

## Scaling Up Rural Sanitation

# Improved Sanitation Can Make Children Taller and Smarter in Rural Tanzania

August 2014

## INTRODUCTION

In Tanzania, 87.8 percent of households do not have access to improved sanitation, such as a latrine or a toilet that separates human feces from human contact. The situation is worse in rural areas, where 92.5 percent of households do not have improved sanitation. Among those without sanitation, 5.6 million individuals defecate in the open. Unfortunately, the situation is getting worse, not better. In 2012, more people in rural Tanzania were defecating in the open than in 2000. In those same areas, 45 percent of children under five were found to be stunted in 2010.

Nutrition interventions alone can only reduce stunting by 36 percent and mortality by 25 percent.<sup>1</sup> Other interventions are needed to make up the rest of the height difference. Recent research has shown that differences in open defecation can explain up to 54 percent of the variation in average child height in some developing countries and more than 60 percent if density of open defecation is considered.<sup>2</sup> This analysis was conducted to determine if a lack of improved sanitation can similarly explain the large amount of stunting in Tanzania.

## PROBLEM STATEMENT

When young children encounter germs from human feces, they may contract diarrhea or related diseases and some may die. For those children who live, their physical and cognitive development may be negatively affected. Stunting makes children more vulnerable to diarrhea, pneumonia, measles, and other infectious diseases and more likely to die from

## KEY FINDINGS

- **Children are, on average, shorter in communities where community members defecate in the open or use unimproved sanitation.** In rural areas of Tanzania, 45 percent of children under five are stunted and 92.5 percent of households do not have access to improved sanitation.
- **The more open defecation and unimproved sanitation are practiced, the more children are stunted.** This height difference indicates that not only children's physical growth, but also their cognitive growth, which impacts adult productivity, is impaired.
- **A child's own household having sanitation is not enough.** If other households in a community lack improved sanitation, the child will still be shorter, even if the child's own household reported using improved sanitation.
- **Unimproved sanitation impacts stunting as much as open defecation.** Open defecation and unimproved sanitation similarly affect the height of children in rural areas of Tanzania. If an entire community is using unimproved sanitation, it will cause as much stunting as open defecation.
- **It is time to invest in the next generation by improving sanitation for all community members.** Sanitation can be improved for entire communities. Efforts to generate demand for improved sanitation, improve supply of sanitation products, and strengthen the enabling environment must continue.

<sup>1</sup> Bhutta, Z. A., et al. 2008. "What Works? Interventions for Maternal and Child Undernutrition and Survival." *Lancet* 371 (9610): 417–40.

<sup>2</sup> Spears, Dean. 2013. *How Much International Variation in Child Height Can Sanitation Explain?* Policy Research Working Paper; no. WSP 6351. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2013/01/17211398/much-international-variation-child-height-can-sanitation-explain>.

those same diseases.<sup>3</sup> In addition, stunted children are more likely to have poorer cognitive and educational outcomes in later childhood and adolescence,<sup>4</sup> to have higher levels of depression and anxiety and lower self-esteem,<sup>5</sup> and to earn less as adults.<sup>6</sup>

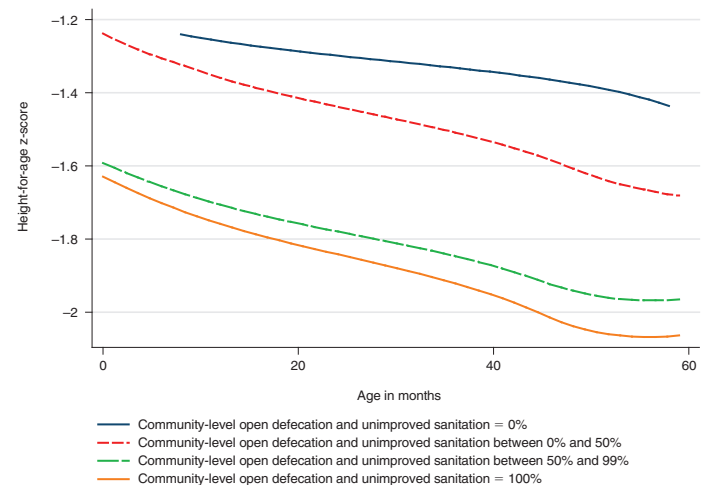
This brief discusses an analysis conducted by WSP to examine the link between sanitation and stunting in Tanzania

## METHODOLOGY

In 2010, the National Bureau of Statistics (NBS), with funding from Ministry of Health and Social Welfare (MoHSW), Tanzania Food and Nutrition Centre (TFNC), and others, conducted a Demographic and Health Survey (DHS). This survey asked a number of questions about population, health, HIV, nutrition, and the environment. To determine the current level of sanitation, the DHS asked household members, “What kind of toilet facility do members of your household usually use?” and recorded the answer. To determine the current level of stunting, they measured the height and recorded the age of children throughout the country. These height-for-ages were then compared to the heights-for-ages of a healthy population to calculate “height-for-age z-scores.” Children whose z-score was more than 2 standard deviations below the mean height for a healthy child of the same gender and age were classified as stunted.

