WASH
Poverty Diagnostic | SERIES

Improving Service Levels and Impact on the Poor

A Diagnostic of Water Supply, Sanitation, Hygiene, and Poverty in Indonesia

INDONESIA

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Executive Summary

Inequality is on the rise in Indonesia. Although the country made significant progress in reducing poverty from 24 percent, at the time of the Asian financial crisis in 1997, to 11 percent in 2014, and maintained 6 percent annual growth for a decade up to 2015, consumption growth has not been evenly distributed across the population. The poorest 40 percent of Indonesians now account for just a fifth of total household consumption, while the richest 20 percent account for nearly half. This places Indonesia among the countries with the highest levels of inequality in East Asia—just below Malaysia, the Philippines, and China—and above the average of five Organization for Economic Co-operation and Development (OECD) countries with the highest levels of inequality.

Indonesia is undergoing rapid urbanization, and although this can be accompanied by strong economic growth, it creates a number of challenges, including disparities in income and access to services. The urban population accounts for about half of the country's total population, a figure estimated to rise to approximately 68 percent by 2025. Underinvestment in urban infrastructure and lack of adequate planning limits the potential economic growth and development benefits of growing cities and contributes to widening inequalities. Over the past decade, for every 1 percent increase in urbanization, Indonesia achieved only two percent gross domestic product (GDP) growth, below the return on urbanization in other Asian countries such as China, Vietnam, and Thailand, which have significantly benefited from economies of agglomeration.

Unequal access to services at the beginning of life is a key driver of inequality. Children who are born into poverty are more likely to be deprived of critical services such as health care, nutrition, education, water supply, and sanitation—placing them at an unfair disadvantage from the outset. When accessible, these services help level the playing field for the next generation by providing the basic conditions that allow children and adults to lead healthier, and more educated and productive lives. Effective service delivery is essential to the future well-being of society, and is key to economic growth and prosperity.

> Unequal access to services at the beginning of life makes it more difficult to break out of poverty later in life.

New evidence shows that owning a toilet, drinking clean water, and living in a community where most of one's neighbors own a toilet are important drivers of child growth and cognitive development in Indonesia. Repeated exposure to fecal pathogens—especially common in areas where open defecation is practiced, fecal waste management is inadequate, and water quality is poor—can cause inadequate absorption and nutrient loss through diarrhea and poor gut function. These conditions stunt a child's growth, causing irreversible impairment to development, learning, and earning—the effects of which extend over generations.

Despite recent gains, many millions of Indonesians still go without improved water and sanitation. In Indonesia, 87 percent of the population has access to improved drinking water and 61 percent has access to improved sanitation, a 39 and 36 percentage point increase, respectively, since 1990. Although these gains are commendable, there are still close to 100 million people without improved sanitation and 33 million without improved drinking water, according to the WHO-UNICEF Joint Monitoring Programme for Water Supply and Sanitation (WHO and UNICEF 2015). These summary figures hide the persistent divides between urban and rural populations and among different income levels in access to services, and they mask underlying gaps in quality faced by all households, regardless of income or geographic location.

> Poverty is only one determinant of WASH access: poor urban dwellers often have better access than wealthier rural inhabitants.

Growing incomes are helping to both reduce poverty and increase access to proper water and sanitation, but gaps in access between the poor and rich remain, and in some cases are widening. For drinking water (urban and rural) and urban sanitation, access increased in

parallel for the top three quintiles (top 60, or T60) and the bottom two quintiles (bottom 40, or B40); however, overall levels of access are lower among the B40 and the gaps remain large. For the most recent year of data (2015), there was a 14 percentage point gap between the T60 and B40 in access to improved water in urban areas (84 percent vs. 70 percent), and a 10 percentage point gap for rural water (64 percent vs. 54 percent). For rural sanitation, the gap between the T60 and B40 households has increased, and in 2015 stood at 20 percentage points (55 percent vs. 35 percent). Although rates of open defecation in rural areas decreased at the same rate in B40 and T60 households, B40 households were more likely to transition from open defecation to basic latrines, whereas their T60 counterparts transitioned to improved latrines. The gap in access to sanitation between B40 and T60 households in urban areas is also substantial (19 percent), but it has narrowed from 25 percent in 2002.

Factors other than poverty also significantly affect access to drinking water and sanitation, particularly geographic location. Urban dwellers in the lower income quintiles are more likely to use improved toilets and drink clean water than rural dwellers in the upper income quintiles. There is also variation at the local government (LG) level. District poverty rates do not neatly correspond with either *levels* of access or *equity* of access to improved sanitation; some poor districts are doing a better job than wealthier districts, and a far better job than some of their poorer peers. For example, despite there being no significant difference in poverty levels between Java and non-Java districts, Java districts have achieved higher levels of coverage overall for both B40 and T60 households.

However, it is the persistent gaps in service quality—rather than barriers to access—that are the main challenge facing Indonesia at the outset of the Sustainable Development Goal (SDG) period. Although most households are gaining access to drinking water and sanitation due to rapid urbanization and increasing living standards, not everyone is benefitting from the same *quality* of service. In 2015, 33 percent of T60 households had a piped water connection in urban areas, compared with only 20 percent of B40 households. Furthermore, it is estimated that more than a quarter (27 percent) of B40 households drink groundwater that is unsafe, due to inadequate protection from environmental contamination. The Government of Indonesia (GoI) has set an ambitious target for universal access to improved water by 2019, aiming for 60 percent coverage of piped and 40 percent coverage of non-piped water sources in urban areas. However, given these patterns of access between B40 and T60 households, it is likely that B40 households will remain on a non-piped service for longer than T60 households.

Progressive approaches to urban sanitation have led to millions of Indonesians gaining access to improved services over the past decade. Despite these gains, an estimated 95 percent of fecal waste still makes its way into the nearby environment due to poor quality on-site septic tanks, lack of adequate emptying and disposal, or dysfunctional wastewater treatment. These conditions elevate the cost of water treatment, and lead to environmental degradation, greater risk of disease, and poor child health and stunting. The poor in urban Indonesia are not only less likely to have adequate sanitation, but are more likely to live in areas where their neighbors also lack these services. Failure to address the sanitation conditions of urban dwellers, especially those living in informal settlements, could exacerbate inequalities, and is among the greatest threats to the inclusive growth and sustainability of Indonesian cities.

The water and sanitation sector in Indonesia is at a pivotal juncture in the post-2015 SDG era, where success will be defined by service quality, sustainability, and equitable distribution of services. The GoI's own ambitious target of achieving universal access to water supply and sanitation by 2019 is 11 years ahead of the SDG target. The challenge to achieving these targets, and achieving them on schedule, is compounded by the trend of rising income inequality and rapid urbanization in Indonesia. In contrast to the SDGs, the 2019 universal access target has no clearly stated poor-inclusive mission guiding it, despite evidence that the poor are less likely to have access to higher quality water and sanitation services, and are more likely to suffer the negative consequences of this lack of access, such as poor health and nutrition.

The objective of this report is to provide an empirical basis for more inclusive and equitable service delivery in the water and sanitation sector in Indonesia. Although the GoI has established a program and strategy for achieving universal access to water supply and sanitation and zero slums (the 100-0-100 program, which aims for 100 percent access to water supply, zero urban slums, and 100 percent access to sanitation), these targets will be achieved through different service level sub-targets. For water supply, the target is for 40 percent of the population to have access to piped water and 60 percent to non-piped (in urban areas, 60 percent piped and 40 percent non-piped), whereas for sanitation, universal access is defined as 15 percent of the population having access to basic sanitation (a toilet that ensures hygienic separation of human excreta from human contact), 12.5 percent to centralized and decentralized sewerage systems, and 72.5 percent to on-site sanitation with improved fecal waste management. A poor-inclusive approach to universal access—one that improves the ability of and opportunity for the poor and vulnerable to benefit from water and sanitation services—can help to ensure that Indonesia not only achieves its service delivery targets, but that water supply and sanitation become key drivers of a reduction in inequality, enhanced health and well-being, and economic growth and prosperity. Policy recommendations are prioritized based on their expected impact on these development goals, and the strength of the evidence base for the solution proposed.

An estimated 95% of fecal waste in Indonesia still makes its way into the environment.

Sanitation levels of a community, once they reach a critical mass, are more important than those of any one household.

Table ES.1 summarizes the key recommended actions and the responsible agencies/ stakeholders.

Key Facts and Recommended Actions

Fact 1

The government of Indonesia's 100-0-100 target is universal access to improved water supply, but current patterns in equity of access to piped water suggest that low-income households are likely to remain on a non-piped service for longer than non-poor households. Currently, of the 29.6 percent of urban households with access to piped water supply, the B40 make up just 7.5 percent, whereas the T60 make up 22.1 percent. A number of barriers, including (1) financial sustainability and performance of PDAMs; (2) government budget allocation and spending; (3) perceptions and behavioral constraints; and (4) lack of legal frameworks for equitable service delivery prevent low-income households from accessing piped water connections.

Recommended Action

Expand piped water services to a larger share of the bottom 40 percent in urban areas.

- **Improve the efficiency and performance of Perusahaan Daerah Air Minum (water utility; PDAMs) to generate a virtuous cycle of performance, tariff increases, cost recovery, and expansion of connections, especially to poor households**. The National Urban Water Supply Program (NUWSP), the main delivery mechanism for the urban water supply platform, includes a robust emphasis on performance improvement of PDAMs. The program could be enhanced through capacity building for LGs and PDAMs on incorporating equity and social concerns into tariff structures, and guidance on structuring cross-subsidization between customers in order to protect the poor and vulnerable. Additional capacity building on project preparation and project proposal development should cover (1) how to assess affordability of water tariffs; (2) willingness among poor households to pay for piped water connections; and (3) incorporation of low-income households, including customers of Water *Hibah* (an output-based grant scheme for piped water), in the overall performance improvement and investment plan.

- **Expand financing options for low-income households to connect to piped water.** Piped water connection fees are unaffordable for households living near or below the poverty line, and although the *Hibah* scheme has incentivized more poor-inclusive service delivery, not all PDAMs are eligible to participate, leaving a large share of poor households unable to connect. Subsidized credit and savings schemes, including microfinance, could be an alternative that allows households to spread the cost of the connection over time. Better coordination between *Hibah* and microfinance schemes can be achieved through the platform approach, taking advantage of a common policy framework regardless of the source of financing and greater flexibility at the LG level to partner with private sector actors. In addition, the existing targeting mechanism for *Hibah* beneficiaries that is based on electricity usage could be combined with income targeting to better identify eligible low-income households for financial subsidies.

- **Raise awareness of the benefits of piped water—both among consumers and among local government actors—to shift consumer behavior and dependence on alternatives, and to build the political will for improvements in water supply to poor households.** Awareness campaigns have been missing from most water supply programs. Although most households treat their water before drinking, either through boiling or filtration, they are unaware of the potential for recontamination during storage. Awareness campaigns, in accordance with a Water Safety Plan to achieve water quality standards, can be coordinated by the Ministry of Public Works and Housing (MoPWH) and Ministry of Health (MoH), and implemented in part by PDAMs. These campaigns can help to increase demand for clean water and put pressure on PDAMs and LGs to expand provision of piped water services to unserved communities and/or improve the quality of existing services.

- **Adjust the current intergovernmental fiscal transfer system to better align transfers to needs.** Although current levels of government budget allocation to water supply are insufficient to achieve the universal access targets for water supply, existing fiscal transfers could be allocated more efficiently to address needs. Basic information on water access is readily available; however, data on the Special Allocation Fund (*Dana Alokasi Khusus*, or DAK) transfers show a declining association between DAK allocations and water coverage at the district level. Additional considerations for aligning fiscal transfers to needs through the General Allocation Fund (*Dana Alokasi Umum*, or DAU) point to population growth in urban centers, and in suburban districts in particular. To better align fiscal transfers with population growth trends will require adoption of a per capita calculation, as opposed to the current per region calculation, to ensure equitable distribution of public resources according to population density of cities and districts. This alignment does not address the need for more financing to the sector overall. Commercial loans and private investment, including business-to-business collaboration, should be explored to better understand how these additional sources of financing can help bridge the gap.

Fact 2

Groundwater quality is not consistently monitored, and representative data are not available. However, water quality surveys conducted in several cities show the potential risk for contamination is severe. A large share of the B40 uses groundwater sources for drinking. In 2015 data showed that over a quarter (27 percent) of the B40 drink unsafe groundwater, compared with 14 percent of the T60. Contamination stems from poor quality septic tanks and untreated domestic wastewater, as well as from landfill and industrial effluent.

Recommended Action

Improve the quality of alternative water sources for those who will remain on non-piped water supply.

- **Enhance monitoring for water quality risks for all source types, and make this information publicly available**. Consumers are largely unaware of the variable quality of drinking water from different sources and the particular risks posed by poor household water storage practices and poor fecal waste management. Water sector strategy should account for the potential water quality risks of poor sanitation, and the respective investments of the water and sanitation sub-sectors should be aligned. This alignment is especially important in areas facing technical barriers to piped water. The Local Development Planning Agency (Bappeda) at city level can ensure that the needed alignment of water and sanitation is reflected in the respective strategy documents (the Master Plan for Drinking Water and the City Sanitation Strategy). Bappeda could also oversee integration of data from the two sub-sectors into planning, implementation, and monitoring.

- **Strengthen regulatory control for small-scale water providers to ensure that regulations on drinking water quality are met**. For refilled bottled water, enhanced control could be achieved by linking water quality monitoring, under the responsibility of MoH, with the licensing process, under the Ministry of Industry (MoI).

Fact 3

Between 2006 and 2015 access to improved sanitation grew at a rate of 6.5 percent annually. However, there were still close to 100 million people without improved sanitation in 2015 and the majority of these lived in rural areas. Just 48 percent of the population has improved sanitation in rural areas, compared with 76 percent of those in urban areas, a gap of 28 percentage points. Rates of open defecation have declined at similar rates between the B40 and T60 since 2002, but B40 households were more likely to move to basic latrines, contributing to the widening gap in access to improved sanitation between the B40 and T60.

Recommended Action

Support the bottom 40 percent in gaining access to improved sanitation.

- **Strengthen the *Sanitasi Total Berbasis Masyarakat* (Community-Based Total Sanitation, or STBM) strategy by revisiting the zero-subsidy approach in order to move up the sanitation ladder**. Although global practice suggests subsidies can harm sanitation behavior-change efforts, experience shows that when well-targeted, delivered through an efficient channel, and affordable, subsidies can be an effective mechanism to reach poor households which otherwise cannot afford the high lump-sum cost of a toilet. Targeting subsidized credit and savings schemes through existing targeting systems that are already working well to identify low-income households for social assistance—such as the Unified Database (UDB) operated by the National Team for the Acceleration of Poverty Reduction (TNP2K) and the Ministry of Social Affairs (MoSA)—can be an efficient and transparent way to reach households most in need of subsidies and achieve higher levels of service. The UDB contains socioeconomic and demographic information for the approximately 40 percent of the population with the lowest welfare status, the equivalent of 24 million households, or 96 million individuals. The MoH should take a leadership

role in adapting the existing policy on sanitation subsidies to address the financial constraints of poor households, and MoPWH should work with TNP2K and MoSA to adopt the UDB for targeting assistance under the Community-Based Rural Water Supply and Sanitation Program (PAMSIMAS).

