Scaling Up Rural Sanitation

Investing in the Next Generation

Children grow taller, and smarter, in rural, mountainous villages of Vietnam where community members use improved sanitation

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INTRODUCTION

Widespread lack of improved sanitation in rural areas of Vietnam leads to stunting, i.e. children being too short for their age. It is not the water that makes children sick and malnourished, it is the feces: sanitation is the primary barrier to stop the ingestion of human feces. Stunted children are not only short for their age, but also more likely to have poorer cognitive and educational outcomes in later childhood and adolescence.[1] They are more likely to become less productive adults, and be less able to contribute to their nation's growth.[2] In addition to the mother's and child's dietary diversity, health care and hand washing and hygiene practices, improved sanitation determines a child's health. Improved sanitation serves as a primary barrier to stop a child from digesting feces that causes disease and reduces the uptake of vital nutrients. Thus, the elimination of open defecation and unimproved sanitation should be a priority issue for policy makers who are concerned with maximizing the current and future human capital of their country. In simple terms: investing in sanitation means investing in a future generation of smart and productive adults.

KEY FINDINGS

- **The use of unimproved latrines in rural villages in mountainous regions of Vietnam leads to five-year-old children being 3.7 cm shorter than healthy children living in villages where everybody practices improved sanitation**. This difference in height is irreversible and matters a great deal for a child's cognitive development and future productive potential.
- **A child remains at risk of stunting if community members use unimproved sanitation facilities, even when the child's family uses improved latrines themselves**. Universal usage of improved sanitation is needed to adequately address stunting.
- **To improve stunting outcomes rural sanitation needs prioritization**, especially after the foreseen ending of the National Target Program for Rural Water Supply and Sanitation in 2015.
- Future rural sanitation policy and incentives need to aim for **community-wide usage of improved sanitation, promote collective behavior change** and include **targeted support for the poor**.
- **A national rural sanitation program beyond 2015 is required to accelerate progress towards the Post 2015 Sustainable Development Goals** of eliminating open defecation, progressive elimination of inequality and universal access to improved sanitation by 2030.
- **Community-wide sanitation interventions should be considered for integration into nutrition and poverty programs** to support stunting prevention.

[1] Grantham-McGregor, S., Cheung, Y.B., Cueto, S., Glewwe, P., Richter, L. and B. Strupp (2007) Developmental potential in the first 5 years for children in developing countries. The Lancet Vol. 369, Issue 9555, pp. 60–70.
[2] Vogl, T. (2012) Height, Skills, and Labour Market Outcomes in Mexico. Department of Economics, Princeton University.

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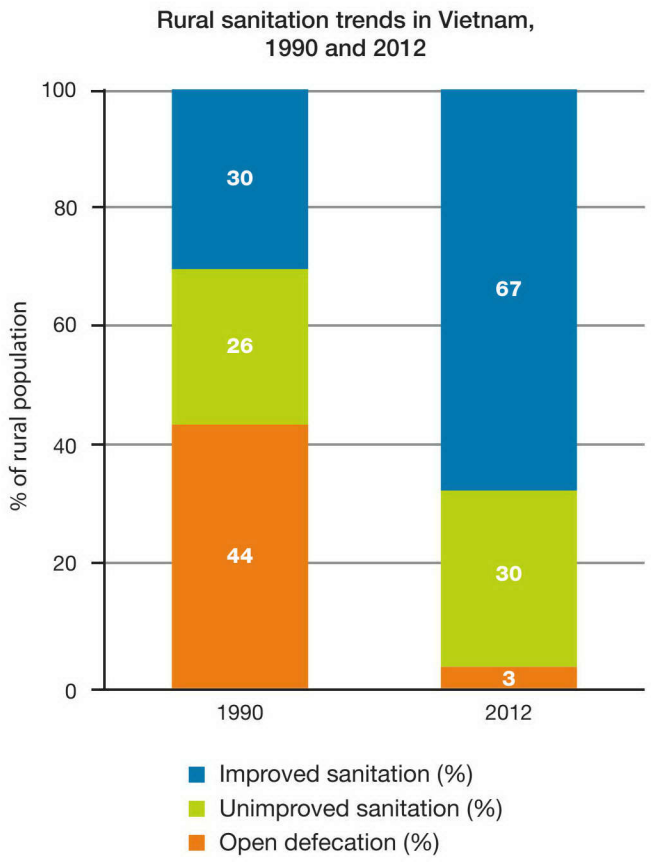
Box 1. LACK OF IMPROVED SANITATION AND STUNTING