To determine if children are shorter on average if their household does not use improved sanitation or if they live near people who do not use improved sanitation, the DHS data was analyzed using multiple regression. Many possible causes of stunting at both the household and the societal level were considered. Other possible causes of stunting that were controlled for include environmental factors (sources of drinking water, appropriate water treatment methods, crowding, and availability of infrastructure in the local area), socioeconomic

**Figure 1: Height-for-Age z-Scores for Children Participating in the 2010 Demographic and Health Survey (DHS)**



characteristics of the child’s household (ownership of assets, mother’s and father’s education and employment, and mother’s height, mother’s BMI, and dietary diversity), the child’s characteristics (gender, age, size at birth, feeding/diet practices, place of delivery, distance to health facility, uptake of vaccinations and iron supplementation, and whether the child had suffered from diarrhea in the last 24 hours and/or two weeks) and fixed effects (systematic differences among the regions of Tanzania).

## KEY LESSONS

**Children are shorter in communities with worse sanitation.** As Figure 1 shows, children who live in communities where a greater percentage of individuals are defecating in the open or using unimproved sanitation have lower height-for-age z-scores. Poor sanitation at the community level helps explain differences between child height in rural areas of Tanzania, even after controlling for other factors and for persistent geographic differences among the regions.

**A child’s household having sanitation is not enough.** Stunting occurs even among those children in rural Tanzania whose household has a toilet, but whose neighbors do not. The results show a coefficient for community-level open defecation and unimproved sanitation of  $-0.534$  after controlling for all the variables mentioned in the methodology section. This is equivalent to a five-year-old child being 2.5 cm shorter

<sup>3</sup> Black, Robert E., et al. 2013. “Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries,” *Lancet* 382(9890):427–451.

<sup>4</sup> Grantham-McGregor, S., Y. B. Cheung, S. Cueto, P. Glewwe, L. Richter, and B. Strupp. 2007. “Developmental Potential in the First 5 Years for Children in Developing Countries,” *Lancet* 369: 60–70.

<sup>5</sup> Walker, S. P., S. M. Chang, C. A. Powell, E. Simonoff, and S. M. Grantham-McGregor. 2007. “Early Childhood Stunting Is Associated with Poor Psychological Functioning in Late Adolescence and Effects Are Reduced by Psychosocial Stimulation,” *Journal of Nutrition* 137: 2464–2469.

<sup>6</sup> Vogl, T. 2012. “Height, Skills, and Labor Market Outcomes in Mexico.” Princeton, NJ: Dept. of Economics, Princeton University.



Photo: Helena Goldon / The World Bank

than a similar child living in a community where all households have improved sanitation. This is close to what was found for similar studies in the rural areas of Cambodia<sup>7</sup> and India.<sup>8</sup>

**Unimproved sanitation impacts stunting as much as open defecation.** Whereas open defecation is the lack of any facility and/or defecation in the bush, field, or forest, unimproved sanitation is the use of pit latrines without slab/open pit, bucket toilets, hanging toilets/latrines, and toilets that flush to somewhere other than a septic tank or sewer. The analysis conducted showed that open defecation and unimproved sanitation similarly affect the height of children in rural areas of Tanzania. If an entire community is using unimproved sanitation, it will cause as much stunting as open defecation.

## CONCLUSION

Children are taller in rural Tanzanian communities where everyone has improved sanitation. The same healthy environment that helps bodies grow tall in the first few years of life also helps brains grow smart. This increased cognitive growth ultimately impacts adult productivity.

The elimination of open defecation and unimproved sanitation should be a priority for policymakers who are concerned with maximizing the human capital of Tanzania, especially in rural areas that are currently lagging behind.

The WHO/UNICEF Joint Monitoring Program (JMP) Water Supply and Sanitation Post 2015 Goals for sanitation advocate universal access to basic improved sanitation for households, schools, and health facilities by 2030.<sup>9</sup> In Tanzania, annual access to improved sanitation needs to increase by an additional 5.2 percent in order for universal access to be achieved by 2030. This means 3.7 million more people per year should gain access and use improved latrines, beyond the 400,000 people currently reached.<sup>10</sup>

The target is ambitious, but the Government of Tanzania has already started implementing important changes in policies and institutions, financing and programmatic approaches, service delivery models, and performance monitoring. The Ministry of Health and Social Welfare and its partners have already developed a national rural sanitation policy that goes beyond the small-scale project approach that has failed to deliver improved and sustainable sanitation.