Fact 4

The vast majority of households in urban areas use an improved toilet connected to a septic or sewerage system (78 percent), but less than 2 percent of those are connected to sewerage. However, a combination of high idle capacity for existing sewerage networks, poor performing septage treatment plants, limited improvements to fecal sludge management, and poor quality investments in on-site sanitation systems results in 95 percent of fecal waste making its way into the nearby environment through the process of containment, emptying, transport, treatment, and disposal. Conditions of high population density and inadequate fecal waste disposal interact to make poor sanitation particularly risky to the health of people population health in urban areas.

Recommended Action

Bring more households into the full sanitation and fecal waste service chain in urban areas.

- **Adopt a more holistic and inclusive approach to planning for citywide sanitation to accommodate the range of solutions required to meet universal access targets in urban areas**. Planning should cover the full fecal waste service chain and outline a progressive roadmap for bringing the entire population into this service chain. Local solutions are complex, requiring a combination of piped and non-piped technologies, such as septic tanks, sewerage, decentralized small-scale wastewater treatment plants, and fecal sludge management. District heads and mayors need to be given responsibility for ensuring consistency in planning, budgeting, and execution; flexible funding arrangements; and technical assistance and capacity building where needed. This approach requires a delicate balance between the national government's fiscal leverage to incentivize investment in sanitation, and granting greater autonomy to LGs to decide where and how to invest those resources.

- **Adapt sanitation behavior change to behavioral issues common in the urban sanitation space**. The universal access targets will be met primarily through on-site sanitation systems with fecal sludge management (72.5 percent); smaller shares are planned for centralized and decentralized sewerage (12.5 percent) and basic sanitation (15 percent). Low consumer demand for fecal waste management services is a reflection of both the lack of integrated services and the lack of knowledge about safe management and disposal practices. Part of the solution will require generating the necessary demand and changing the behavior of individuals, communities, and providers. But behavior change cannot happen in a vacuum—it also requires a coherent policy framework, clarity on institutional arrangements, and adequate enforcement of LG ordinances for design, construction, and desludging (World Bank and Australian Aid 2013). Coordination between MoH and MoPWH will be needed for effective implementation of STBM in urban areas, along with the Ministry of Environment and Forestry (MoEF) to enforce new regulations on effluent standards.

- **Elevate the profile of sanitation in political and fiscal discussions, as well as in intra-household decision-making**. This change could require a shift in the narrative around

urban sanitation to emphasize not only elements of modernity and competitiveness, but also the lifelong effects on intellectual and economic potential of early life stunting, caused in part by poor sanitation. AKKOPSI (Regency/City Alliance for Better Sanitation) could lead advocacy efforts with mayors and district heads.

Fact 5

An estimated 9 million children (37 percent) under five in Indonesia are stunted. Children in rural areas are more likely to be stunted than children in urban areas, but a child from the lowest income quintile is just as likely to be stunted whether he or she lives in an urban area (48 percent likelihood) or a rural area (49 percent). Owning a toilet and having access to clean drinking water supply, as well as living in a community where most of one's neighbors own a toilet, are important drivers of child growth and cognitive development in Indonesia. Access to WASH is just one key driver of nutrition, with food security, care, and access to health care being additional factors. The nutritional impact of WASH investments can be enhanced through multisectoral convergence to ensure that children have simultaneous access to all drivers of nutrition.

Recommended Action

Champion multisectoral approaches to reduce child stunting.

- **Capitalize on synergies of multisectoral approaches.** Progress toward reducing stunting in Indonesia can be enhanced by coordinated multisectoral interventions that address effectively the four key underlying determinants of nutritional status—food security, access to health care, child care practices, and access to water and sanitation. Geographic targeting can be used to reach areas where undernutrition and underlying deprivations are high. In these areas, interventions should be co-located to achieve service improvements across multiple sectors that impact stunting. PAMSIMAS can serve as the main platform for multisectoral convergence between WASH and other programs addressing nutrition outcomes in young children, with oversight of implementation coordinated through the National Development Planning Agency (Bappenas).

- **Crowd in resources until communities achieve near universal coverage of sanitation.** There is now compelling evidence, both within Indonesia and globally, that sanitation levels of a community are more important than those of any one household. The evidence shows that health and nutritional benefits mainly accrue after a minimum threshold level of coverage is surpassed, and that full benefits may only be achieved as sanitation becomes universal. This evidence supports existing sector practices, which aim for open-defecation free (ODF) areas, and suggests that resources should be spent on bringing as many communities as possible to universal or near-universal levels of coverage in order to realize the health benefits of sanitation.

- **Adapt water and sanitation interventions to be more "child-centric."** The five pillars of STBM ([1] stop open defecation; [2] hand washing with soap; [3] household safe water treatment and storage, and safe food handling; [4] safe disposal and management of solid waste; and [5] safe disposal and management of wastewater) are comprehensive across WASH services, but may still miss some of the dominant fecal contamination pathways that affect small children. An emerging approach known as "baby WASH" or "child-centered WASH" focuses on interrupting exposure pathways that are most strongly associated with subsequent diarrheal disease.

The MoH should adapt existing STBM behavior-change communication materials and LG capacity building to incorporate baby WASH, while implementation of the approach should be aligned with the current nutrition-sensitive pilot of PAMSIMAS.

- **Target slum areas and informal settlements with multisectoral action.** Conditions of poverty, overcrowding, and poor quality services interact to magnify the risks of poor water and sanitation in densely populated urban slums. The speed and scale of urbanization in Indonesia contributes to the urgency with which these challenges must be addressed. Multisectoral approaches have largely focused on rural areas, but the challenge in urban slums and informal settlements is complex, as an effective response involves a multitude of actors and is complicated by institutional constraints and tenure insecurity. Additional work is needed to understand the contamination pathways unique to these settings, and how to effectively engage different actors under the National Slum Upgrading Program (*KOTAKU*).

Table ES.1: Key Recommended Actions and Responsible Agencies

What	Who
Reduce Inequalities in Access and Quality	
Expand piped water services to a larger share of the B40 in urban areas	
Improve the efficiency and performance of PDAMs	MoPWH, Bappenas, MoHA, private sector
Enhance the capacity of LGs and PDAMs on tariff-setting to support the establishment of cost-recovery tariffs · Conduct analytical work on the implementation of new regulations on tariffs and subsidies · Add specific tariff-setting content to existing capacity building programs	MoHA, MoPWH, donor agencies, Center of Excellence (CoE) program, Association of PDAMs (Persatuan Perusahaan Air Minum Seluruh Indonesia, or PERPAMSI), NUWSP
Additional financing mechanisms to ease the financial and liquidity constraints faced by the poor · Continue and improve the Water *Hibah* scheme by linking with investment on capacity improvement · Scale up microfinance and similar mechanisms · Encourage collaboration between *Hibah* and microfinance schemes · Combine existing targeting mechanism with income targeting to better identify eligible low-income households	Bappenas, MoPWH projects, NGOs, local financing institutions

table continues next page

Table ES.1: Continued

What	Who
Increase demand and raise consumer awareness of the benefits of piped water	MoPWH, MoH, PDAMs
Adjustments to the current intergovernmental fiscal transfer system to better align transfers to needs • Exercise alternative approach in the allocation of DAK and DAU • Diagnose private sector involvement in water sector, including commercial loans, private investment, and business-to-business collaboration in bridging the financing gap	Bappenas, MoPWH, MoF, donor agencies
Improve the quality of alternative water sources for those who will remain on non-piped water supply	
Consistently monitor water quality risks to drinking water supplies, piped or non-piped, and make this information publicly available • Strengthen the critical link across water and sanitation sub-sectors—e.g., ensure the alignment of the Master Plan for Drinking Water and City Sanitation Strategy	MoH, District Health Office, Bappeda
Strengthen regulatory control for small water providers to ensure that regulations on drinking water quality are met • Link water quality monitoring with licensing process for refilled bottled water providers	MoH, MoI
Support the B40 in gaining access to improved sanitation	
• Strengthen STBM strategy by revisiting the "zero-subsidy" for poor households	Bappenas, MoH
• Identify various financial schemes to move up the sanitation ladder, such as DAK, Sanitation *Hibah*, Village Grant, and community social responsibility (CSR) funds	Bappenas, MoH, MoPWH
• Explore the possibility of targeted subsidy for the poorest segment of people to move up the sanitation ladder (from basic to improved latrines)	Bappenas, MoH, MoPWH, PAMSIMAS
• Adopt existing targeting systems that are already working well identifying low-income households (such as the UDB from TNP2K) to ongoing programs, including STBM, PAMSIMAS, etc.	Bappenas, MoH, MoPWH, Ministry of Social Protection

table continues next page

Table ES.1: Continued

What	Who
Bring more households into full sanitation and fecal waste service chain in urban areas	
Take holistic approach to planning in implementing citywide sanitation-inclusive approach • Apply the fecal waste diagram as a tool to assess citywide sanitation and identify priorities for city sanitation strategy • Ensure consistency in sanitation management at local level through PPSP (Acceleration of Urban Sanitation Development Program) and link it with decision-making on investment using central budget	Bappenas, MoPWH, Bappeda, PPSP
Adapt approach to behavior issues in urban sanitation, including enforcing the effluent standard • Effective implementation of STBM in urban areas • Enforce new regulations on effluent standards	MoH, MoPWH, MoEF
Elevate the profile of sanitation in political and fiscal discussion	MoHA, Bappenas, MoPWH, MoH, AKKOPSI
Improve Health, Nutrition, and Early Child Development	
Champion multisectoral approaches to reduce child stunting	
Capitalize on synergies of multisectoral approaches, including strengthening the existing scaling up nutrition (SUN) program and alignment with non-cash nutrition support	Bappenas, MoPWH, MoH, Ministry of Social Protection
Crowd in resources until communities achieve high coverage of sanitation	Bappenas, MoH, MoPWH, Bappeda
Adapt water and sanitation interventions to be more "child-centric" • Adapt existing STBM behavior-change communication materials and LGs capacity building programs to incorporate "baby WASH" • Ensure that the implementation of the "baby WASH" approach aligns with current nutrition-sensitive pilot of PAMSIMAS	MoH, PAMSIMAS
Enhance water supply and sanitation interventions to be more impactful on nutrition outcomes	MoH, Bappenas, STBM
Target slum areas and informal settlements with multisectoral action	Bappenas, MoPWH, Vice President's Office

References

WHO and UNICEF. 2015. *Progress on Drinking Water and Sanitation: 2015 Update and MDG Assessment*. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. New York: UNICEF.

World Bank and Australian Aid. 2013. *Urban Sanitation Review: Indonesia Country Study*. Washington, DC: World Bank.

Abbreviations

AKKOPSI	Regency/City Alliance for Better Sanitation
APBD	Local government budget
APBN	National government budget
B40	Bottom two quintiles, or bottom 40%
Bappeda	Local Development Planning Agency
Bappenas	National Development Planning Agency
BPPSPAM	Support Agency for the Development of Drinking Water Supply System
BPS	*Badan Pusat Statistik* or Central Bureau of Statistics
BPSPAMS	*Badan Pengelola Sistem Pelayanan Air Minum dan Sanitasi* (village water boards)
CHEF	Care, Health, Environment (or WASH) and Food Security
CLTS	Community-Led Total Sanitation
CoE	Center of Excellence Program
CSS	City Sanitation Strategies
DAK	Special Allocation Fund (*Dana Alokasi Khusus*)
DAU	General Allocation Fund (*Dana Alokasi Umum*)
DFAT	Department of Foreign Affairs and Trade, formerly known as AusAid
GDP	Gross domestic product
GoI	Government of Indonesia
IDR	Indonesian Rupiah
IFLS	Indonesia Family Life Survey
IMF	International Monetary Fund
IndII	Indonesia Infrastructure Initiative (project funded by DFAT)
JMP	Joint Monitoring Programme for Water Supply and Sanitation
LG	Local government
MDG	Millennium Development Goal
MoEF	Ministry of Environment and Forestry
MoEMR	Ministry of Energy and Mineral Resources
MoF	Ministry of Finance
MoH	Ministry of Health
MoHA	Ministry of Home Affairs
MoI	Ministry of Industry
MoPWH	Ministry of Public Works and Housing
MoSA	Ministry of Social Affairs
NTT	East Nusa Tenggara

NUWSP	National Urban Water Supply
ODF	Open Defecation Free
OECD	Organisation for Economic Co-operation and Development
PAMSIMAS	Community-Based Rural Water Supply and Sanitation
PDAM	*Perusahaan Daerah Air Minum* (Water Utility)
PDPAL	*Perusahaan Daerah Penanganan Air Limbah* (Regional Wastewater Treatment Enterprise)
PERPAMSI	*Persatuan Perusahaan Air Minum Seluruh Indonesia* (Association of PDAMs)
PPSP	Acceleration of Sanitation Development Program
RISKESDAS	Indonesia Basic Health Research
RPJMN	*Rencana Pembangunan Jangka Menengah-Nasional* (National Medium Term Development Plan)
SANIMAS	*Sanitasi Oleh Masyarakat* (Sanitation by Communities)
SDG	Sustainable Development Goal
STBM	*Sanitasi Total Berbasis Masyarakat* or Community-Based Total Sanitation
STH	soil-transmitted helminths
Susenas	National Socio-Economic Survey
T60	Top 3 quintiles, or top 60%
TNP2K	National Team for the Acceleration of Poverty Reduction
UDB	Unified Database
UNICEF	United Nations Children's Fund
UPTD	District Technical Implementing Unit
USAID	United States Agency or International Development
WASH	Water Supply, Sanitation, and Hygiene
WHO	World Health Organization

Chapter 1
Introduction and Background

Indonesia is the fourth most populous country in the world, with 252 million people spread over a vast equatorial archipelago of 6,000 inhabited islands; the country has a total of more than 13,000 islands, which extend nearly 6,000 kilometers east to west and across three time zones. The population distribution and levels of development vary considerably across the islands. The largest population cluster is on Java, which hosts 60 percent of the country's inhabitants, followed by Sumatra, which has a larger land area but hosts less than a third of the population. Approximately 118 million people (46 percent of the population) currently live in rural areas, where the majority of the poor are concentrated.[1]

A Global Mandate for Quality, Sustainability, and Equitable Distribution of Services

The Millennium Development Goals (MDGs) came to a conclusion in 2015. Worldwide, 2.1 billion people gained access to improved sanitation, while 147 countries met the MDG drinking water target, 95 countries met the MDG sanitation target, and 77 countries met both. To continue these efforts and shift the world onto a sustainable path, world leaders gathered on 25 September 2015 at the United Nations in New York to adopt the 2030 Agenda for Sustainable Development. The 2030 Agenda comprises 17 new Sustainable Development Goals (SDGs), or Global Goals,[2] which will guide policy and funding for the next 15 years. Universal access to clean water and sanitation is 1 of 17 Global Goals that make up the 2030 Agenda for Sustainable Development. Goal 6 aims to "Ensure availability and sustainable management of water and sanitation for all," with two main targets:

- Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all

- Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

In this context, the GoI, through the National Medium Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*, or RPJMN) for the period 2015–19, has set the target of universal access to water supply and sanitation by the end of 2019.[3] To achieve this universal access target, Ministry of Public Works and Housing (MoPWH) has launched the 100-0-100 program (100 percent access to water supply, zero urban slums, and 100 percent access to sanitation). The 100-0-100 program defines specific service levels to be met for universal access by the end of 2019:

Water Supply

- 40 percent of the population with access to piped water and 60 percent to non-piped water (in urban areas 60 percent piped and 40 percent non-piped);

- 85 percent of urban areas receiving at least 100 liters per capita per day;

- 15 percent of urban areas receiving a basic level of 60 liters per capita per day;

- all supplies meeting the 4K standards (*Kualitas, Kuantitas, Kontinuitas, Keterjangkauan*) for quality, quantity, continuity and affordability

Sanitation

- 15 percent of the population having access to basic sanitation (a toilet that ensures hygienic separation of human excreta from human contact);

- 12.5 percent to centralized and decentralized sewerage systems;

- 72.5 percent to on-site sanitation with improved fecal waste management.

