 1(c)). The gap between Spanish speakers and non-Spanish speakers

narrowed significantly between 2000 and 2004, but has since held steady, despite significant declines in use in both populations.

When analyzed by region (see Figure 2), there was significant variation in the progress made towards reducing households' use of untreated surface water. The region with the highest percentage of the population using untreated surface water was Loreto with more than 10% of households reporting to use this water source. The lowest prevalence of consumption (0%) was found in the western regions of Callo, La Libertad, and Junín. The average annual percentage point change in use of untreated drinking water remained nearly steady for more than ten regions (changes of less than 1%), while four observed a slight increase between 2000 and 2008. The largest declines were observed in regions that continued to have the highest percentages using untreated surface water. Untreated

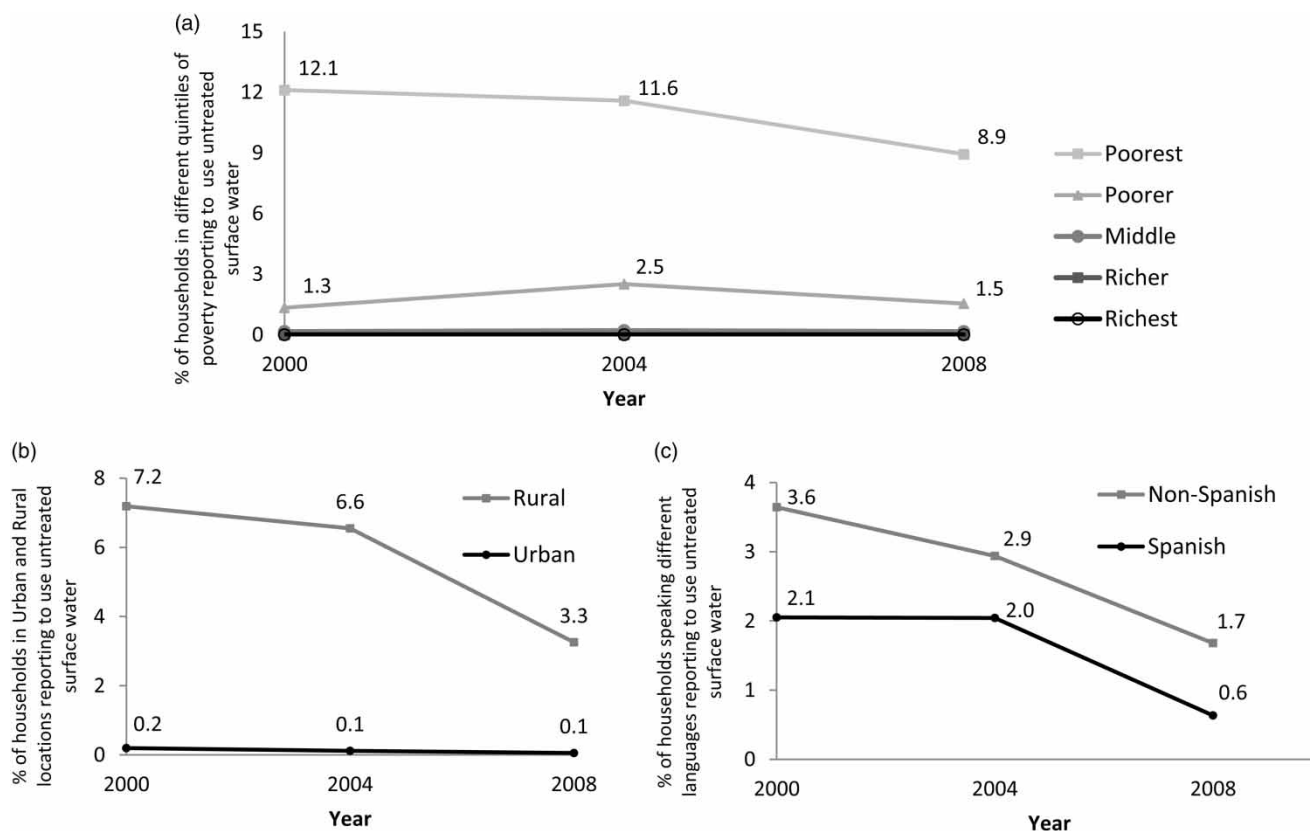


Figure 1 | Percent of households reporting the use of untreated surface water: (a) by wealth quintile; (b) by urban/rural residence; and (c) by language (Spanish or non-Spanish speaking).