One of the key interventions undertaken by the Government of Tanzania is the National Sanitation Campaign (NSC), which has begun the process of scaling up sanitation outcomes across rural communities throughout the country. This has not only resulted in households improving their sanitation facilities, but also in villages and subvillages becoming open defecation free (ODF). The campaign is funded by the Water Sector Development Program and coordinated by the Ministry of Health and Social Welfare, which has started to promote community-wide behavior change. The Government has also attempted to link the NSC to other sectors and set up a dedicated budget line for community sanitation by the Ministry of Health.<sup>11</sup>

<sup>7</sup> Vyas, Sangita, Dean Spears, Phyrum Kov, and Susanna Smets. 2013. "Investing in the Next Generation: Growing Tall and Smart with Toilets, Stopping Open Defecation Improves Children's Height in Cambodia." Water and Sanitation Program, World Bank. <http://www.wsp.org/sites/wsp.org/files/publications/Growing-Tall-and-Smart-with-Toilets-Research-Brief.pdf>.

<sup>8</sup> Spears, Dean. 2013. "Coming Up Short without Sanitation: A Community Sanitation Program by the Indian Government Helped Children Grow Taller and Healthier in the State of Maharashtra." Water and Sanitation Program, World Bank. <http://www.wsp.org/sites/wsp.org/files/publications/WSP-Coming-Up-Short-without-Sanitation-India.pdf>.

<sup>9</sup> WHO/UNICEF Joint Monitoring Program, "Data and Estimates." <http://www.wssinfo.org/data-estimates>.

<sup>10</sup> WaterAid, Africa Water Week, <http://www.wateraid.org/get-involved/campaigns/africa-water-week#/interactive-map>.

<sup>11</sup> Perez, Eddy. 2014. "How and Why Countries are Changing to Reach Universal Access in Rural Sanitation by 2030." *The Water Blog* July 8. <http://blogs.worldbank.org/water/how-and-why-countries-are-changing-reach-universal-access-rural-sanitation-2030>.





Photo: Helena Goldon / The World Bank

Efforts to generate demand for improved sanitation, improve supply of sanitation products, and strengthen the enabling environments have already resulted in impressive gains in sanitation.

Entrepreneurs have created sanitation businesses, sold sanitation components, and installed improved sanitation in customers' households. However, still more must be invested to help the 32.2 million individuals in rural Tanzania without access to improved sanitation build and use their own improved latrine or toilet. The Ministry of Health and Social Welfare will be able to reach this goal in partnership with other stakeholders, including the Ministries

of Finance, Water, and Education, non-profit and international organizations, businesses, provincial, and district and village governments. Together they can ensure that enough resources are available to create community demand for sanitation, that businesses are selling viable options, and that leaders are using their political will to increase sanitation coverage.

### ACKNOWLEDGEMENTS

This research brief was prepared by Maria Quattri and Emily Rand, with valuable contributions and support from WSP colleagues Yolande Coombes, C. Ajith Kumar, Craig Kullmann, and Eduardo Perez.

WSP is a multi-donor partnership created in 1978 and administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services. WSP's donors include Australia, Austria, Denmark, Finland, France, the Bill & Melinda Gates Foundation, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States, and the World Bank.

The findings, interpretations, and conclusions expressed herein are entirely those of the author and should not be attributed to the World Bank or its affiliated organizations, or to members of the Board of Executive Directors of the World Bank or the governments they represent.

## Related reading

- WSP (Water and Sanitation Program). 2014. "Investing in the Next Generations through Open Defecation Free Villages: Children Grow Taller, and Smarter, in Rural Villages of Lao PDR Where All Community Members Use Improved Sanitation." Jakarta, Indonesia: World Bank.
- WSP (Water and Sanitation Program). 2014. "Investing in the Next Generations: Children Are Taller, and Smarter, in Rural Villages of Vietnam Where Community Members Use Improved Sanitation." Jakarta, Indonesia: World Bank.

## About the program

Today, 2.5 billion people live without access to improved sanitation. Of these, 71 percent live in rural communities. To address this challenge, WSP is working with governments and local private sectors to build capacity and strengthen performance monitoring, policy, financing, and other components needed to develop and institutionalize large-scale, sustainable rural sanitation programs. With a focus on building a rigorous evidence base to support replication, WSP combines Community-Led Total Sanitation, behavior change communication, and sanitation marketing to generate sanitation demand and strengthen the supply of sanitation products and services, leading to improved health for people in rural areas. For more information, please visit [www.wsp.org/scalingupsanitation](http://www.wsp.org/scalingupsanitation).

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