There is a growing body of evidence that links open defecation to poor child health through at least two mechanisms. The first and most commonly recognized mechanism is diarrhea from digesting feces. The second, which is only recently becoming understood, is a disorder of the intestine caused by continued fecal exposure. This condition called chronic ***environmental enteropathy*** prevents absorption of nutrients, even without the child getting diarrhea and appearing ill.[3]

Figure 1. Rural Sanitation Coverage (1990-2012)



PROBLEM STATEMENT

The population in Vietnam remains predominantly rural. In 2011, 62 million people (70% of the overall population) were living in rural areas. The strong economic growth that occurred over the past two decades, combined with government programs that address sanitation, have contributed to a dramatic decline in the prevalence of open defecation between 1990 (44%) and 2012 (3%) in rural areas. However, the percentage of people using unimproved sanitation has increased from 26% to 30% over the period (including 4% sharers).[4]

The rural poorest are five times more likely to open defecate or use unimproved facilities (58%) than the richest (11%)[7]. Rural poverty and lack of improved sanitation are mainly found in Vietnam's highland regions: the Central Highlands, the Northern Midlands and Mountain Areas and the North Central and Central Coast Area.

Key Facts

- In rural Vietnam, the prevalence of **open defecation has dramatically declined** from 44% in 1990 to 3% in 2012. **Yet the percentage of households using unimproved latrines increased from 26 to 30% over the same period**.[5]
- **The poorest households living in Vietnam's mountainous regions are the most affected by the lack of improved sanitation facilities** (Central Highlands, Northern Midlands and Mountain Areas and North Central and Central Coastal Area).
- Children are **more at risk of stunting if they live in rural areas in those same mountainous regions and if they were born from the poorest households**. The prevalence of stunted children in all rural areas decreased from 42% in 2000 to around 25% in 2010/11. Yet, **stunting prevalence in the mountainous regions remains high in the range of 28 to 31%**.[6]

[3] Checkley, William, Gillian Buckley, Robert H Gilman, Ana MO Assis, Richard L Guerrant, Saul S Morris, KareMolbak, PalleValentiner-Branth, Claudio F Lanata, Robert E Black, and The Childhood Malnutrition and Infection Network.2008. Multi-country analysis of the effects of diarrhoea on childhood stunting." International Journal of Epidemiology, 37: 816-830.

[4] The Government of Vietnam sets a higher standard for improved sanitation than the WHO/UNICEF Joint Monitoring Programme. In fact, the Government classifies as 'hygienic' sanitation only water flush, composting and ventilated improved pit (VIP) latrines. The simple pit latrine with a slab and cover, but without a vent pipe, is not considered 'hygienic'. This research brief distinguishes between improved and unimproved sanitation. See the box on 'Definition of sanitary means of excreta disposal in the research' for further details.

[5] JMP, 2014. Joint Monitoring Programme of WHO/UNICEF. Progress on Sanitation and Drinking Water – Update 2012.

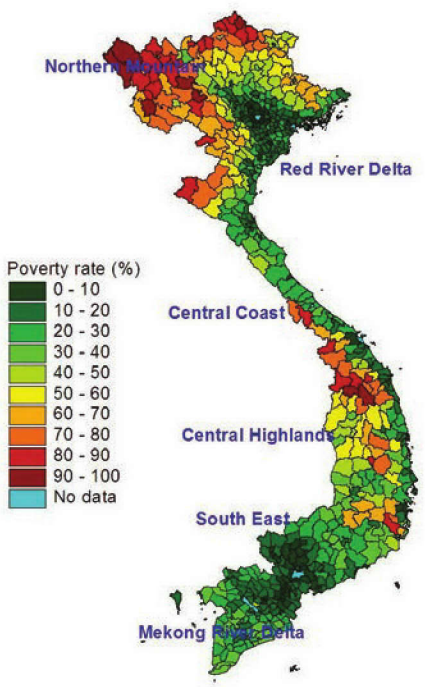
[6] UNICEF (2010-11) MICS4 – Multiple Indicator Cluster Survey 2010–2011 for Vietnam.