Overview of the Water Supply and Sanitation Sector in Indonesia

Table 1.1 provides a high-level overview of the Water Supply and Sanitation Sector in Indonesia. Chapter 5 provides further detail on the institutional setup of Urban Water as a basis for

Table 1.1: Overview of Water Supply and Sanitation Sector in Indonesia

Sub-sector	National authority	Service authority	Service provider	Programs
Urban Water Supply	• Ministry of Public Works and Housing (lead institution) • National Development Planning Agency (Bappenas, for national planning and monitoring) • Ministry of Health (for water quality standards) • Ministry of Home Affairs (for institutional improvements in subnational governments and setting up the monitoring on minimum service standards)	District	PDAMs (district water utilities)	**NUWSP** (under preparation) The delivery mechanism for the urban water supply platform of the urban water program, which includes a robust emphasis on performance improvement and capacity building of PDAMs and Local governments (LGs) to accelerate urban piped water service provision. **Water *Hibah*** An output-based grant (*Hibah*) scheme for household piped water connections, particularly for low-income households. The *Hibah* program provides reimbursement to the LG once connections have been independently verified. The program serves as an incentive to LGs to ensure water service delivery. Eligibility is restricted to "healthy" PDAMs that are performing well and have adequate spare production capacity and the ability to pre-finance capital investments.

table continues next page

Table 1.1: Continued

Sub-sector	National authority	Service authority	Service provider	Programs
Rural Water Supply	• Ministry of Public Works and Housing (lead institution) • National Development Planning Agency (Bappenas, for national planning and monitoring) • Ministry of Villages, Underdeveloped Regions and Transmigration (for institutional improvements in village government) • Ministry of Home Affairs (for capacity building for community-based organization [CBO] that manage the rural water and sanitation systems)	District and village governments since the Village Law (passed in 2014)	Village-level CBOs predominantly; referred to as *Badan Pengelola Sistem Pelayanan Air Minum dan Sanitasi* (BPSPAMS) under the national platform to accelerate rural water supply access (PAMSIMAS)	**PAMSIMAS** The government's main platform for expanding Community-Based Rural Water Supply and Sanitation, which targets underserved and low-income communities. PAMSIMAS devolves planning and management of water systems to local government and communities through the establishment of village BPSPAMS.
Urban Sanitation	• Ministry of Public Works and Housing (lead institution) • National Development Planning Agency (Bappenas, for planning and monitoring) • Ministry of Health (for advocacy and behavior change) • Ministry of Environment and Forestry (for setting up the effluent standard)	District	Regional Wastewater Treatment Enterprise (Perusahaan Daerah Penanganan Air Limbah, or PDPALs), PDAMs, technical unit under specific district office or District Solid Waste Management Office	**PPSP** Acceleration of Urban Sanitation Development Program—a national program to assist LGs in conducting comprehensive citywide sanitation planning through the preparation of City Sanitation Strategies (CSS). Currently, PPSP is in its second phase (PPSP-2) and focused on the transition from planning to implementation. **SANIMAS** Community-managed decentralized wastewater treatment system—a national program to expand decentralized community-managed wastewater systems, which may include public facilities or decentralized sewerage systems with a communal treatment facility. These systems were developed as a medium-term solution to serve high-density residential areas, with plans to eventually connect to municipal sewerage.

table continues next page

Table 1.1: Continued

Sub-sector	National authority	Service authority	Service provider	Programs
				Sanitation *Hibah* An output-based grant (*Hibah*) scheme for sewerage connections, particularly for low-income households. The *Hibah* program provides reimbursement to the LG once connections have been independently verified. The program serves as an incentive to LGs to ensure sanitation service delivery. Improving Urban Fecal Sludge Management **Activities initiated to help LGs improve existing fecal sludge management** practices, which include (1) improving on-demand services, and (2) initiating regular desludging services.
Rural Sanitation	• Ministry of Health (lead institution, for behavior change) • National Development Planning Agency (Bappenas, for planning and monitoring) • Ministry of Public Works and Housing (for technical advisory and support)	District and village governments since the Village Law (passed in 2014)	Sanitarian, Community Health Centre (*Puskesmas*)	**STBM** Community-Based Total Sanitation—adopted in 2005 by combining community-led total sanitation with a market-based approach and behavior-change communication. *Sanitasi Total Berbasis Masyarakat* (STBM) is seen as the primary national approach to scaling up rural sanitation.

diagnosis of the constraints to, and opportunities for, extending piped water access to the poor in urban settings provided in chapter 6. Given the complexity of the water and sanitation sector in Indonesia—with differing institutional, financial, and technical arrangements across sub-sectors—it was not possible to provide a similar level of detail for each of the sub-sectors within the present study, and it is recommended that these sub-sectors be the subject of further analytical work moving forward.

Approach and Methodology of the WASH Poverty Diagnostic

The Indonesia WASH Poverty Diagnostic seeks to strengthen the evidence base on inequality of access to, and quality of, water and sanitation services between the bottom 40 percent and the top 60 percent of the population in Indonesia. The World Bank Group's new goal of boosting shared prosperity shines a spotlight on the welfare of the B40 population. Although growth itself

will be important to achieve the goal of shared prosperity, it has become increasingly clear that promoting equality of opportunities has the dual advantages of fostering fairness and helping countries to achieve their aspirations of economic prosperity. Equalizing basic opportunities for children today will promote social mobility and reduce income inequality tomorrow.

The diagnostic tailors a pilot framework developed by the Water Global Practice that focuses on a set of core questions. The overall objectives are to (1) deepen understanding of the extent and distribution of inequalities in access to water supply and sanitation services; (2) inform policy and investment strategy to achieve national and global targets; and (3) increase client capacity for identifying and diagnosing service delivery constraints to improving the quality of water supply and sanitation services for the poor. The following core questions guide the Diagnostic:

1. ***Who and where are the poor and bottom 40 percent of national distribution of income?*** This is a fundamental question for identifying the population of interest, and draws mainly on evidence and analysis produced under the Poverty Global Practice Indonesia country work program.

2. ***What are the linkages and synergies between WASH and other sectors?*** This question addresses how lack of access to water and sanitation affects early child health, nutrition, and development. Inequality in outcomes, such as income, is influenced by inequality of opportunity that includes access to basic services such as water supply and sanitation, and the inability of households to benefit from the synergies associated with access to more than one basic service.

3. ***What is the level of access and quality of WASH services experienced by the poor and bottom 40 percent compared to the non-poor and top 60 percent?*** Analysis of "access" for the diagnostic is based on the WHO/United Nations Children's Fund (UNICEF) Joint Monitoring Programme (JMP) global categories of improved and unimproved service levels, but prioritizes Government of Indonesia (GoI) methods and definitions to facilitate policy dialogue. Where possible, additional dimensions of service quality are analyzed to begin to characterize levels of service as defined under the SDG framework.

4. ***What are the WASH service-delivery constraints and potential solutions to improving services to the poor and bottom 40 percent?*** Addressing the previous core questions helps to frame an institutional and problem-driven political economy analysis in one of the four sub-sectors.

The diagnostic draws on a variety of existing data sources. Socioeconomic household survey data (primarily Susenas) is used for distributional and geospatial analysis to characterize how access to services varies at national and subnational levels. To reflect the nature of decentralized service delivery and responsibility in Indonesia, a key unit of analysis of the diagnostic is the district. The analysis also investigates differences across cities of different sizes (e.g., metropolitan, small, medium, and big cities). Econometric analysis using Susenas is used to understand the determinants of access, while the Indonesia Family Life Survey (IFLS) is used to model impacts of access to WASH in early childhood on later life nutrition and cognitive outcomes; the Indonesian Basic Health Research (RISKESDAS) survey is used for distributional and econometric analysis of access to the determinants of nutrition. Spatial mapping is used to visualize associations between access to WASH, poverty, and health outcomes.

Stakeholder consultations were conducted throughout the preparation of the WASH Poverty Diagnostic. These consultations included Bappenas, MoPWH, Ministry of Health (MoH), Ministry of Environment and Forestry (MoEF), several development partners and relevant projects, such as UNICEF, United States Agency or International Development (USAID), Department of Foreign Affairs and Trade (DFAT), IUWASH Plus (Indonesia Urban Water Sanitation and Hygiene, or Penyehatan Lingkungan untuk Semua, a USAID-funded project) and IndII (Indonesia Infrastructure Initiatives, a DFAT-funded project), as well as the World Bank

Indonesia Water, Health, Poverty, and Governance teams, and other stakeholders. A final consultation was held on June 7, 2017, after completion of the diagnostic to solicit feedback on the policy recommendations and incorporate suggestions into the final report.

It is increasingly recognized that indicators of access to "improved" services are insufficient for capturing all crucial preconditions for the desired poverty and prosperity outcomes over the long term. Monitoring of drinking water and sanitation services during the MDG period focused on indicators that identify adequate protection from outside contamination, particularly fecal matter (for drinking water), and hygienic separation of human excreta from human contact (for sanitation). The SDG targets, which are more in line with the current indicators used by the GoI, provide further granularity on service levels by including additional dimensions such as availability, accessibility, and quality. Existing socioeconomic household surveys in Indonesia do not yet capture these dimensions consistently, necessitating the use of multiple surveys, which are limited in population representativeness. To overcome data limitations, the WASH Poverty Diagnostic uses a variety of published evidence and secondary data sources. Importantly, the WASH Poverty Diagnostic uses GoI definitions, rather than those of the JMP, to categorize access to improved drinking water and sanitation (see box 1.1).

Box 1.1: Defining Access to Improved Drinking Water

There are differences in the definition of access indicators used by the Government of Indonesia (GoI) and the WHO/UNICEF Joint Monitoring Programme (JMP).

The GoI defines "access to improved water" as the share of households whose primary source of drinking water is either: (1) piped water; (2) protected pump/well/spring water, at a minimum distance of 10 meters from a fecal disposal site; or (3) rain water.

Excluded from the definition are: (1) pump/"protected" well/spring water, at less than 10 meters from a fecal disposal site; (2) "unprotected" well/spring; (3) bottled water; and (4) others.

Bottled water is regarded as an "unsustainable" source in view of its relative price compared with other sources, but recent increases in use of bottled water as the primary source of drinking water prompted the GoI to modify the definition to include households using a safe and sustainable water source for both cleaning and cooking (even if their drinking water is not from a sustainable source, such as bottled water).

The Central Bureau of Statistics (BPS) compiles this indicator through the National Socio-Economic Survey (Susenas), which is conducted annually.

In addition to differences in how access is defined, different data sources and underlying population data contribute to different estimates.

The JMP uses both the Demographic and Health Survey (DHS) and Susenas and applies a linear regression model to estimate coverage, while GoI refers only to Susenas.

Roadmap of the Report

The remainder of this report is structured in 6 parts. Chapter 2 gives an overview of recent trends in poverty and the increase in inequality in Indonesia—in particular, inequality of opportunity and implications for economic growth and stability. Chapter 3 reviews global and Indonesia-specific evidence on the links between water supply and sanitation, and health and nutrition, including econometric anlaysis of the impact of WASH on early child health conducted under the Diagnostic. In addition, analysis is presented on the role of multisectoral interventions to address stunting. Chapter 4 presents a core set of diagnostics of water supply and sanitation, including recent trends in access and quality, disparities across geography and income groups, and key service delivery challenges facing the sector. The chapter begins with a diagnostic of the sanitation sector, both urban and rural, and then turns to urban and rural water supply. Chapter 5 outlines the constraints on and opportunities for delivery of piped water to the poor in urban settings. A focus on the urban water sector is timely and opportunistic given the context of rapid urbanization in Indonesia, the longstanding challenges faced by urban utilities to keep up with the resulting rising demand, and the current focused efforts by government urban water counterparts to tackle these issues. Chapter 6 presents key recommended actions to orient future water supply and sanitation policy and investment toward a more inclusive approach. Recommendations are prioritized based on their expected impact on the development goals of (1) reducing inequality; (2) enhancing health and well-being; and (3) promoting economic growth and prosperity, as well as on the strength of the evidence base for the solution. The chapter also presents proposed future analytical work on topics that were not fully addressed in the report.

The evidence summarized in this report has benefited from a set of topical background papers. The background papers include:

1. *Determinants of Access to Improved Water Sources in Indonesia from a Household Demand Perspective*, which estimates the influence of households' socioeconomic, demographic, and geographic characteristics on the probability of choosing specific sources of drinking water. It then quantifies and synthesizes this understanding of determinants, and suggests how this knowledge could be utilized to provide scientific evidence in support of the GoI's efforts to accelerate access to improved water sources in Indonesia.

2. *Child Stunting and Cognitive Impacts of Water, Sanitation and Hygiene in Indonesia,* which examines the relationship between poor households and community water and sanitation services and child stunting, underweight, and cognitive development in Indonesia, using a sample of 3,049 children from the IFLS.

3. *Operationalizing a Multi-Sectoral Approach for the Reduction of Stunting in Indonesia: An Application Using the 2007 and 2013 RISKESDAS,* which conducts analysis of the distribution, co-distribution, and synergies between the underlying determinants of nutrition and their effect on height-for-age outcomes in children under five. The analysis provides a practical diagnostic framework for identifying potential "binding constraints" in the Indonesian context to support efforts to reduce child stunting and malnutrition.

4. *Identifying and Overcoming Binding Constraints to Piped Urban Water Services for the B40 in Indonesia,* which uses problem-driven political economy and institutional analysis to examine the WASH service delivery constraints and potential solutions to improving urban piped water services to the poor in Indonesia.

Additionally, a dynamic dashboard accompanies the report, which contains all underlying data. The dashboard is intended for use by the GoI, the World Bank, and development partners to monitor inequalities in WASH services, along with poverty levels, and prevalence of health outcomes among children under five, including stunting. The dashboard can help to inform

geographic and sub-group targeting for more pro-poor and poor-inclusive WASH interventions, as well as identify where further inquiry is needed to understand why service delivery fails within certain groups or geographic areas. The dashboard is available at: http://witiestudio .com/worldbank-map/ (see appendix A for examples).

Notes

1. World Bank Development Policy Review 2014 Indonesia: Avoiding the Trap.
2. UNDP, http//www.undp.org.
3. National Medium Term Development Planning 2015–19.

Chapter 2
Rising Inequality and Why It Matters

Core Question: Who and where are the poor and bottom 40 percent (B40) of national distribution of income?

Key facts

- Between 2002 and 2015 Indonesia reduced poverty from 18.2 percent to 11.2 percent.
- 28.6 million Indonesians live below the poverty line and 62 million are vulnerable to poverty.
- Poverty rates are higher in Eastern Indonesia, compared with other regions, but the largest number of people living below the poverty line are in the islands of Java and Sumatra in Western Indonesia.
- Consumption inequality, as measured by the Gini index, increased from 36 to 41 between 2002 and 2015, one of the largest increases in the world over this period.
- The level of wealth inequality in Indonesia is one of the highest in countries for which there are data; by some estimates, the richest 1 percent own 50 percent of all financial and property wealth.
- The poorest 40 percent now account for only a fifth of total household consumption, while the richest 20 percent account for nearly half.
- Around a third of total inequality in Indonesia is due to inequality of opportunity— circumstances that give a child an unfairly disadvantaged start in life.
- A key driver of better opportunities for the next generation begins with improvements in the delivery of basic services.