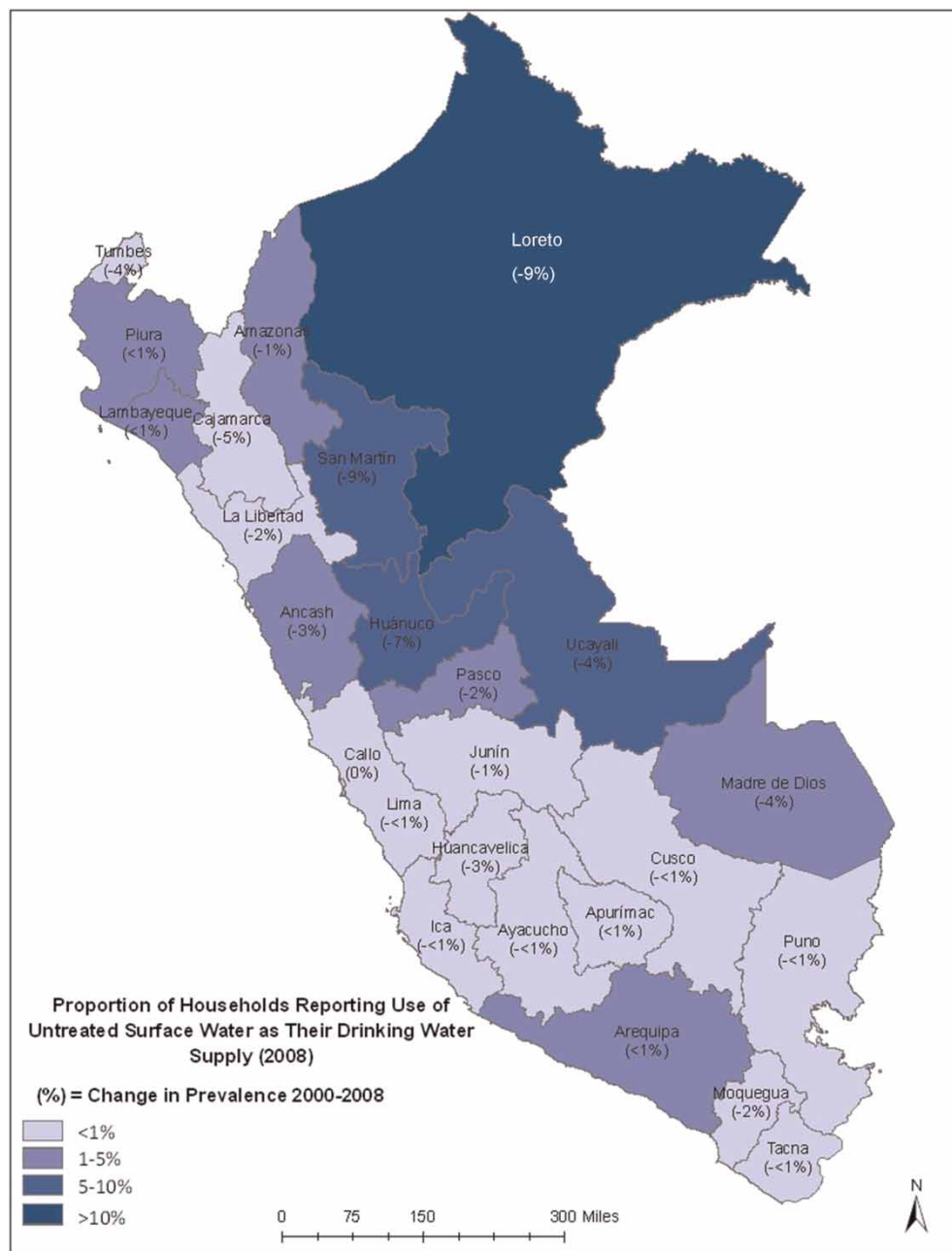


Figure 2 | Percentage of households reporting use of untreated surface water in 2008 (represented by different shading) and the change in prevalence between 2000 and 2008 (represented by the percentage under the region name).

surface water use increased in four regions between 2000 and 2008. Between 2000 and 2004, the prevalence in Ucayali was cut in half; however, it increased slightly between 2004 and 2008. In many regions, however, the prevalence of using untreated surface water remained steady between 2000 and 2008.