Similar patterns are found for stunting prevalence: children are more at risk of being stunted if they live in rural areas and in mountainous regions and were born from the poorest households. Stunting prevalence among children under five years old in these regions is in the range of 28 to 31%.[8] These similarities suggest that there may be a correlation between a lack of improved sanitation and stunting in rural communities in the mountainous regions of Vietnam, especially among the poorest communities, as can be observed in Figure 2.

Thus, this research brief aims to answer the question: 'Is community level unimproved sanitation associated with child height in rural Vietnam?' While addressing this question and for the reasons explained above, the research zoomed in on a subset of the national data that looks at rural mountainous regions. Based on the research findings, and considering the ongoing government's efforts, a number of policy recommendations and suggestions are presented to tackle the sanitation challenge.

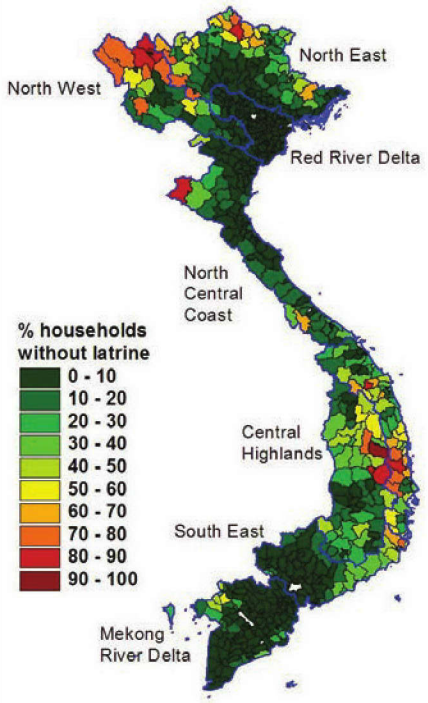
Figure 2. Overview maps of Vietnam poverty, sanitation access and stunting rates

Percentage of rural poverty rate



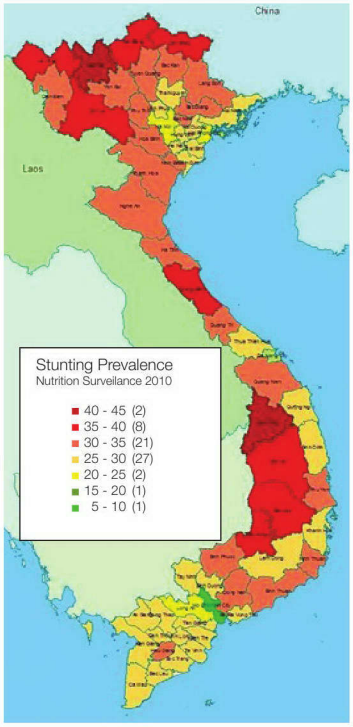
Source: 2009 Census for Sanitation Maps; Poverty Map based on 2009 Census and 2010 VHLSS; Nguyen Viet Cuong

Percentage of rural households without a toilet



Source: 2009 Census for Sanitation Maps; Poverty Map based on 2009 Census and 2010 VHLSS; Nguyen Viet Cuong

Stunting prevalence — Nutrition surveillance 2010



Source: National Institute of Nutrition and Alive and Thrive Vietnam, 'National nutrition monitoring survey,' 2010

[7] Based on quintile analysis of the Viet Nam Multiple Indicator Cluster Survey (MICS4) which was conducted from December 2010 to January 2011 by the General Statistics Office in collaboration with the Ministry of Health (MOH) and the Ministry of Labour, Invalids and Social Affairs (MOLISA). Financial and technical support for the survey was provided by the United Nations Children's Fund (UNICEF) and financial support by the United Nations Population Fund (UNFPA). MICS4 is based on an actual sample of 11,614 households in 600 communes/wards of 440 districts in all 63 provinces/cities in the country, and it is representative of Vietnam's six regions.

[8] JMP (2013) estimates for the year 2011 are used in this brief as MICS (2010/11) data have been used for the regression analysis.