The Evolution of Poverty and Inequality in Indonesia

Understanding how poverty and inequality have evolved, and exploring the pathways to reducing poverty and boosting shared prosperity, are questions of central importance both globally and in Indonesia. While Indonesia has achieved solid economic growth and reduced poverty from 18.2 percent in 2002 to 11.2 percent in 2015, there are still 28.6 million Indonesians who live below the poverty line and 62 million people vulnerable to poverty.[1] Alongside poverty reduction, the GoI recently declared rising inequality the administration's top priority for 2017 (Gibson 2017).

Figure 2.1: Trend in Poverty Reduction 2002–15
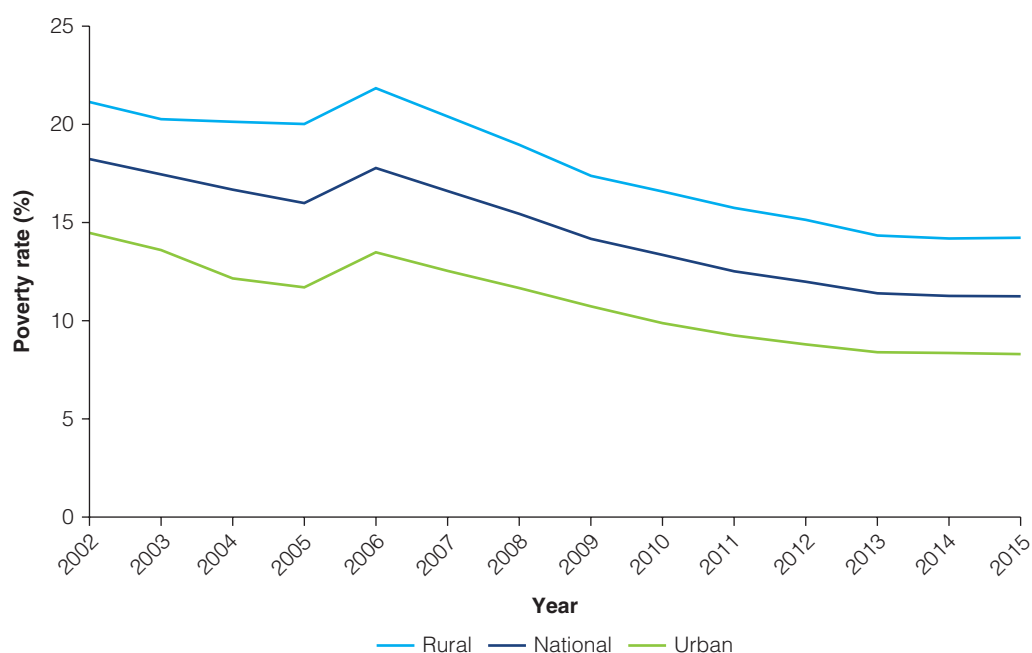
Source: Susenas, World Bank calculations.

Between 2002 and 2015 poverty decreased by more than a third in Indonesia. Urban areas experienced a slightly faster rate of poverty reduction, at 4 percent annually, compared to a reduction of 3 percent in rural areas (figure 2.1).[2]

Poverty rates are higher in Eastern Indonesia, compared with other regions in the country. Eight out of 16 provinces that exceeded the national poverty rate of 11.2 percent in 2015 are located in Eastern Indonesia. Provinces in Papua Island, East Nusa Tenggara, and Maluku have more than one-fifth of their population below the poverty line (map 2.1). However, the largest number of people living below the poverty line are on the islands of Java and Sumatra in Western Indonesia. This is primarily due to greater population density—in fact, half of the Indonesian population is living in Java.

Vulnerability to poverty remains high in Indonesia, with a large share of the population living just above the official poverty line.[3,4] This group accounts for 27 percent of the population, so that the poor and the vulnerable together make up 38 percent of the population (that is, the bottom 40 percent). Living standards for households classified as vulnerable remain low, and a small shock to income or expenditures for this group can easily send them into poverty (World Bank 2016a).

Inequality in Indonesia has been steadily rising despite rapid growth over the past decade. Between 2002 and 2015 the country's mean per capita consumption grew an average of 4.6 percent per year, and gross domestic product (GDP) per capita (measured at 2010 constant US$) rose from US$2,259 in 2002 to US$3,834 in 2015 (WDI). During this same period consumption inequality, as measured by the Gini index, increased from 36 to 41, as shown in figure 2.2 (*Badan Pusat Statistik*) (BPS). This places Indonesia among the countries with the highest levels of inequality in East Asia, just below Malaysia, the Philippines, and China.

Improving Service Levels and Impact on the Poor

Map 2.1: Poverty Rate and Poverty Headcount, by Geographic Location, 2015

a. Poverty Rate

b. Poverty Headcount

0   250 500 750 km

0.0–3.3	4.9–6.8
3.3–4.9	6.8–8.4
	8.4–10.8
	10.8–13.0

13.0–16.5	
16.5–20.0	
20.0–26.0	
26.0–46.0	

0   250 500 750 km

| 0-6377 |
| 6377-10805 |

| 10,805–16,139 |
| 16,139–22,040 |
| 22,040–29,320 |
| 29,320–41,154 |

| 41,154–54,974 |
| 54,974–85,993 |
| 85,993–1,45,796 |
| 1,45,796–6,26,529 |
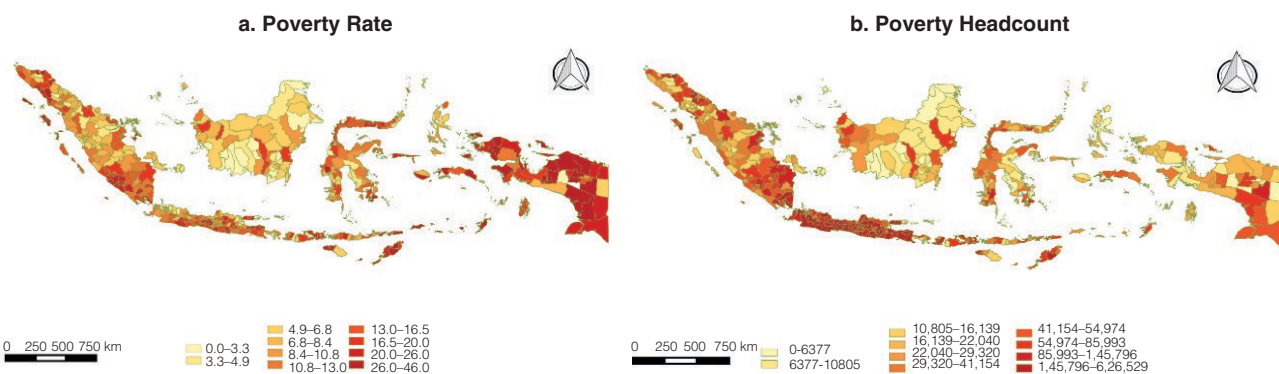
Source: Susenas, World Bank calculations.

Figure 2.2: Trends in Inequality, Households Per Capita Consumption, 1980–2015
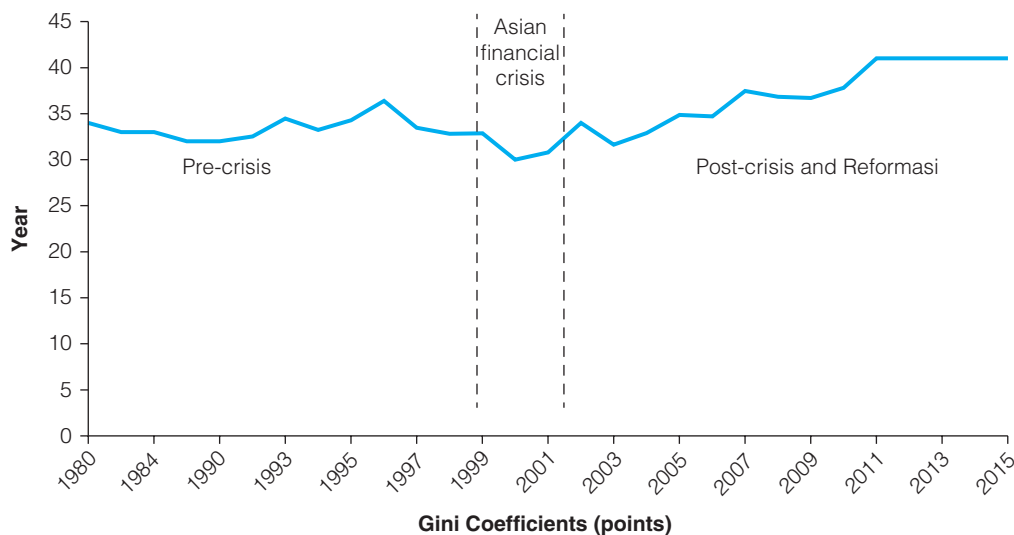
Source: Susenas, World Bank staff calculations.

Indonesia now has one of the highest levels of wealth inequality amongst countries for which there are data. In 2014, according to Credit Suisse, the richest 10 percent of people owned 77 percent of all financial and property wealth, the fourth highest level of wealth inequality in the dataset. The richest 1 percent owned *half* of all wealth. The World Bank (2016a) identified high wealth inequality as a key driver of rising consumption inequality in Indonesia, as this high concentration of wealth in the hands of a few provides both higher incomes today for wealthy families—affording better health care and education for their children, greater opportunities, and better jobs for tomorrow—and wealth that is passed down between generations.

> The richest 1 percent of Indonesians own half of the country's wealth.

The increase in inequality is the result of the richest 20 percent enjoying the most economic growth, while the B40 enjoyed relatively little. While the richest 10 percent enjoyed annual

Figure 2.3: Change in Inequality, Gini Coefficient
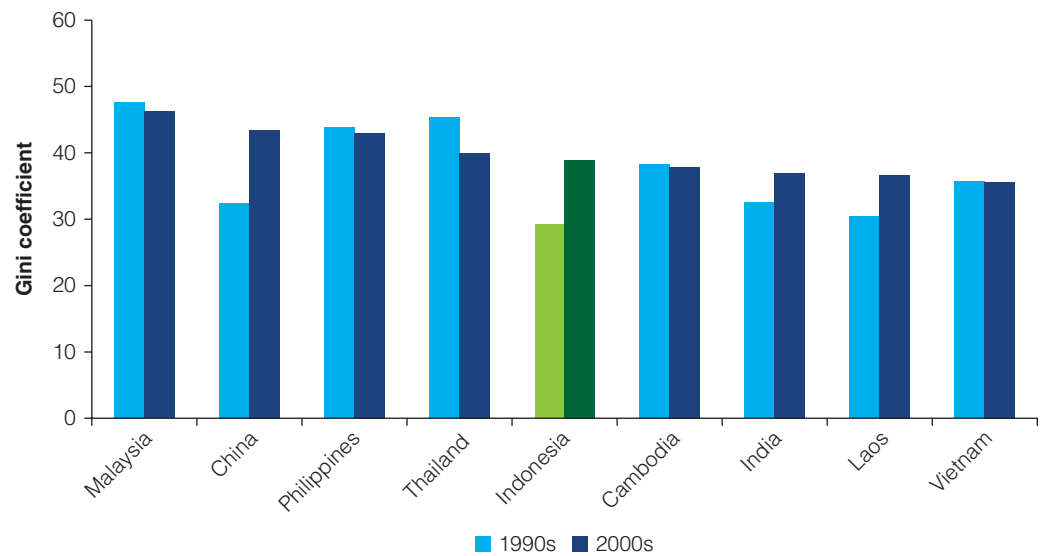
Source: Zhuang et al. 2014.

consumption growth of over 6 percent and the second richest 5.3 percent, consumption for the B40 grew at only 3–4 percent annually between 2002 and 2015. The B40 now account for only a fifth of total household consumption, while the richest 20 percent account for nearly half.

Inequality has been rising rapidly compared to Indonesia's neighbors, although it has not yet reached the levels seen in some countries. Indonesia started out in the 1990s with the lowest Gini coefficient in the region, but by the late 2000s, inequality had reached the levels seen in its peers (figure 2.3).[5] The size of the increase was also larger than that seen in any other country in the region, except China, and most of this increase happened over a short time. Importantly, other fast-growing East Asian neighbors such as Malaysia, Thailand, and Vietnam experienced stable or declining inequality over the same period (World Bank 2016a).

Generally speaking, higher income inequality reduces and destabilizes economic growth, according to an International Monetary Fund (IMF) study (Ostry and Berg 2011). When the share of total income held by the richest 20 percent of the population increases by 5 percentage points annually, economic growth *falls* by 0.4 percentage points. Conversely, when the share of total income held by the poorest 20 percent of the population increases by 5 percentage points, growth *increases* by 1.9 percentage points.

Urbanization can catalyze strong economic growth, but it can also exacerbate disparities in income and access to services.

Indonesia is also undergoing rapid urbanization, and while this can be accompanied by strong economic growth, it creates a number of challenges, including disparities in income and access to services. For example, in just the past few years poverty has increased by 2 percentage points in Jakarta, despite the downward trend nationwide, and this could be related to high rates of migration from rural areas. In the absence of adequate planning, rapid urbanization also creates challenges for effective delivery of services, the absence of which contributes to widening inequalities. These inequalities can cause social friction, leading to a rise in crime and violence, which threaten the sustainability of the growth process and undermine the benefits of urbanization (UN Habitat 2008).

The Source of Inequality and Implications for Service Delivery

Sometimes inequality incentivizes people to work hard and take risks, leading to innovation and economic growth. But when not everybody begins life with the same opportunities, due to factors beyond their control, inequality is considered unfair. This sort of inequality (inequality of opportunity) makes people uncomfortable and can lead to social conflict (Atinc et al. 2005). Thus, a society that ensures equality of opportunity for its citizens helps engender greater trust, more efficient growth, and better institutions. Although it is difficult to guarantee equality in outcomes such as income—and many would argue against this as a policy objective—ensuring equitable distribution of basic services and interventions can "level the playing field," which can make equitable outcomes more likely.

Around a third of total inequality in Indonesia is due to inequality of opportunity—that is, when a child is born into circumstances that give him or her a disadvantaged start in life (World Bank 2016a). Inequality of opportunity can stem from birthplace, race, gender, or other inherited characteristics. Basic opportunities, such as access to water and sanitation, education, and health care, are other circumstances that are out of a child's control but which compelling evidence shows dictate future opportunities. Often these deprivations overlap. In Indonesia, for instance, evidence indicates that one-fifth of rural children lack simultaneous access to critical services such as health care, education, and transportation services (figure 2.4).

A key driver of better opportunities for the next generation is improved delivery of basic services. In Indonesia, responsibility for delivery of basic services, including water supply and sanitation, was devolved to local governments (LGs) after the democratization and decentralization reforms in the late 1990s. However, LG entities often lack capacity, a supportive regulatory environment, coherent institutional and fiscal arrangements, and political incentives to effectively deliver these services. As a result, service delivery breaks down—despite supportive policies and high-level political commitment. Addressing the critical gap between policy and implementation that impedes service delivery requires doing business differently: understanding the functioning of the public sector and the politics of reform, and taking action in the context of those constraints.