Sanitation

Trends in sanitation were similar to those of untreated surface water. Greater disparities, however, existed between many groups and nearly twice as many Peruvians practiced OD than consumed untreated surface water. The prevalence

of OD in Peru in 2000 was approximately 30% and in 2008 had decreased to 22%. OD decreased by 8 percentage points for the poorest and poorer populations between 2000 and 2008, from 66 to 58% among the poorest and 40 to 32% among the poorer category. The prevalence of OD increased for the middle wealth group by 4%, from 11 to 15% between 2004 and 2008 (Figure 3(a)). Despite decreases among the poorest, and a slight increase for the middle wealth category, significant gaps between the poorest and wealthiest remained, with more than 50 percentage points between the richest and poorest quintiles. Overall, the prevalence of OD for the poorest quintile was higher than in any individual region.

Urban and rural disparities in OD prevalence showed the greatest gap (Figure 3(b)). Thirty-three percent of rural residents reported to practice OD in 2008 versus 7% of urban households. Despite a rapid reduction in the

prevalence of OD over the study period (4.2% reduction per year) among households in rural areas, the urban population practicing OD was less than half that of rural populations (Figure 3(b)).

Significant differences among Spanish speaking and non-Spanish speaking households existed (Figure 3(c)). Prevalence of OD by Spanish speaking households was half that of non-Spanish speaking households. Despite a decrease of more than 10% in OD by non-Spanish speaking households between 2000 and 2008, and a decrease of 5% for Spanish speaking households, which narrowed the gap between the groups, the prevalence of OD by non-Spanish speaking households remained more than twice that of households that spoke Spanish (Figure 3(c)).

Among the regions, the highest prevalence of OD in 2008 was 46% (Pasco), and the lowest was 0.5%, in Callo (Figure 4). The regions that reported greater than