METHODOLOGY

The research uses regression analysis, which looks at the relationship between a child's height and household, social and environmental variables that may impact on a child's height, including sanitation. Data that were used are from a nationally representative household survey conducted by UNICEF in 2010/11 called the Multiple Indicator Cluster Survey (MICS4).[9]

Children are stunted when a statistical measure called 'height-for-age Z score' is less than -2. This means their height is 2 (or more) standard deviations below the mean height of children of a well-nourished and healthy reference population.

The research first examines whether open defecation and unimproved sanitation in a rural community are related to stunting among children of different age groups across entire Vietnam. The analysis then zooms into a subset of the data for the mountainous regions to investigate whether the use of unimproved latrines by a large proportion of households in the community is associated with stunting.[10] In this part of the analysis, the research controls for all factors that may impact a child's height, such as lack of improved sanitation in a rural community and in the child's household, level of poverty of the child's family, their ethnic origin, the mother's education, the gender of the household's head, access to safe water and health services, hand washing and hygiene practices, child's sex, age and month of birth, child's illness, feeding practices and dietary diversity, size of the child's household and population density at the region level, and availability of electricity and road access in the community. The research finds similar results for all regions of Vietnam and for the subset of mountainous regions where unimproved sanitation and stunting prevail. This policy brief presents results for the subset of regions[11].

[9] Based on quintile analysis of the Viet Nam Multiple Indicator Cluster Survey (MICS4) which was conducted from December 2010 to January 2011 by the General Statistics Office in collaboration with the Ministry of Health (MOH) and the Ministry of Labour, Invalids and Social Affairs (MOLISA). Financial and technical support for the survey was provided by the United Nations Children's Fund (UNICEF) and financial support by the United Nations Population Fund (UNFPA). MICS4 is based on an actual sample of 11,614 households in 600 communes/wards of 440 districts in all 63 provinces/cities in the country, and it is representative of Vietnam's six regions.

[10] A community in the survey refers to villages or cluster of nearby villages (primary sampling unit), but not to administrative communes. The term villages or communities is used throughout the brief to indicate this primary sampling unit.