The following chapter reviews global and Indonesia-specific evidence on the links between water supply and sanitation and human development outcomes, illustrating the ways in which water and sanitation services, along with other key determinants of nutrition, can safeguard a child's future health, and social and economic well-being.

> Equitable distribution of services can level the playing field and make equitable outcomes more likely.

> About one third of inequality in Indonesia is due to inequality of opportunity that children experience early on in life.

> Improved delivery of services is key to creating better opportunities for the next generation.

Figure 2.4: Children in Rural Areas Lack Access to Multiple Services

a. Urban access to services, 2011

Poor health access 8% — 3%, 2%, 3% — Poor education access 7% — 2%, 1%, 2% — Poor transportation 26% (22%)

b. Rural access to services, 2011

Poor health access 40% — 6%, 9%, 5% — Poor education access 41% — 5%, 20%, 6% — Poor transportation 50% (18%)
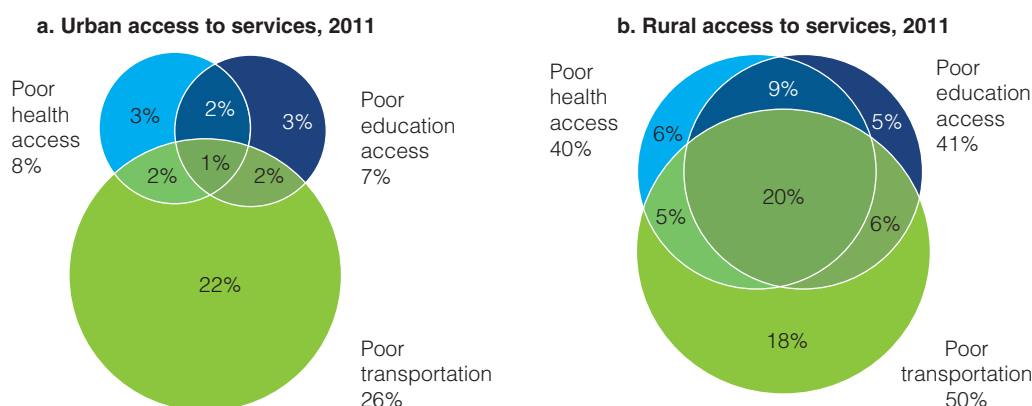
Source: World Bank 2015 An Unfair Start: How Unequal Opportunities Affect Indonesia's Children.

Notes

1. The poverty line used throughout the report is Indonesia's national poverty line, currently approximately 330,000 IDR per person per month, set by BPS unless stated otherwise.
2. The poverty rate increased by nearly 2 percentage points between 2005 and 2006 due to sharply higher rice prices, a result of a ban on rice imports (World Bank 2006a Making the New Indonesia Work for the Poor).
3. The official method used by the Central Bureau of Statistics (BPS) to set the poverty line is the basic needs approach, begun in 1984. Since poverty is defined as the inability to meet basic food and non-food needs, the "basic needs approach" is based on the consumption module of Susenas that is collected annually from around 65,000 households. Currently, the consumption module includes 216 food items and 94 non-food items. Based on the "basic needs approach," the indicator used to measure poverty is the Head Count Index, defined as the number or percentage of poor people living under the poverty line.
4. Vulnerable is defined as households with at least a 10 percent chance of being below the poverty line in the following year. Using this definition, the World Bank calculated the vulnerability line based on Susenas panel data 2008–10. The calculated vulnerability line is approximately 1.5 times the poverty line (World Bank 2012).
5. Note on Figure 4: Consumption Ginis for all countries except Malaysia, which uses income. The periods for each country are: Indonesia 1990–2011; Malaysia 1992–2009; the Lao People's Democratic Republic 1992–2008; China 1990–2008; Vietnam 1992–2008; Thailand 1990–2009; the Philippines 1991–2009; and Cambodia 1994–2008.

References

Atinc, T. M., Banerjee, A., Ferreira, F. H. G., Lanjouw, P, Menendez, M., Ozler, B., Prennushi, G., Rao, V., Robinson, J., Walton, M., and Woolcock, M. 2005. *World Development Report 2006: Equity and Development*. World Development Report. Washington, DC: World Bank.

Gibson, Luke. 2017. "Towards a More Equal Indonesia." Oxfam.

Ostry, J. D., and A. Berg. (2011). *Inequality and Unsustainable Growth; Two Sides of the Same Coin?* (11/08). International Monetary Fund.

UN Habitat. 2008. *State of the World's Cities 2008–2009: Harmonious Cities*. Earthscan.

World Bank. 2015. *An Unfair Start: How Unequal Opportunities Affect Indonesia's Children*. Jakarta: World Bank.

World Bank. 2016a. *Indonesia's Rising Divide*. Washington, DC: World Bank Group.

Zhuang, J., R. Kanbur, and C. Rhee. 2014. "Asia's income inequalities." In *Inequality in Asia and the Pacific: Trends, Drivers, and Policy Implications*, edited by J. Zhuang, R. Kanbur, and C. Rhee. New York: Asia Development Bank and Routledge.

Chapter 3
The Role of WASH in Human Development

Core Question: What are the linkages and synergies between WASH and other sectors?

Key facts

- Children living in an environment contaminated by feces are more likely to be infected by disease-causing pathogens, leading to diarrhea, poor gut function, and stunting.

- An estimated 9 million children (37 percent) under five are stunted in Indonesia, and children in the lowest quintile (49 percent) are more likely to be stunted than children in the highest (29 percent).

- Stunting is higher in rural areas (42 percent) than in urban (33 percent), but children in the lowest quintile are just as likely to be stunted whether they live in urban areas (48 percent) or in rural (49 percent).

- Owning a toilet and having access to clean drinking water supply, as well as living in a community where most of one's neighbors own a toilet, are important drivers of child growth and cognitive development.

- Poor access to WASH is just one key driver of stunting and malnutrition, with food security, child care practices, and access to health care being additional factors.

- Children who have simultaneous access to multiple determinants of nutrition are taller on average, but very few children meet this criteria, suggesting that the nutritional impact of sector-specific interventions may be limited by poor access to the other drivers of nutrition.

Pathways of Exposure and Impacts on Health and Nutrition

Poor quality latrines, inadequate fecal waste management, and open defecation are the main sources of environmental fecal contamination that cause disease. Pathogens in the environment are spread through drinking and washing water, hands, vectors (such as flies), and the soles of the feet or shoes. The "F-diagram" (figure 3.1) illustrates how these fecal pathogens can enter into the open environment, and illustrates the role that sanitation, clean water supply, and hygiene each play in blocking these contamination routes.

The evidence underlying the F-diagram has recently expanded to show how children, in particular, face high risk of exposure (Mahmud and Mbuya 2015). For instance, a recent

Figure 3.1: F-Diagram Showing How Inadequate WASH Affects Child Health and Nutrition
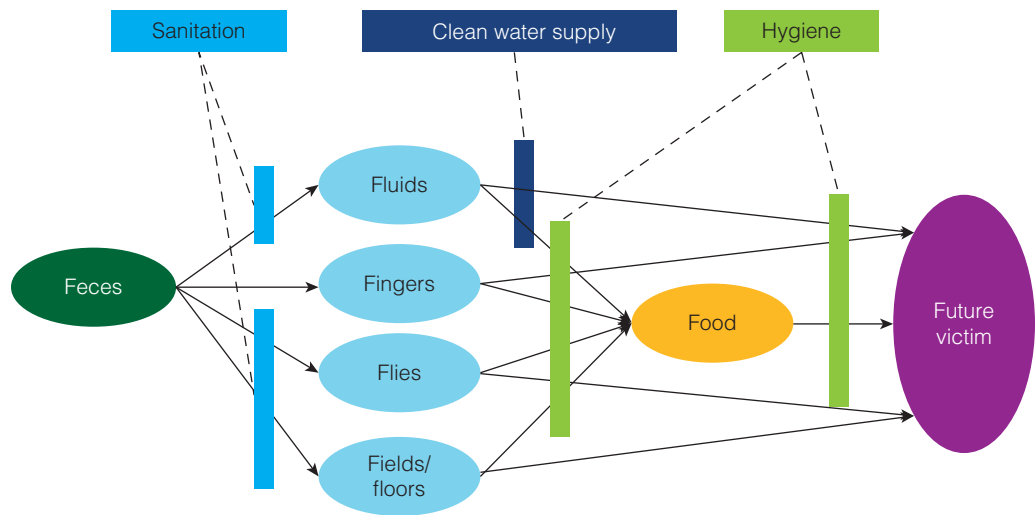
Source: Wagner and Lanoix 1958 adapted by the World Bank.

study in Bangladesh found that 98 percent of soil samples from areas where small children play tested positive for *E. coli* at extraordinarily high levels. Structured observations of children in the study showed them frequently mouthing hands and objects that had touched the soil, and 18 percent of children were observed putting soil directly into their mouths (Ercumen et al. forthcoming). Infants and children also risk being fed water and food that has become contaminated by poor hand hygiene, and by dirty utensils and containers used for preparation, storage and serving. Food and water can be contaminated at a more macro level due to inadequate management and disposal of feces, disposal of untreated wastewater into water supply sources, and storm runoff. Due to a pregnant woman's immune response, and the permeability of the placenta to disease-causing pathogens, researchers hypothesize that these risks can affect an unborn fetus (see box 3.1) (Campbell et al. 2015).

Stunting is caused by multiple determinants, and sector-specific interventions may have limited impact.

Access to a safe water supply improves the overall disease environment and enables behaviors that influence child health and nutrition. Access to piped water in urban areas has been shown to decrease infant mortality. For example, privatization of water services in Buenos Aires led to improved access and service quality, resulting in an 8 percent reduction in child mortality from infectious disease. In the poorest areas that benefited the most from the service expansion, child mortality declined by 26 percent (Galiani, Gertler, and Schardrogsky 2005). Lack of access to a continuous source of safe water can have negative health consequences if households revert to using unimproved sources of water for even short periods of time (Hunter, Zmirou-Navier, and Hartemann 2009). Adequate quantities of water are also needed to practice hygiene behaviors such as handwashing, washing utensils and containers, and cleaning objects and surfaces used by children (Howard and Bartram 2003).

A child who lives in an environment contaminated by feces is more likely to be infected by disease-causing pathogens, including bacteria, viruses, and other microorganisms. An estimated 58 percent of diarrheal disease is due to poor water supply, sanitation, and hygiene (Prüss-Ustün et al. 2014), causing the loss and malabsorption of nutrients. Protozoa and helminths (worms) live in feces and are transmitted in water (schistosomiasis) and soil-transmitted helminths (STH), causing infections that lead to anemia, malnutrition, stunted growth, and impaired physical and cognitive development. These outcomes are associated with lower school attendance and educational attainment—factors that limit future economic productivity (Victora et al. 2008).

Box 3.1: Water Supply, Sanitation, and Hygiene and their Effect on
Maternal Health

Poor water supply and sanitation can contribute to maternal outcomes through
factors such as hygiene and quality of piped water and sewerage systems in the
home or at a health facility where antenatal care or delivery takes place (Campbell
et al. 2015).

Direct evidence about the effect of household-level water supply, sanitation, and
hygiene (WASH) availability on maternal outcomes in Indonesia is limited to a 2003
study in Surabaya (Taguchi et al.), which found that lack of a toilet facility in the home
more than doubled the probability of maternal mortality.

Using panel data from the Indonesia Family Life Survey (IFLS), a sample of 456
women who were pregnant at the time of the survey were tracked to a subsequent
wave, and their pregnancy outcomes (live birth or miscarriage) observed. After
controlling for other confounding factors, preliminary results suggest that having
access to improved water at the time of pregnancy is associated with a 7 percentage
point increase in the probability of a live birth. The increase is particularly associated
with women living in rural areas where access to clean water is lower. Access to
improved water also reduces the probability of miscarriage by 2 percentage points.
Having an improved toilet in the home, or living in a community with high coverage of
toilets at the time of pregnancy, was not associated with pregnancy outcomes.

There is robust evidence that access to WASH decreases the incidence of diarrhea in young
children. Synthetic review and meta-analysis of health impact assessments of water and
sanitation interventions (Wolf et al. 2014) show water interventions reduce diarrhea morbidity
by 34 percent, sanitation interventions reduce it by 28 percent, and promotion of handwashing
with soap results in a 40 percent reduction (Freeman et al. 2014). The largest health effects
for improved water are for piped water supply, with a greater benefit associated with higher
quality piped water—water that is safe and continuously available (Wolf et al. 2014).

Open defecation and poor sanitation are harmful not only to those who lack access to toilets,
but—due to externalities—to other households in the community as well. Researchers have
demonstrated across countries and data sets that the health benefits of sanitation mostly
accrue as sanitation becomes universal (Andres et al. 2014; Hunter and Prüss-Ustün 2016;
Larsen et al. 2017). A number of randomized controlled trials of household sanitation
interventions have failed to demonstrate health impacts (Clasen et al. 2014; Patil et al. 2014),
and researchers hypothesize that this is due to insufficient community-wide coverage and
behavior change. The implication is that sanitation interventions that fail to adequately reduce
the pathogen load in the environment will not achieve substantial nutritional impacts.

Stunting reflects
the cumulative
effects of
infection and
undernutrition,
and is regarded
as the non-
income face
of poverty.

Growing Tall and Smart with WASH

Researchers have recently begun to look at the impacts of WASH on stunting. This work points
to environmental enteric dysfunction (EED), or poor gut function, caused by repeated ingestion
of fecal bacteria (Humphrey 2009) as the primary pathway linking unsafe WASH to poor health
and nutrition outcomes, especially stunting. A child who suffers from EED is less able to

Photo 3.1: Malnourished and Nourished Gut Lining

| Malnourished | Nourished |
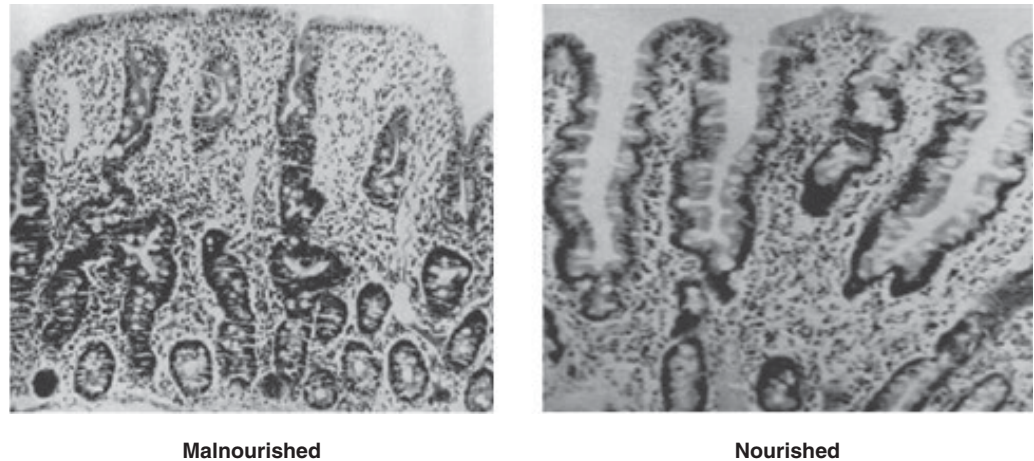
Source: Garcia 1968.