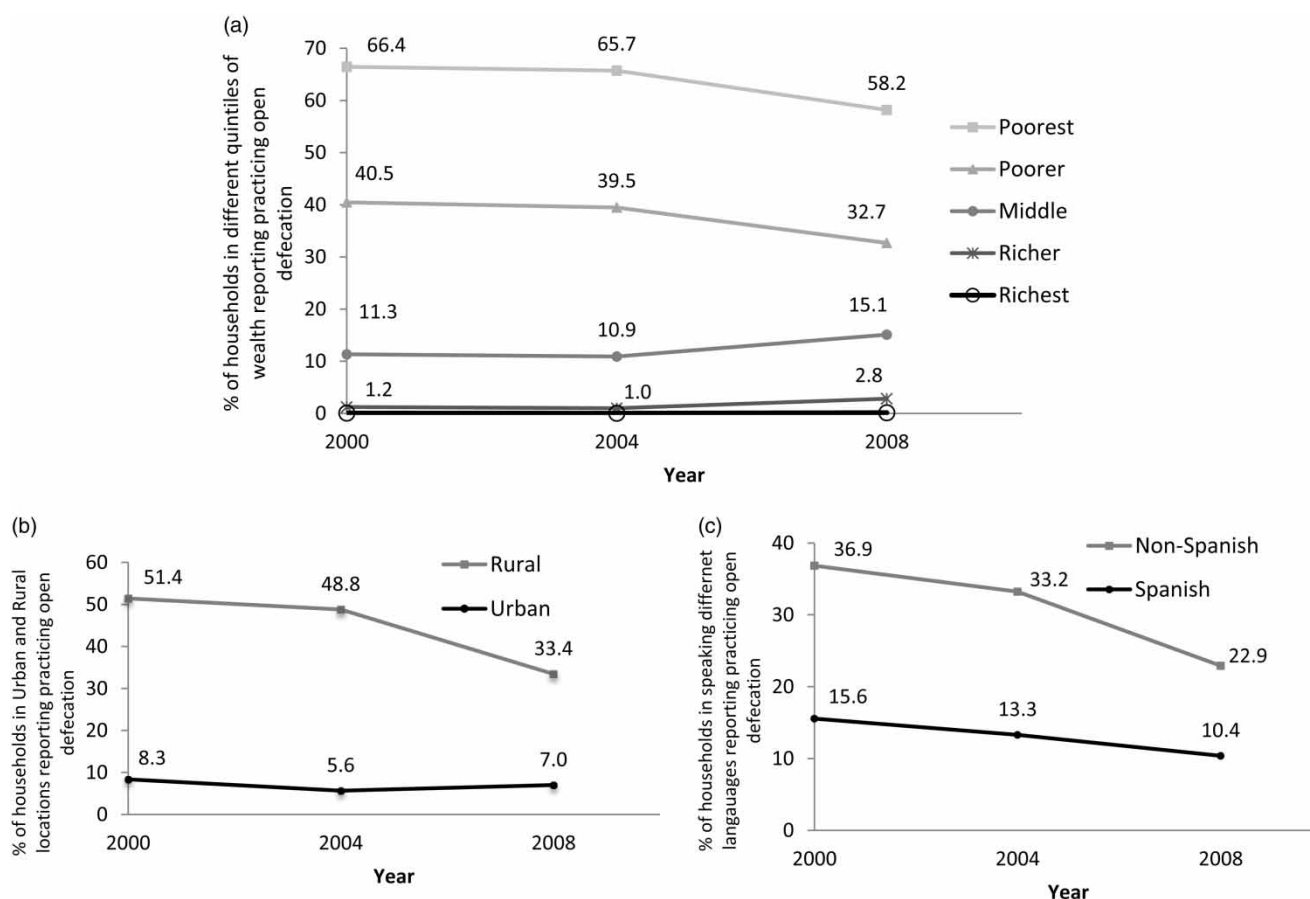


Figure 3 | Percent of households reporting OD: (a) by wealth quintile; (b) by rural/urban residence; and (c) by language (Spanish or non-Spanish speaking).