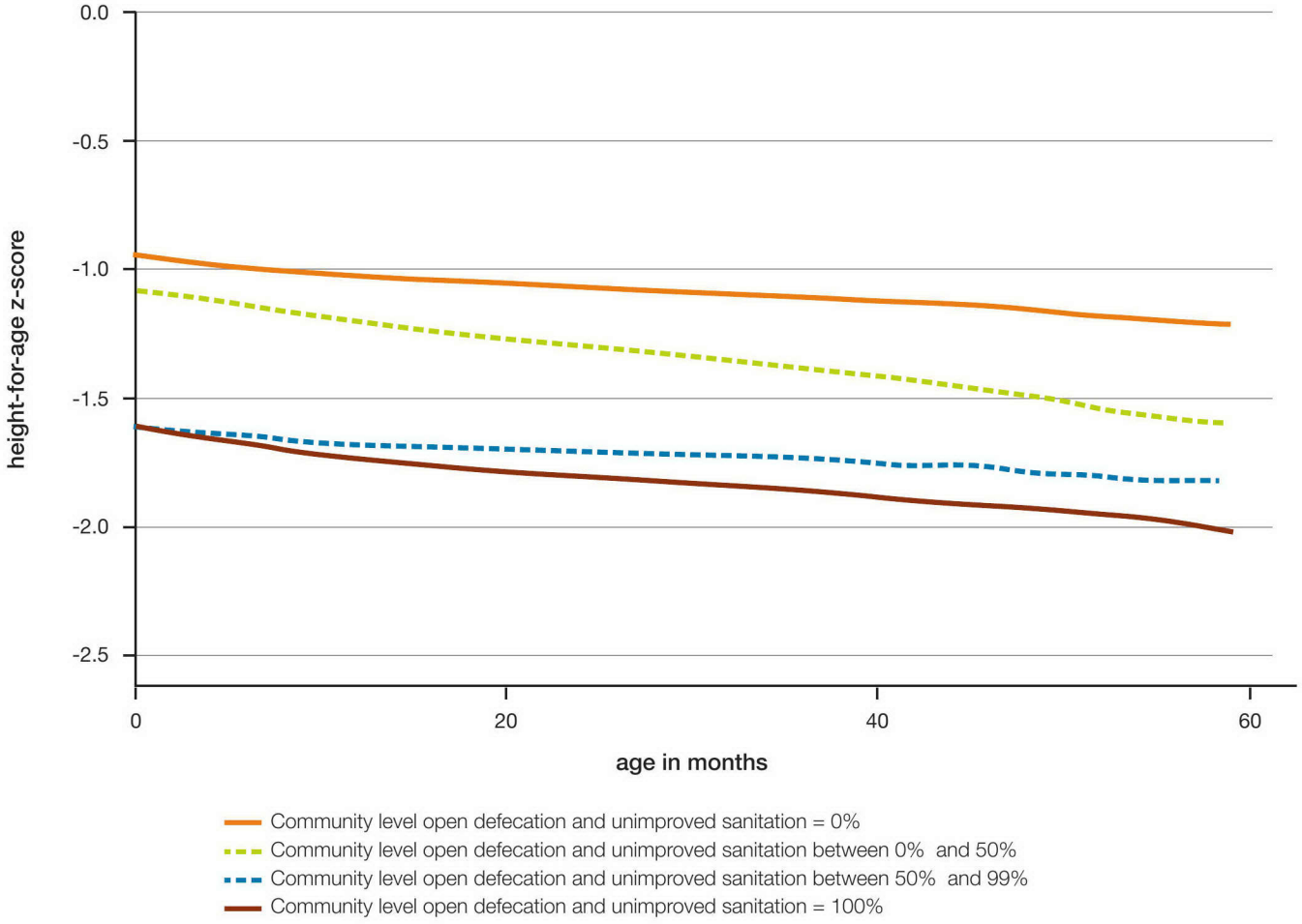
[11] For further details, see M. Quattri and S. Smets, 'Lack of community-level improved sanitation is associated with stunting in rural villages of Lao PDR and Vietnam,' submitted for the 37th WEDC International Conference 'Sustainable Water and Sanitation Services for All in a Fast Changing World', Hanoi, Vietnam, 2014.

KEY LESSONS

1. Lack of improved sanitation in rural villages of Vietnam is associated with increasing stunting at every age

The following figure shows the relationship between a child's height and the sanitation status in the child's rural community. As poor sanitation status (meaning combined unimproved sanitation and open defecation) moves from 0% of the community members to 100%, children are on average shorter than healthy children. Children grow shorter even when only a small proportion of villagers (less than 50%) do not use improved latrines. Once a child's height becomes shorter than average, it remains shorter at every age. By the age of five, on average, a child in communities where no one uses improved sanitation reaches the critical level of stunting (Z-score of -2).

Figure 3. Growth faltering (height for age z-score) of rural children under five years old for different ages



2. Unimproved sanitation is associated with stunting in rural villages of mountainous regions of Vietnam

In the regression analysis, the brief focuses on the subset of rural areas in the mountainous regions of Vietnam: the Central Highlands, the Northern Midlands and Mountain Areas and the North Central and Central Coast Area. The research also controls for all the above mentioned socio-economic, demographic and health variables and environmental factors that may influence a child's height,[12] which means that possible factors that impact the height of a child are taken into account. If the sanitation status in the community remains to have an effect on the child height after consideration of all these factors, it can be safely concluded that this effect is real and not by chance. Indeed, the regression analysis shows that the height of a child decreases in a significant way when community-level unimproved sanitation increases. The analysis finds that an average five-year-old child that lives in a rural village where community members use unimproved sanitation is 3.7 cm shorter than a child who lives in a rural village where everybody uses improved facilities. This seemingly small difference in height is irreversible and matters a lot for a child's cognitive development and future productive potential.

3. Community members' unimproved sanitation negatively affects a child's height even when the child's family uses improved facilities

Surprisingly, while the relationship between height and community level sanitation is statistically significant, this is not the case for the child's household sanitation practices. After controlling for community members' use of unimproved sanitation, a child's household use of improved sanitation does not help to reduce the risk of stunting for this child. The child is still exposed to contact with human feces and fecal bacteria due to neighbors' lack of improved sanitation and thus remains at risk of stunting if not all community members use improved latrines.