Figure 3.2: Pathways between Poor WASH and Early Child Development
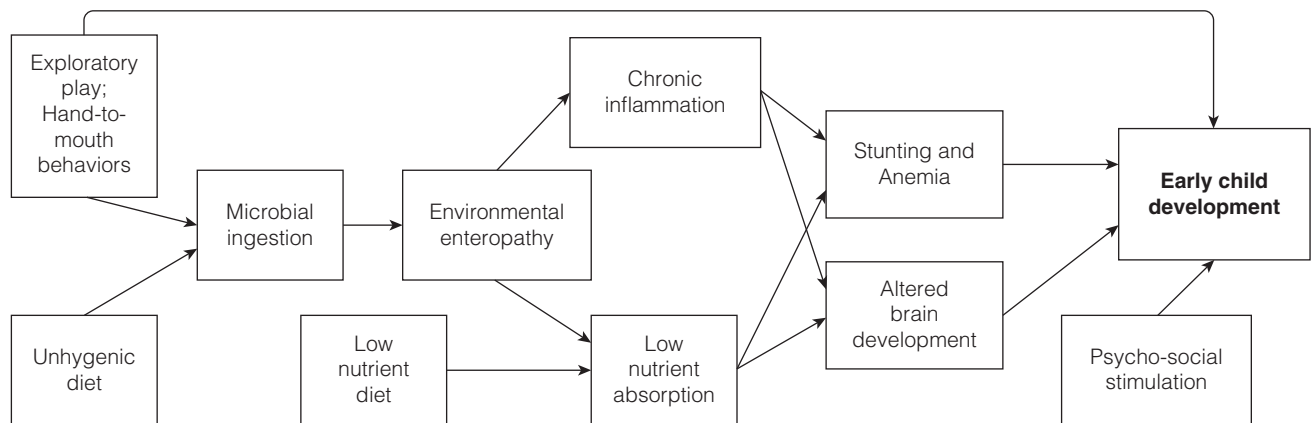
Source: Ngure et al. 2014.

absorb nutrients due to a damaged gut lining (photo 3.1). At the same time the small intestine becomes more porous, and disease-causing pathogens enter the bloodstream more easily, activating an immune response and diverting energy from human growth. These conditions do not produce overt symptoms like diarrhea, making them harder to track and quantify, although estimates suggest that up to 43 percent of stunting may be due to these silent infections (Guerrant et al. 2012).

Stunting has lifelong effects on cognitive development, earnings, and intergenerational poverty.

Few studies have extended this work to understand the potential impact of WASH on early childhood development. Early childhood experiences—encompassing care, stimulation and learning, nutrition, and stress, especially in the first 1,000 days of life—have a profound impact on brain development. The chronic gut inflammation characteristic of EED, caused in part by poor WASH, makes it more difficult to absorb nutrients and leads to poor cognitive development (Ngure et al. 2014). At the same time, children who are sick often or who aren't growing as well as their peers may be treated differently or sheltered from their social environment, depriving them of early psycho-social stimulation opportunities critical for brain development (Ngure et al. 2014) (figure 3.2).

The Stubborn Problem of Child Stunting in Indonesia and Linkages with WASH

Stunting is a severe and persistent problem in Indonesia, where an estimated 9 million children under five (37 percent) are stunted (RISKESDAS 2013). This situates Indonesia just behind India in terms of the share of children who are stunted.[1] Stunting is chronic undernutrition—defined as a child whose length/height is below minus 2 standard deviations of the median height for a child of the same age from the reference population. Since it reflects the cumulative effects of infection and undernutrition from the time a child is in the womb, stunting is often referred to as the non-income face of poverty and is regarded as one of the best indicators of overall human development. Stunting has lifelong adverse consequences for cognitive development, human capital, productivity, earnings, and intergenerational transmission of poverty (Victora et al. 2008).

The prevalence of stunting is widespread and distributed across the Indonesian archipelago (map 3.1). In rural areas the prevalence of stunting is 42 percent, while in urban areas it is 33 percent (Skoufias 2016). Although stunting rates are higher in rural areas, research has shown that slum populations are particularly at risk—more so than rural and urban (total) populations (FAO 2017).

Map 3.1: Stunting Rates in Indonesia, 2013

Stunting rate
11.1–37.2
37.2–70.4
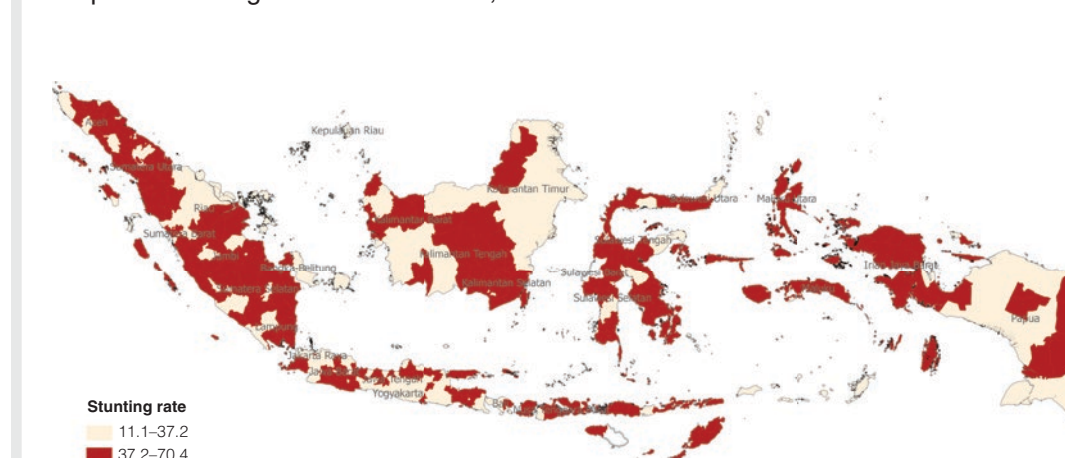
Source: Calculations based on the 2007 and 2013 RISKESDAS.

The prevalence of stunting varies by wealth quintile (figure 3.3). A striking 29 percent of children in the topmost quintile are stunted, while 49 percent are stunted in the bottommost (Skoufias 2016). Furthermore, more children in the poorest households were stunted in 2013 than in 2007, rising from 43 percent in 2007 to 49 percent in 2013; the same is not true for wealthier households, where rates of stunting are declining.[2] Children in wealthier households were 5 percentage points less likely to be stunted in 2013 than in 2007. Therefore, whereas in 2007 the difference in stunting rates between children from the poorest households and those from the wealthiest households was 10 points, by 2013 it had increased to 20 points.

There is no clear pattern in trends of stunting prevalence across districts between 2007 and 2013. In the maps below (map 3.2), the upper panel shows changes in stunting rates for those districts where the stunting rate in 2007 was above the national stunting rate of 36.8 percent; the lower panel shows changes in stunting rates for those districts where the stunting rate in 2007 was below 36.8 percent. In both panels, districts in green saw a more than four percentage point *decrease* in stunting between 2007 and 2013, while those in red saw a more than four percentage point *increase* in stunting. Many of the districts with stunting rates *above* the national average in 2007 had *lower* stunting rates in 2013, and many of the districts with stunting rates *below* the national average in 2007 had a *higher* prevalence of

Figure 3.3: Stunting Rates, by Wealth Quintile, 2007–13

Percentage of children with HAZ < –2 SD (y-axis, 0 to 100)

Quintile	2007	2010	2013
1	43	48	49
2	42	44	43
3	40	39	39
4	37	35	33
5	33	28	29
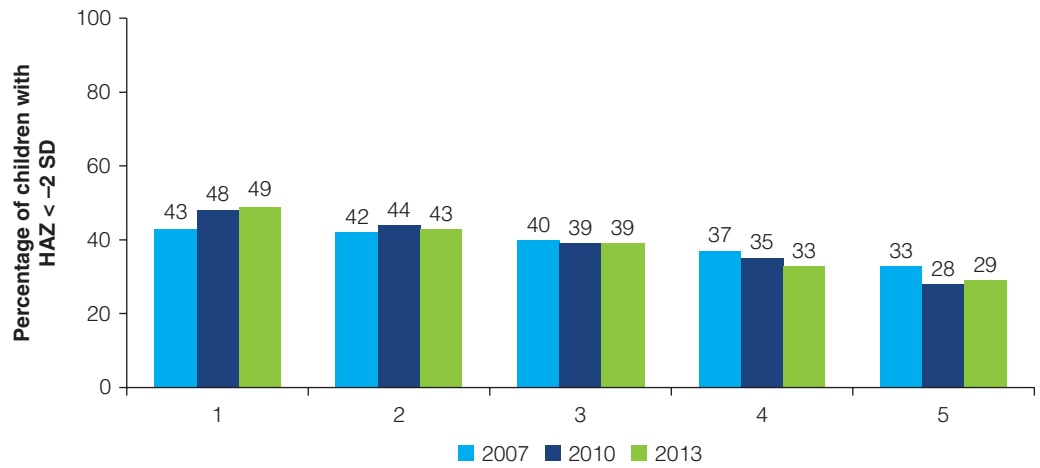
Source: Calculation based on the 2007, 2010, and 2013 RISKESDAS.

Map 3.2: Changes in District Stunting Rates, 2007–13

a. Below national average (36.8%), 2007

Percentage point change in stunting
- Stunting decreased
- Stunting remained constant
- Stunting increased
- Stunting in 2007 below 36.8 percent
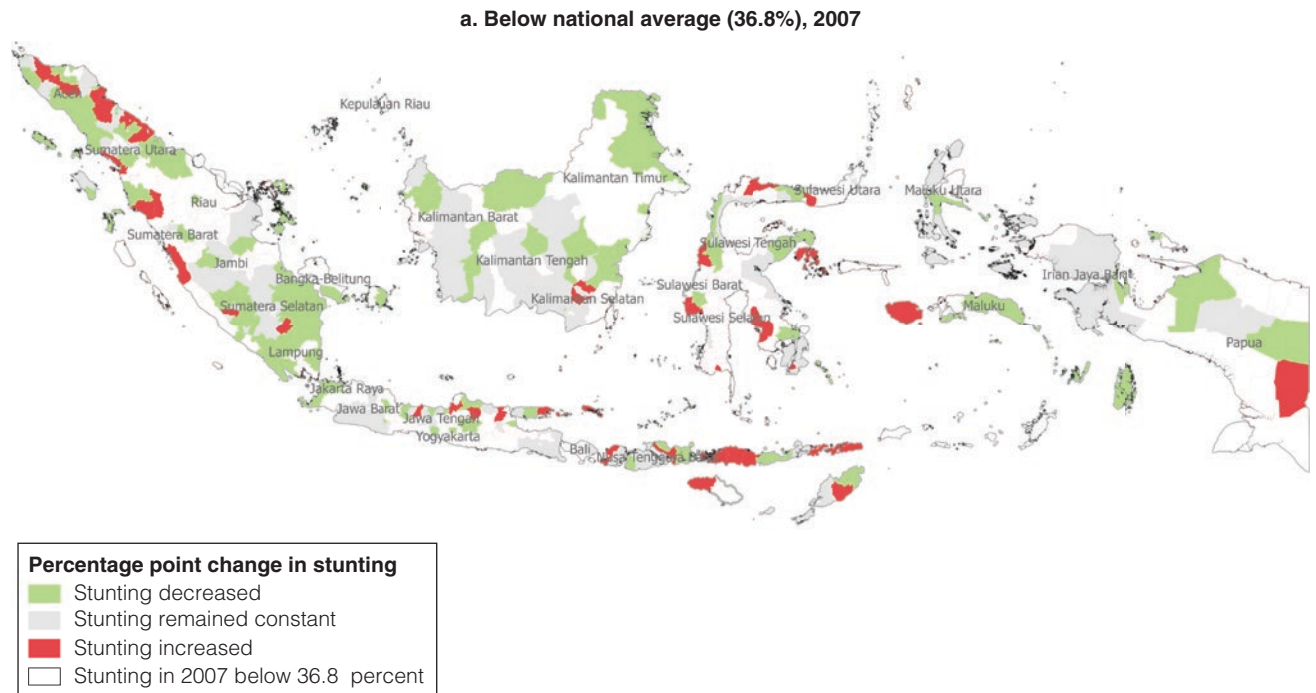
figure continues next page

Map 3.2: Continued

b. Above national average (36.8%), 2007

Percentage point change in stunting
- Stunting decreased
- Stunting remained constant
- Stunting increased
- Stunting in 2007 above 36.8 percent
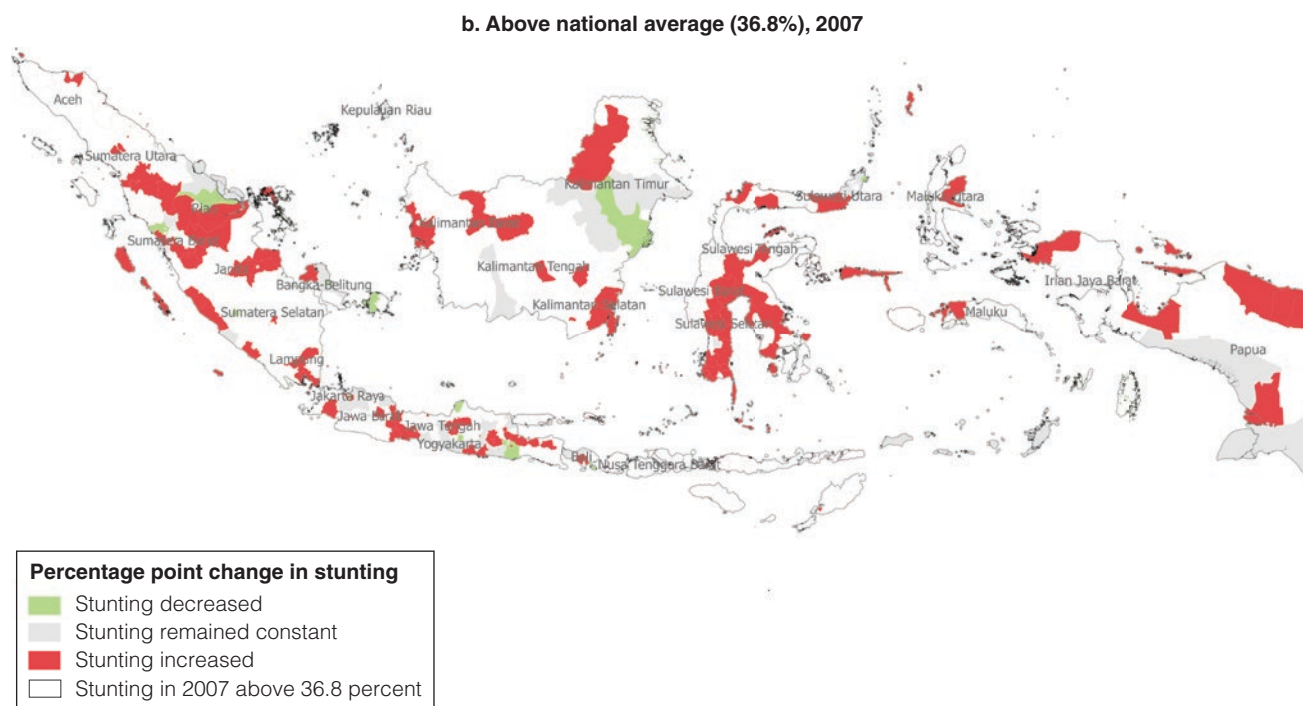
Source: Calculations based on the 2007 and 2013 RISKESDAS.

stunting in 2013. Only a few districts that had stunting rates lower than the national average were able to decrease stunting by more than 4 percentage points, whereas a number of districts with stunting rates above the national average saw an increase in stunting.