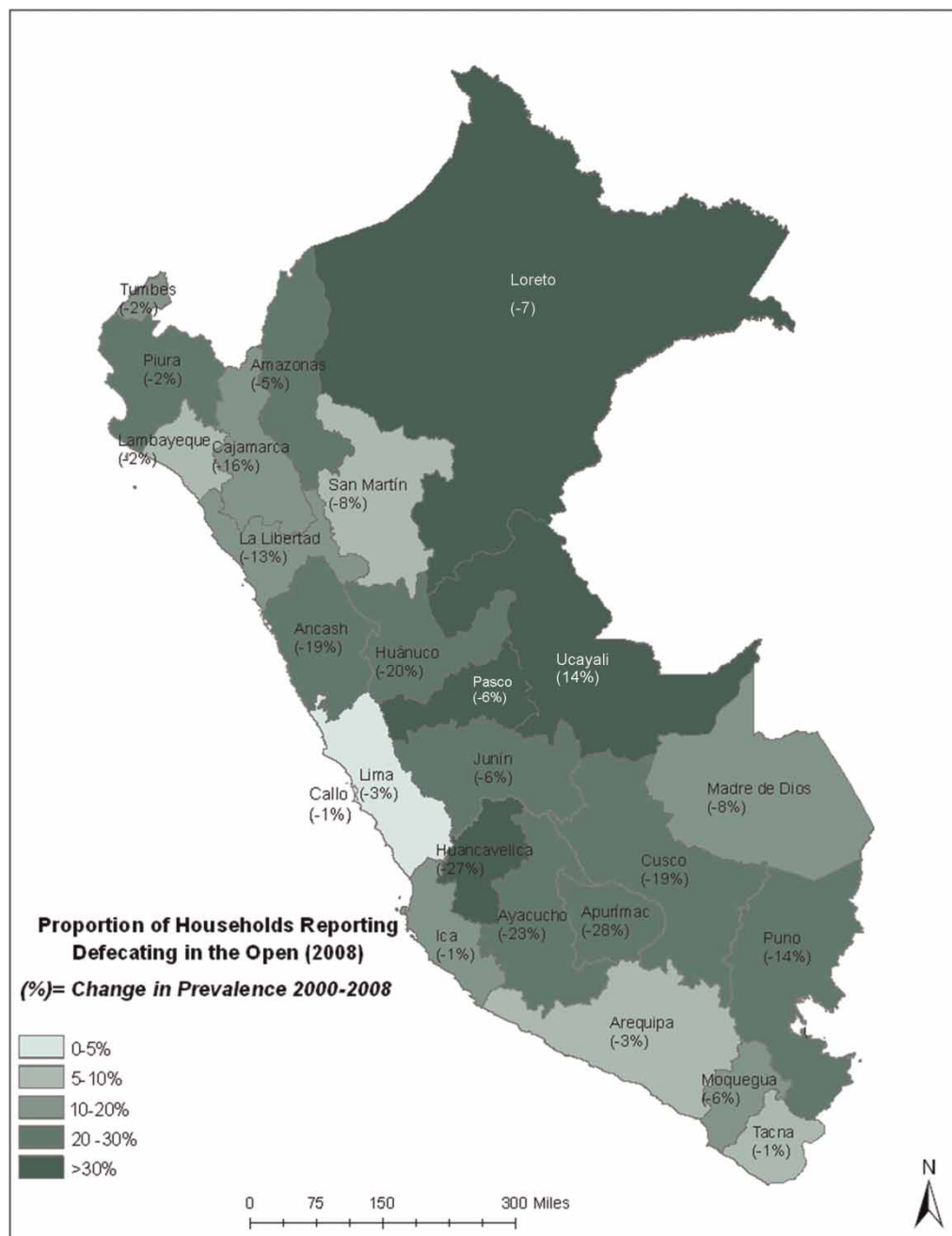


Figure 4 | Percentage of households reporting OD in 2008 (represented by different shading) and the change in prevalence between 2000 and 2008 (represented by the percentage under the region name).

30% OD, included Loreto (30%), Pasco (47%), Ucayali (34.4%), and Huancavelica (43.5%). All regions saw major decreases in OD prevalence between 2000 and 2008, with the exception of Ucayali, where the prevalence increased from 19.9% in 2000 to nearly 35% in 2008.

Ucayali was the only region to observe an increase in OD throughout the study period (Figure 4), and had one of the worst rates of increase (3.2% average increase per year) between 2004 and 2008. Seven regions reduced the OD prevalence by half between 2000 and 2008, but

only two regions, Lima and Callo, had a prevalence below 5% in 2008. Unlike surface water use, the prevalence of OD and annual average percentage point change between neighboring regions varied greatly – the OD prevalence in Huancavelica was 43% with a 3.4% reduction per year, while in Lima and Callo, the prevalence was 3.9 and 0.05%, respectively, with little change annually.

In the analysis of OD among households in different wealth quintiles with different urban and rural status (Figure 5), the prevalence of OD among the poorest quintile in urban areas was found to be 55%, while OD among the rural poorest was 58%. The prevalence among the urban poorer category in 2008 was 42%, which represented an increase of five percentage points from 2000 to 2008, and also was nearly 12 percentage points higher than that of rural poorer populations (30% in 2008). The prevalence of OD among the rural poorer category decreased by 12 percentage points between 2000 and 2008. OD in urban populations in the middle wealth quintile increased from 9.5% practicing OD in 2000 to 14.5% in 2008, while the rural middle wealth quintiles experienced a decrease from 19.3 to 16.3% between 2000 and 2008. The OD prevalence among the rural richer category was 6.3% in 2008, while in

the urban richer category was 2%. The prevalence of OD for the richest populations in both urban and rural areas was nearly zero.

Additional analyses by wealth quintile category and urban/rural status, as well as language were undertaken. The use of untreated surface water was highest among the rural poorest followed by rural poorer category and the urban poorer category. The prevalence of using untreated surface water among the urban poorest populations decreased from 6% in 2000 to 1% in 2008.

Analysis of results among the language categories, in combination with urban/rural residence, found results similar to the aggregated urban and rural categories. For use of untreated surface water, both urban Spanish speaking populations and urban non-Spanish speaking populations had a lower prevalence of use than either Spanish speaking or non-Spanish speaking rural populations. In 2008, rural non-Spanish speaking populations had the highest use of untreated surface water – 3.2% reported using untreated surface water, while urban Spanish speakers had the lowest at nearly 0%. The OD prevalence among rural non-Spanish speakers was six times higher than for urban Spanish speakers (5.8%).