[12] Because of data unavailability, the following variables could not be included in the regression analysis for Vietnam: mother's age, height, BMI, and employment status in the 12 months preceding the survey date, information on whether the child is twin and size of the child at birth, information on whether the child was given iron supplementation, place of delivery, and distance to health facility.

Box 2. DEFINITION OF SANITARY MEANS OF EXCRETA DISPOSAL IN THE RESEARCH

- Improved sanitation includes water flush latrine (that is, flush to piped sewer system, septic tank, pit latrine or unknown place), pit latrine with a slab and cover, ventilated improved pit (VIP) latrine, composting toilet and, for rural areas, hanging toilets/latrines.
- Unimproved sanitation is the use of pit latrines without slab/open pit, bucket toilets, and flush or pour-flush to elsewhere (that is, street, yard or plot, open sewer, a ditch, a drainage way or other location).
- Open defecation refers to defecation in the bush, field or forest.

The research excludes hanging toilets/latrines (mainly found in the Mekong River Delta region) from the definition of 'unimproved sanitation'. The reason is that children are less likely to be exposed to fecal contamination from feces from fish-pond latrines, as the feces are 'water sealed' and not exposed to flies. Further regression analysis indicates that the use of hanging toilets by community members has no significant negative impact on stunting.

CONCLUSION

Poor sanitation and stunting are prevalent particularly among the poorest rural villages in the mountainous regions of Vietnam. Stunted children are not only shorter than average, but they are also more likely to have poor cognitive abilities and become less productive adults. A lack of improved sanitation throughout the community is associated with stunting of children in rural villages of Vietnam. It is also shown that unimproved sanitation in the community affects every child in the community: also those children whose families use an improved sanitation facility themselves. Thus, policies and interventions should focus on community-wide behavioral change and outcomes for improved sanitation, rather than only on individual household investments in improved sanitation. Government targets and incentives need to go beyond open defecation-free status and focus on community-level universal access to improved sanitation.

At present, community-wide targets and a programmatic approach that focuses on village-level improved sanitation outcomes are still to be adopted at scale under Vietnam's Third National Target Program for Rural Water Supply and Sanitation (RWSS-NTP3). While the RWSS-NTP3 aims to provide 65% of rural households with hygienic latrines, the research suggests that universal use of improved sanitation is needed to adequately reduce stunting[13].

[13] The findings do not mean that there is no accrual of marginal health benefits while moving towards the 100% improved sanitation status.

While Vietnam is clearly making progress along the sanitation ladder from open defecation to unimproved sanitation, this does not seem to be enough to address the risk of stunting. Stunting impact is expected to be lower if access and use of improved sanitation by 100% of community members is achieved.

Once RWSS-NTP3 ends in 2015, a national sanitation program will be needed to achieve universal usage of improved sanitation. Policies, targets and incentives under such future program should be aligned to promote community-wide behavior change, including targeted support for the poor, such as low-interest household financing and/or targeted output-based subsidies. Such measures are already introduced under RWSS-NTP3, and deserve further scaling beyond 2015, especially to the mountainous regions and with improved targeting to the poorest segments. Affordable, accessible and aspirational toilets provided through local private suppliers remain needed to move more people from open defecation and unimproved sanitation to improved sanitation, while community mobilization and behavioral change communications are required to support a new social norm within communities.

A national rural sanitation program is required to accelerate progress towards the proposed Post 2015 Sustainable Development Goals of eliminating open defecation, progressive elimination of inequality and universal access to improved sanitation by 2030.[14]

Finally, community-wide sanitation interventions should be considered for integration into existing nutrition programs to support stunting prevention in Vietnam.

[14] WSSC, 2014. Water Supply and Sanitation Collaborative Council. Water Supply, Sanitation and Hygiene Targets and Indicators Post-2015 Factsheet: Comprehensive recommendations – updated April 2014.

The Water and Sanitation Program is a multi-donor partnership, part of the World Bank Group's Water Global Practice, supporting 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.

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Scaling Up Rural Sanitation

Today, 2.5 billion people live without access to improved sanitation. Of these, 71% 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.

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