Child Stunting and Cognitive Impacts of Water and Sanitation in Indonesia

The WASH Poverty Diagnostic used panel data from the IFLS to analyze associations between access to WASH in utero and in the first 2 years of life, and nutrition and cognitive outcomes for the same children later in life (see Cameron 2017). First, local polynomial regression analysis was used to explore the relationship between community open defecation and child nutrition and cognitive outcomes. The analysis shows that children living in villages (urban and rural combined) where a higher proportion of households have a toilet are closer to meeting growth standards and score higher on cognitive tests than children in villages with a lower proportion of toilets. Two-thirds of the gains in average height-for-age z-scores (HAZ)[3] accrue after a threshold of around 60 percent coverage of improved sanitation is surpassed (figure 3.4). Data from the 2013 round of RISKESDAS show that just 27 percent of children in rural settings and 62 percent in urban settings are living in communities where coverage of sanitation is at adequate levels of 75 percent or above (Skoufias 2016), putting the majority of children, especially in rural areas, at risk.

Regression analysis was used to examine the effect of three independent variables of interest on the nutrition and cognitive outcomes of Indonesian children. The three variables are: household-level sanitation, community-level sanitation, and access to improved household-level water sources during the window of opportunity (from the time a child is in utero until 2 years of age). Outcomes include a child's cognitive test scores from the 2007 round of IFLS when a child is between the ages of 7 and 16, and anthropometric outcomes, including stunting, underweight, HAZ, and weight-for-age z-scores (WAZ), measured when a

Stunting has lifelong effects on cognitive development, earnings, and intergenerational poverty.

Figure 3.4: Relationship between ODF and Height-for-Age and ODF and Cognitive Scores

a. Village ODF and HAZ z-score (Pooled)

b. Village ODF and cognitive scores (Pooled)

95% CI — lpoly smooth

Kernel = epanechnikov, degree = 0, bandwidth = 0.14, pwidth = 0.21

Kernel = epanechnikov, degree = 0, bandwidth = 0.23, pwidth = 0.34
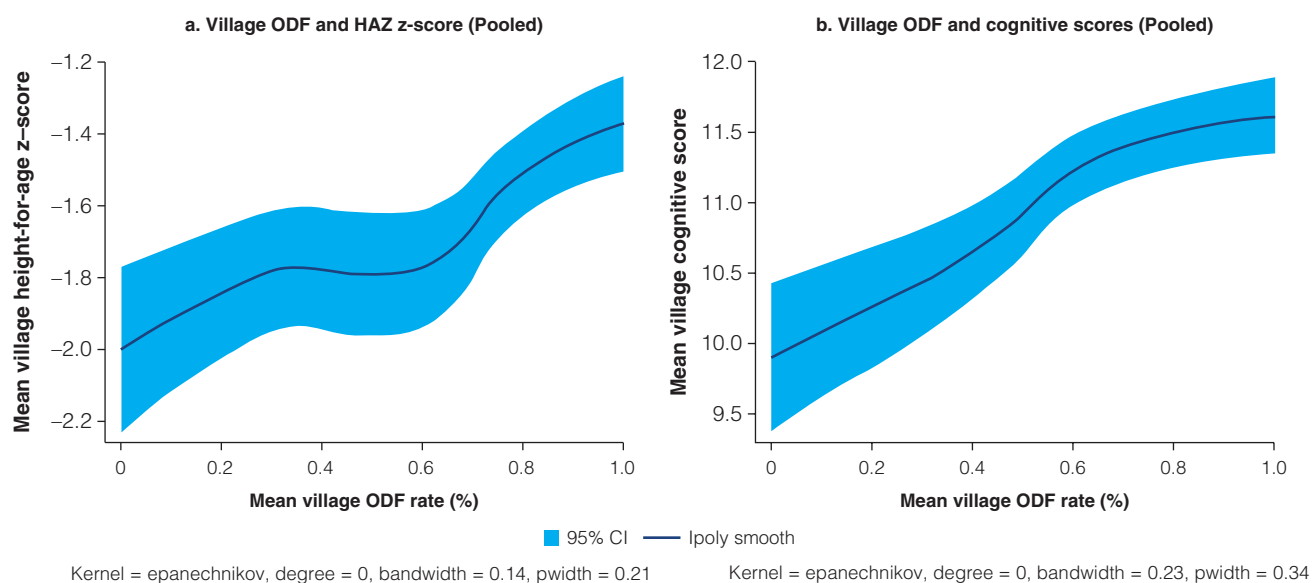
Source: Cameron et al. 2017.
Note: ODF = open-defecation free.

child is under 5 years of age.[4] The analysis controls for parental/caregiver education, mother's age at the time of birth, age at the time of measurement (either anthropometric or cognitive testing), and decile of per capita consumption. Sub-district and IFLS wave fixed effects were also included.

Results indicate that Indonesian children who were exposed to a poor water and sanitation environment early in life were more likely to be stunted or underweight and to score lower on cognitive tests than those with adequate levels of water and sanitation. Children living in communities with lower levels of open defecation during the critical window of the first 1,000 days of life are 11 percentage points less likely to be stunted and 5 percentage points less likely to be underweight. These children also score 1.3 points higher on cognitive tests—equivalent to about a 0.33 standard deviation increase in cognitive score.

Both water and sanitation access at the household level are associated with better early childhood outcomes in Indonesia. Children who have access to an improved water supply gain 0.41 standard deviation in WAZ,[5] while an improved toilet in the home reduces the likelihood of being underweight by 3 percentage points and improves cognitive test scores by 0.37 percentage points. Forty-four percent of households in the study were located in urban areas. There was no significant difference in health or cognitive outcomes for children living in urban as compared with rural areas.

Owning a toilet and living in a community where most people own a toilet helps drive cognitive development.

These findings suggest that owning a toilet, as well as living in a community where most of one's neighbors own a toilet, are important drivers of a child's cognitive development. The only other published evidence of a sanitation/cognitive development link comes from an econometric study in India (Spears and Lamba 2016), which uses variation in latrine construction at the district level in a child's first year of life and matches it with child-level data on cognitive achievement to estimate the impact of India's Total Sanitation Campaign (TSC) on cognitive outcomes. The authors found that children exposed to TSC in their first year of life were better able to recognize letters and simple numbers by the age of six. The cognitive effects from early life exposure to safe water and sanitation are comparable to a range of early childhood education and health interventions, suggesting that access to water and sanitation is among a core set of critical early childhood development interventions.

Not by WASH Alone: How Multisectoral Interventions Help Improve Nutrition

Operationalizing a Multisectoral Approach for the Reduction of Stunting in Indonesia

Stunting is widely understood to be caused by multiple underlying factors, including food insecurity, poor child care practices, and lack of access to health services, water, and sanitation. The United Nations Children's Fund (UNICEF) conceptual framework of child undernutrition, initially proposed in 1990 (UNICEF 1990), was one of the first attempts to emphasize household food security, WASH services, and maternal and child care practices as the main underlying determinants of child nutrition in developing countries. A fundamental premise of this conceptual framework is that increases in access to adequate services in any one of the drivers of nutrition—for example, food security alone—cannot substitute for inadequate levels of access to the other determinants. While there is widespread acknowledgment of the key underlying determinants of nutrition, there is limited quantitative information on the interdependence of adequate (or inadequate) access to the determinants for child nutrition.

The WASH Poverty Diagnostic undertook an econometric analysis to quantify the relationships between and interdependence of the determinants of child nutrition outcomes using the 2007 and 2013 RISKESDAS surveys. Indicators were constructed for four groups of child nutrition determinants proposed in the UNICEF framework—child care practices, health, environment (water and sanitation), and food security (CHEF).[6] Each indicator is comprised of various components, depending on the data available in the survey, with the definition of "adequacy" based on national and/or accepted international standards.[7] In consideration of the complexity of the linkages between the underlying determinants of nutrition and the economic situation of the family, the analysis is also carried out separately for urban and rural households, and for resource-rich T60 and resource-poor B40 households, as well as for districts with high stunting rates and those with low stunting rates. A more holistic view is provided regarding the extent to which adequate levels of the four determinants—food security; adequate caregiving resources at the maternal, household, and community levels; access to health services; and a safe and hygienic environment—are, both on their own and in combination, associated with better nutrition as measured by HAZ and stunting rates.

In Indonesia, survey results indicate overall low levels of access to the key drivers of nutritional health. Nationally, in 2013, just 7 percent of children under 5 had access to adequate child care practices—defined by factors such as early and appropriate breastfeeding, handwashing, a smoke-free home environment, and complementary feeding. A similarly low percentage of children (14 percent) had access to adequate food, such as protein, calories, exclusive breastfeeding, and nutrition of the mother. About 56 percent of children had access to basic drinking water and improved sanitation, including adequate levels of community coverage of sanitation, and 46 percent had access to adequate health services such as prenatal care, vitamin A, and immunizations.

Substantial inequalities in access to adequate levels of CHEF determinants remain between rural and urban areas, between districts with high and low stunting rates, and between poorer and wealthier households. In 2013 fewer children in rural areas had access to all four drivers of nutrition than children in urban areas. The largest discrepancy was in access to an adequate environment, with only around 40 percent of those in rural areas having access and around 70 percent of those in urban areas having access. Access to an adequate environment is also the nutrition driver showing the largest differences between wealth quintiles. Only 1 percent of children in the lowest wealth quintile had access to an adequate environment, whereas in the highest quintile 92 percent of the children had access to an adequate environment (Skoufias 2016).

The health benefits of sanitation mostly accrue as sanitation becomes universal and pathogens in the environment are adequately reduced.

Access to all four CHEF determinants is exceedingly uncommon, suggesting that nutritional impacts of sector-specific interventions may be limited by inadequate access to the underlying drivers of nutrition. In 2013, 23 percent of children between 0 and 5 years of age did not have adequate access to *any* of the four determinants of nutrition, while less than 1 percent of children had simultaneous access to *all four* key underlying determinants of nutrition. For the poorest 20 percent of children, 68 percent lack adequate access to all four determinants.

Children under 5 in Indonesia with simultaneous access to adequate levels of two of the four drivers of nutrition have higher mean height for age z-scores. Stunting rates are even lower among children with simultaneous access to adequate levels of three of the four drivers of nutrition (figure 3.5). These children had a 13.4 percent lower likelihood of stunting, compared to the reference group without access to any drivers, whose rate of stunting is 41.4 percent. This pattern is consistent across rural and urban areas, and for children living in households in the top 60 percent of the wealth distribution. These results illustrate the importance of coordinated multisectoral policies and suggest that the success of "sector-specific nutrition-sensitive" initiatives could be enhanced by better coordination and integration across sectors to effectively address multiple underlying determinants of nutrition.

In the next chapter, the report turns to the core diagnostics of the water supply and sanitation sector in Indonesia, including recent trends in access and quality, disparities across geography and income groups, and key service delivery challenges facing the sector. The chapter begins with a diagnostic of the sanitation sector, both urban and rural, and then turns to urban and rural water supply. The trends and patterns described provide overall guidance on sector policy priorities, particularly as they relate to the B40. However, the list of challenges described is not necessarily exhaustive, and is limited in the sense that it uses existing data and evidence (primary data collection was not part of the WASH Poverty Diagnostic in Indonesia). These trends and patterns, along with recent sector studies and reports and global experience and evidence, form the basis of the policy recommendations in chapter 6. For the urban water sub-sector, the policy recommendations benefit from an in-depth institutional and political economy analysis described in chapter 5. Additional analytical work could shed further light on some of the challenges discussed for urban sanitation, rural sanitation, and rural water, and lead to more targeted policy recommendations (see chapter 6).

Figure 3.5: Difference in Probability of Being Stunted, 2013
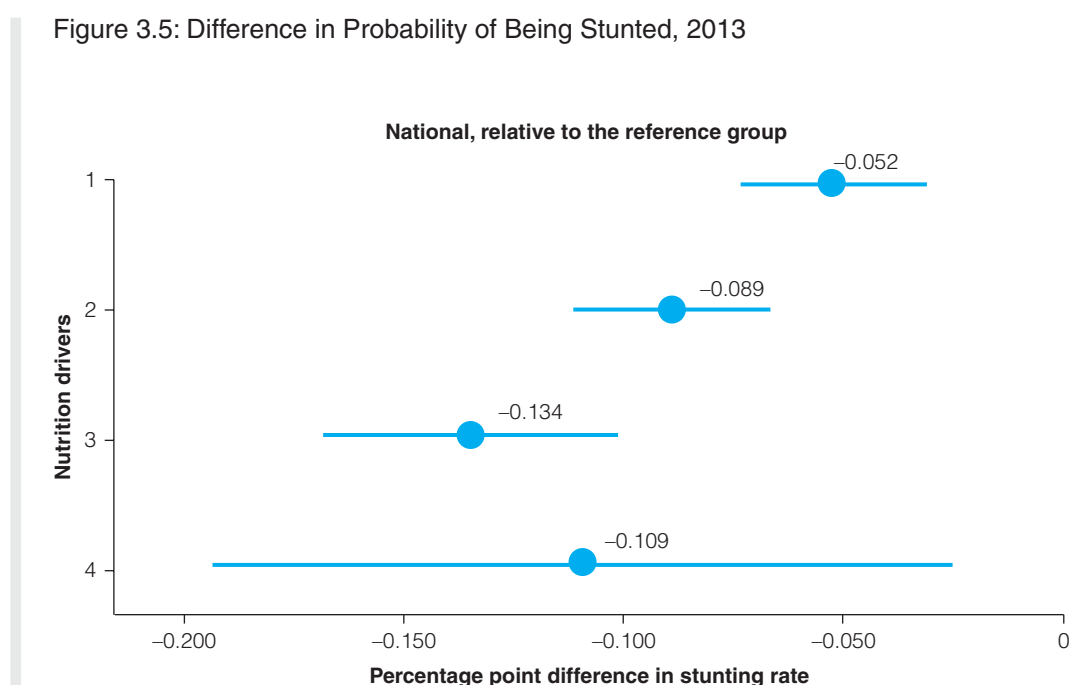
Source: Calculation based on RISKESDAS 2013.

Notes

1. Indonesia stunting rate is 37 percent and is ranked 25; India is 24. Global Nutrition report.
2. These analyses, and all that follow, are based on the official HAZ scores calculated by the Indonesian Ministry of Health.
3. Height-for-age z-scores (HAZ) measure the deviation of a child's height from the median of children of the same age in a reference population. A HAZ less than 2 standard deviations below the median for the reference population is classified as stunted; a HAZ less than 3 standard deviations is classified as severely stunted.
4. For children who were in utero during the window of opportunity, their anthropometric measures from the subsequent wave, when they were under-5 years, were used.
5. Weight-for-age z-scores (WAZ) measure the deviation of a child's weight from the median of children of the same age in a reference population. A WAZ less than 2 standard deviations below the median for the reference population is classified as underweight; a WAZ less than 3 standard deviations is classified as severely underweight.
6. CHEF indicators consolidate similar groupings of determinants as proposed in the UNICEF framework.
7. Further details on the definitions of adequacy can be found in Skoufias 2016.

References

Andres, L. A., B. Briceño, C. Chase, and J. A. Echenique. 2014. "Sanitation and Externalities: Evidence from Early Childhood Health in Rural India." Policy Research Working Papers, World Bank, Washington, DC.

Cameron, L., C. Chase, G. Joseph, and R. Pinto. 2017. "Child Stunting and Cognitive Impacts of Water, Sanitation and Hygiene in Indonesia." Policy Research Working Paper. World Bank, Washington, DC.