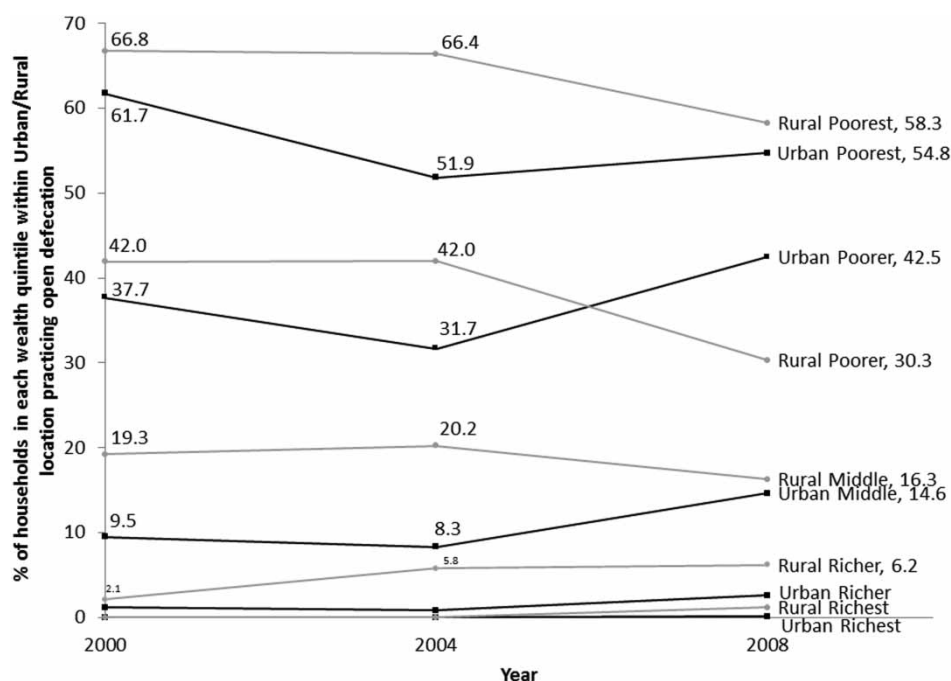


Figure 5 | Percent of households in each wealth quintile within urban/rural location practicing OD.

DISCUSSION

The results of this analysis indicate that Peru has made substantive progress for a number of water and sanitation access indicators. Prevalence of OD has decreased, and many regions have cut the OD prevalence by more than half. Furthermore, the proportion of the population that reported to use untreated surface water for their drinking water supply was small and was found to be decreasing. Inequities, however, remained high between the different quintiles of wealth, Spanish and non-Spanish speaking households, the different regions and urban/rural areas in the country. Regions that observed the greatest declines in both use of untreated surface water and OD between 2000 and 2008 continued to have the highest prevalence in 2008, indicating that a continued effort to target certain regions is needed.

With the exception of the poorest wealth quintile, which consistently had the worst levels of access, the impact of wealth on use of untreated surface water and OD was not consistent. The gap between the poorest and the poorer quintiles varied for both OD and use of untreated surface water – an eight-fold difference existed for use of untreated surface water and a two-fold difference for OD. The gap between the poor and middle wealth quintiles varied as well; however, minimal differences were noted between the middle and poorer quintile categories. Poorer populations had an OD prevalence nearly two times higher than that of populations in the middle wealth quintile.

Analysis of households reporting the use of untreated surface water showed a narrowing gap and dramatic reductions in this use among all groups. The prevalence of using untreated surface water was reduced by nearly half among all of the population categories between 2000 and 2008. Seventeen of 25 regions observed a reduction in the use of untreated surface water by at least half, and of the remaining seven regions, three had levels of use less than one percent. A four-fold decrease in use of untreated surface water among Spanish speakers was found, while the prevalence for non-Spanish speakers was reduced by only half. Use of untreated surface water among the poorest wealth quintile decreased by one-quarter and in rural areas was halved. Overall, rapid reductions in the use of untreated surface water was a positive finding.

The prevalence of OD among all portions of the population was almost ten times higher than the use of surface water, indicating that extremely poor sanitation conditions persist. While decreases were observed in OD prevalence, many sub-populations in the country continued to see more than a quarter of their population practicing OD.

Certain regions of Peru have made major progress in reducing OD. Among the five regions that had the highest prevalence of OD in 2000, only two remained among the top five in 2008. In the three regions that fell from the top five (Apurímac, Cusco, Huánuco), all observed a decrease in OD prevalence of more than 19 percentage points between 2000 and 2008 (28%, 23%, and 19%, respectively). Huancavelica observed a 27% decrease in the OD prevalence; however, it remained among the top five regions for OD prevalence due to its initially high OD prevalence in 2000 (70%). The most rapid reductions in the prevalence of OD among the regions were regions that started with the highest OD levels. This was encouraging and highlights the pace of change that is possible. The relative lack of progress in Pasco, which experienced only a six percent drop between 2000 and 2008, was notable – and, it remained among the regions with the highest prevalence of OD. Further analysis on the differences in efforts in each region may help to characterize why changes occurred where they did. Among the ten regions with the highest prevalence of OD in 2008, half were also among the ten regions with the highest use of untreated surface water in 2008. This double burden indicates that a lack of progress in one sector may not be an isolated event.

The increased prevalence of OD among urban populations, particularly among the urban poorest and the urban poorer population categories, were among some of the most troubling results in this analysis. The prevalence of OD among urban poorer populations surpassed OD among rural poorer populations in 2008. The OD prevalence for the poorest quintile and middle wealth quintile in urban areas has also increased, and moved closer to the prevalence of OD in rural areas. The increase in OD among certain wealth quintiles in urban areas is a concern and greater efforts should be made to reverse this trend.

The prevalence of OD among rural areas was cut by nearly one-third while the prevalence in urban areas

decreased by only one-eighth between 2000 and 2008. The OD prevalence for both Spanish and non-Spanish speaking households decreased by one-third, indicating equity in the rates of change and decreasing inequity. Rates of change for the poorer and poorest wealth quintiles were almost identical for OD, while the middle wealth quintile increased slightly. The remaining high prevalence of OD highlights a serious issue throughout multiple regions and sub-sections of Peru. The limited changes in prevalence among all wealth quintiles highlight that the poor and poorest are not the only populations to target. Decreases in OD of more than 20% in regions with the highest prevalence were encouraging. Variability in the OD prevalence, however, noted by a difference of 43% between regions, may suggest that resources and opportunities for improvements are not being distributed throughout the country evenly. The results demonstrate that while efforts to improve sanitation are needed in rural areas in general, specific populations in urban areas have an equally high need of support.

Differences in WS&S access trends between Spanish and non-Spanish speaking households provided evidence on the struggles of indigenous, Afro-Colombian, and immigrant populations to gain access to the most basic water and sanitation services. Uneven trends in access are compounded as these populations are often poor and live in more remote areas of the country (UNICEF 2010).

While this study primarily discussed the prevalence of coverage (as a static percentage) among sub-populations, the rate of progress over time, indicated by the slope of the line in the figures, was also important to note and helps show the pace and direction in which Peru is moving. The progress between 2004 and 2008 was noteworthy, and appeared more significant than the progress between 2000 and 2004. Additionally, the most rapid rates of change were in those areas that had the highest prevalence of OD and the highest use of untreated surface water in 2000. This suggests that recent efforts may be paying off and leading to the desired changes in progress.

This study had a number of limitations. First and foremost, this analysis did not attempt to address social, political, and economic trends that may affect progress in access to water and sanitation in Peru. Critical information, such as the amount of human resources dedicated to improving water and sanitation access, may be driving

observed trends, and this study did not capture those driving factors. Second, we used the worst case scenarios for both water and sanitation – households reporting the use of untreated surface water and reporting to engage in OD – which results in smaller percentages when compared to JMP estimates of access to unimproved water supply and unimproved sanitation. We did not attempt to analyze ‘improved’ water and sanitation access due to the formatting of questions in the Peru DHS, which did not distinguish between ‘protected’ or ‘unprotected’ water sources nor ‘improved’ and ‘unimproved’ pit latrines in earlier questions. Again, the use of only untreated surface water and OD are worst case scenarios and fall far below the number of households using unimproved sources of drinking water and unimproved sanitation as defined by JMP (WHO/UNICEF 2012b).

CONCLUSIONS

Significant progress has been made in Peru to increase access to water and sanitation. Despite these improvements, however, inequities in access persist. Despite Peru having reached the MDG targets for access to water and sanitation it is important that future efforts focus on sub-sectors of the Peruvian population that are seeing little progress or have regressed in terms of access. Additional emphasis on improving sanitation, specifically reducing the practice of OD, throughout the country would likely benefit health and the environment.

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