Campbell, O. M., L. Benova, G. Gon, K. Afsana, and O. Cumming. 2015. Getting the Basic Rights—The Role of Water, Sanitation and Hygiene in Maternal and Reproductive Health: A Conceptual Framework. *Tropical Medicine and International Health* 20 (3): 252–67.

Clasen, T., S. Boisson, P. Routray, B. Torondel, M. Bell, O. Cumming, J. Ensink, M. Freeman, M. Jenkins, M. Odagiri, S. Ray, A. Sinha, M. Suar, W. Schmidt. 2014. Effectiveness of a Rural Sanitation Programme on Diarrhoea, Soil-Transmitted Helminth Infection, and Child Malnutrition in Odisha, India: A Cluster-Randomised Trial. *The Lancet Global Health* 2 (11).

FAO (2017). *Assessment of Nutritional Status in Urban Areas*. http://www.fao.org/ag/agn/nutrition/urban_assessment_en.stm.

Freeman, Matthew C., Meredith E. Stocks, Oliver Cumming, Aurelie Jeandron, Julian Higgins, Jennyfer Wolf, Annette Prüss-Ustün, S. Bonjour, P. R. Hunter, L. Fewtrell, V. Curti. 2014. "Systematic Review: Hygiene and Health: Systematic Review of Handwashing Practices Worldwide and Update of Health Effects." *Tropical Medicine & International Health* 19 (8): 906–16.

Galiani, S., P. Gertler, and E. Schargrodsky. 2005. "Water for Life: The Impact of the Privatization of Water Services on Child Mortality." *Journal of Political Economy* 113 (1): 83–120.

Garcia S. 1968. "Malabsorption and Malnutrition in Mexico." *Am J Clin Nutr.* Sep; 21 (9): 1066–76. PMID: 5675845.

Guerrant, R. L., M. D. Deboer, S. R. Moore, R. J. Scharf, and A. M. Lima. 2012. The Impoverished Gut a Triple Burden of Diarrhoea, Stunting and Chronic Disease. *Nature Reviews Gastroenterology & Hepatology* 10 (4).

Howard, G., and J. Bartram. 2003. *Domestic Water Quantity, Service Level and Health*. Geneva: WHO.

Humphrey, J. H. 2009. Child Undernutrition, Tropical Enteropathy, Toilets, and Handwashing. *The Lancet* 374: 9694.

Hunter, P. R., and A. Prüss-Ustün. 2016. "Have We Substantially Underestimated the Impact of Improved Sanitation Coverage on Child Health? A Generalized Additive Model Panel Analysis of Global Data on Child Mortality and Malnutrition." *PLoS One* 11 (10).

Hunter, P. R., D. Zmirou-Navier, and P. Hartemann. 2009. Estimating the Impact on Health of Poor Reliability of Drinking Water Interventions in Developing Countries. *Science of the Total Environment* 407 (8): 2621–24.

Larsen, D. A., T. Grisham, E. Slawsky, and L. Narine. 2017. "An Individual-Level Meta-Analysis Assessing the Impact of Community-Level Sanitation Access on Child Stunting, Anemia, and Diarrhea: Evidence from DHS and MICS Surveys." *PLoS Neglected Tropical Disease* 11 (6): e0005591. https://doi.org/10.1371/journal.pntd.0005591

Mahmud, I., and N. Mbuya. 2015. *Water, Sanitation, Hygiene, and Nutrition in Bangladesh: Can Building Toilets Affect Children's Growth?* Washington, DC: World Bank.

Ngure, F. M., B. M. Reid, J. H. Humphrey, M. N. Mbuya, G. Pelto, and R. J. Stoltzfus. 2014. "Water, Sanitation, and Hygiene (WASH), Environmental Enteropathy, Nutrition, and Early Child Development: Making the Links." *Annals of the New York Academy of Sciences* 1308 (1): 118–28.

Patil, Sumeet R., Benjamin F. Arnold, Alicia L. Salvatore, Bertha Briceno, Sandipan Ganguly, John M. Colford Jr., and Paul J. Gertler. 2014. "The Effect of India's Total Sanitation Campaign on Defecation Behaviors and Child Health in Rural Madhya Pradesh: A Cluster Randomized Controlled Trial." *PLoS Medicine* 11 (8): e1001709.

Prüss-Ustün, A., J. Bartram, T. Clasen, J. M. Colford, O. Cumming, V. Curtis, and S. Cairncross. 2014. "Burden of Disease from Inadequate Water, Sanitation and Hygiene in Low- and Middle-Income Settings: A Retrospective Analysis of Data from 145 Countries." *Tropical Medicine & International Health* 19 (8): 894–905.

Skoufias, E. 2016. *Operationalizing a Multi-Sectoral Approach for the Reduction of Malnutrition in Indonesia: An Application Using the 2007 and 2013 RISKESDAS*. Washington DC: World Bank.

Spears, D., and S. Lamba. 2016. "Effects of Early-Life Exposure to Sanitation on Childhood Cognitive Skills: Evidence from India's Total Sanitation Campaign." *Journal of Human Resources* 51 (2).

UNICEF. 1990. "Strategy for Improved Nutrition of Children and Women in Developing Countries."

Victora, C. G., L. Adair, C. Fall, P. C. Hallal, R. Martorell, L. Richter, and H. S. Sachdev. 2008. "Maternal and Child Undernutrition: Consequences for Adult Health and Human Capital." *The Lancet* 371 (9609): 340–57.

Wagner, E.G., Lanoix, J.N., *Excreta Disposal for Rural Areas and Small Communities*, Geneva: World Health Organization.

Wolf, J., A. Prüss-Ustün, O. Cumming, J. Bartram, S. Bonjour, S. Cairncross, and J. P. Higgins. 2014. "Systematic Review: Assessing the Impact of Drinking Water and Sanitation on Diarrhoeal Disease in Low- and Middle-Income Settings: Systematic Review and Meta-Regression." *Tropical Medicine & International Health* 8 (19): 928–42.

Chapter 4
WASH Service Delivery Progress and Challenges in Indonesia

Core Question: What is the level of access and quality of WASH services experienced by the poor and bottom 40 percent as compared to the non-poor and top 60 percent?

Key facts

- Since the launch of the STBM, access to improved sanitation has grown at 6.5 percent annually, but there are still 47 million people defecating in the open and another 52 million using sanitation that is considered unsafe.

- 76 percent of the population in urban areas has improved sanitation compared with just 48 percent in rural areas, a gap of 28 percentage points.

- District poverty rates do not neatly correspond with either *levels* of access or *equity* of access to improved sanitation at the district level; some poor districts are doing a better job than wealthier districts, and a far better job than some of their poorer peers.

- Despite there being no significant difference in poverty levels between Java and non-Java districts, Java districts have achieved higher levels of coverage overall for both B40 and T60 households.

- B40 households are not achieving higher levels of service in rural areas, which is contributing to the widening gap in access to improved sanitation between the B40 and T60.

- In urban areas, 95 percent of fecal waste makes its way into the nearby environment through the process of containment, emptying, transport, and disposal, despite high coverage (78 percent) of on-site septic tanks.

- While trends in access have increased in parallel since 2002, 80 percent of the population in urban areas has access to improved drinking water supply, compared to just 60 percent in rural areas.

- Gaps in access to improved water between B40 and T60 households remain, most starkly in urban areas.

- *Hibah*-participating *kotas* demonstrate higher, but not necessarily more equitable, access to piped water supply.

- Data on water quality suggest that the potential risk of contamination is severe, especially in more dense urban settings.

In 2015 the WHO/UNICEF JMP estimated that access to improved drinking water was 87 percent in Indonesia, a 39 percentage point increase since 1990, and access to improved sanitation was 61 percent, a 36 percentage point increase. Indonesia achieved the MDG target for water, and while good progress was made towards the sanitation goal, it was not achieved. There are still close to 100 million people without improved sanitation and 33 million without improved drinking water, according to the JMP for global monitoring purposes WHO and UNICEF (2015). When considering inequalities in access, Joint Monitoring Programme (JMP) estimates show that overall access levels to sanitation are lower among the poor and lower in rural areas. The B40 households—especially those in rural areas—have not gained access to improved sanitation at the same rate as their T60 counterparts. Trends for drinking water appear more equitable, although a relatively low share of the rural population drinks piped water on premises (figure 4.1). The sharp increase in unimproved drinking water is partly due to households—particularly those in the upper wealth quintiles in urban areas—drinking bottled water as their primary source, which JMP does not categorize as improved. As discussed in this report, the vast majority of bottled water users have access to another source of improved water, reflecting a change in preferences rather than access.

Stopping Open Defecation in Indonesia: A Global Success Story

In 2015 the WHO/UNICEF JMP estimated that access to improved sanitation was 61 percent, a 36 percentage point increase since 1990 (WHO and UNICEF 2015).[1] Although this increase was substantial, it fell short of achieving the MDG sanitation target of reducing by half the proportion of the population without access to sanitation. While there are still close to 100 million people without improved sanitation, Indonesia has become a global success story due to the rapid and sustained reduction in the practice of open defecation that was achieved in less than a decade.

Community-Led Total Sanitation (CLTS) was adopted nationwide in 2005, leading to the launch of the STBM by MoH in 2008. These combined approaches and programs heralded a major shift in the trajectory of sanitation in the country, and between 2006 and 2015 access to improved sanitation grew at 6.5 percent annually, up from an annual growth rate of 3.4 percent in the years between 2002 and 2004. STBM is a community-based total sanitation strategy focused on behavior change at the household and community levels to cut off contamination pathways for E. coli, a primary pathogen causing diarrheal disease. STBM includes 5 pillars: (1) stop open defecation (including using a community "triggering" approach to motivate people to stop open defecation); (2) handwashing with soap; (3) household safe water treatment and storage, and safe food handling; (4) safe disposal and management of solid waste; and (5) safe disposal and management of wastewater. The open defecation pillar of STBM was a major departure from previous publicly funded toilet construction programs in Indonesia as it explicitly shunned household subsidies and embraced a community mobilization approach to stopping open defecation.

STBM prioritized an improved policy environment, demand creation, and sanitation service improvement to address the open defecation problem.

The STBM program approached the open defecation problem from three directions, with the aim of achieving "total sanitation." It aimed to improve the enabling policy environment to make sanitation a priority for LGs, to create demand for safe sanitation and hygiene through community empowerment and behavior change, and to improve the supply of sanitation products and services so that households had access to the materials they needed at a price they could afford. The program only provided subsidies to build communal sanitation facilities and implemented a community award to incentivize achievement and sustainability of total sanitation. STBM has mainly been a rural-focused program, but was recently expanded to urban settings.

Figure 4.1: Access to Sanitation and Drinking Water, by Urban and Rural Wealth Quintile

Sanitation trends by rural wealth quintile

Trends in sanitation coverage (%) by rural wealth quintile from 1995 to 2012

Sanitation trends by urban wealth quintile

Trends in sanitation coverage (%) by urban wealth quintile from 1995 to 2012

Legend: Open defecation ■ Other unimproved ■ Shared ■ Improved

Sanitation trends by rural wealth quintile

Trends in sanitation coverage (%) by rural wealth quintile from 1995 to 2012

Sanitation trends by urban wealth quintile

Trends in sanitation coverage (%) by urban wealth quintile from 1995 to 2012

Legend: ■ Unimproved ■ Other improved ■ Piped on premises

Location Matters: Subnational Estimates of Sanitation Coverage and Associations with Poverty

At provincial level, there is no clear correlation between poverty and access to improved sanitation, pointing to the presence of other factors affecting sanitation coverage. The following map (map 4.1) shows the geographic dispersion of poverty and access rates at provincial level for the most recent year data are available (2015). Some provinces with above average poverty rates have above average sanitation coverage, while others with below average poverty rates have below average sanitation. For example, the provinces that make up the island of Java mostly have above average poverty levels, but also enjoy above average access, while the Western Indonesian island of Sumatra generally has lower levels of access irrespective of poverty levels. Eastern Indonesia—especially Papua, Maluku, East Nusa Tenggara, and Central and West Sulawesi—has high poverty levels and low access, while Southeast Sulawesi and West Papua have above average levels of access despite having above average levels of poverty. These findings point to the presence of factors other than poverty that influence sanitation coverage. These are explored in map 4.1.

At district level there is a trend toward improvement in sanitation coverage over time, but there is wide variance across districts and not only according to poverty levels (figure 4.2). There are some poor districts that are doing a better job than wealthier districts with regard to sanitation coverage, and a far better job than some of their poorer peers. The implication of these discrepancies is that strategies that improve coverage in low-poverty districts may be vastly different from those that would work in high-poverty districts. To date, the national STBM program has relied on community empowerment and behavior

Map 4.1: Poverty Rate and Access to Improved Sanitation, by Province, 2015

Categorization based on proportion

- Below average proportion of poverty, above average proportion of access
- Above average proportion of poverty, above average proportion of access
- Below average proportion of poverty, below average proportion of access
- Above average proportion of poverty, below average proportion of access
- No data
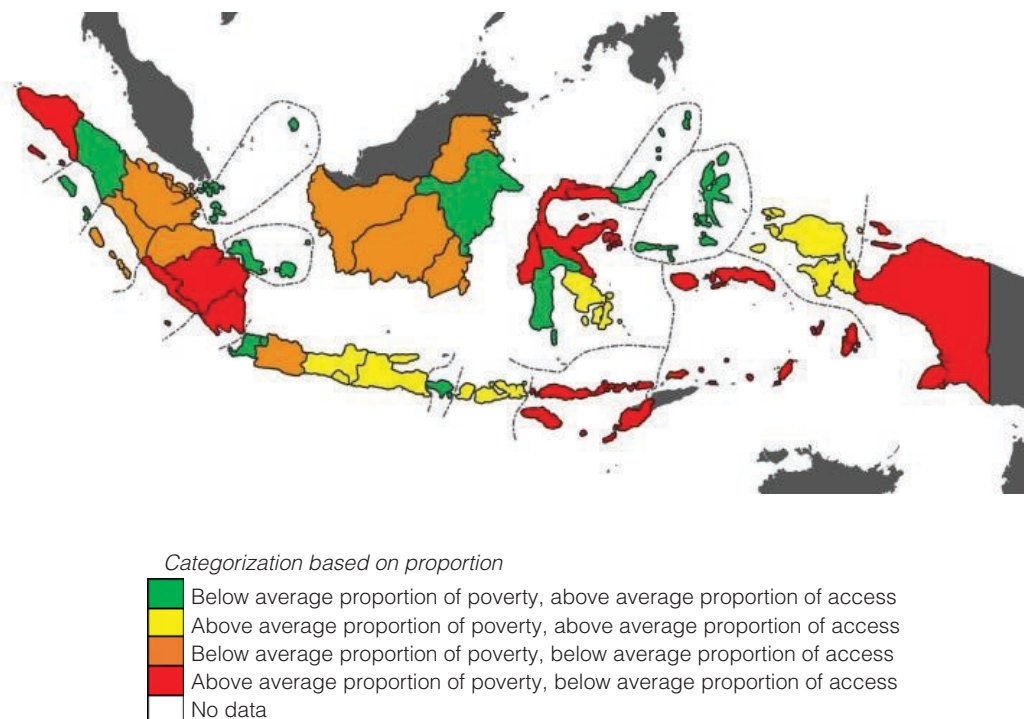
Source: Susenas.

Figure 4.2: Correlation between Poverty Rate and Improved Sanitation Access in *Kabupatens*/Districts, 2002–15
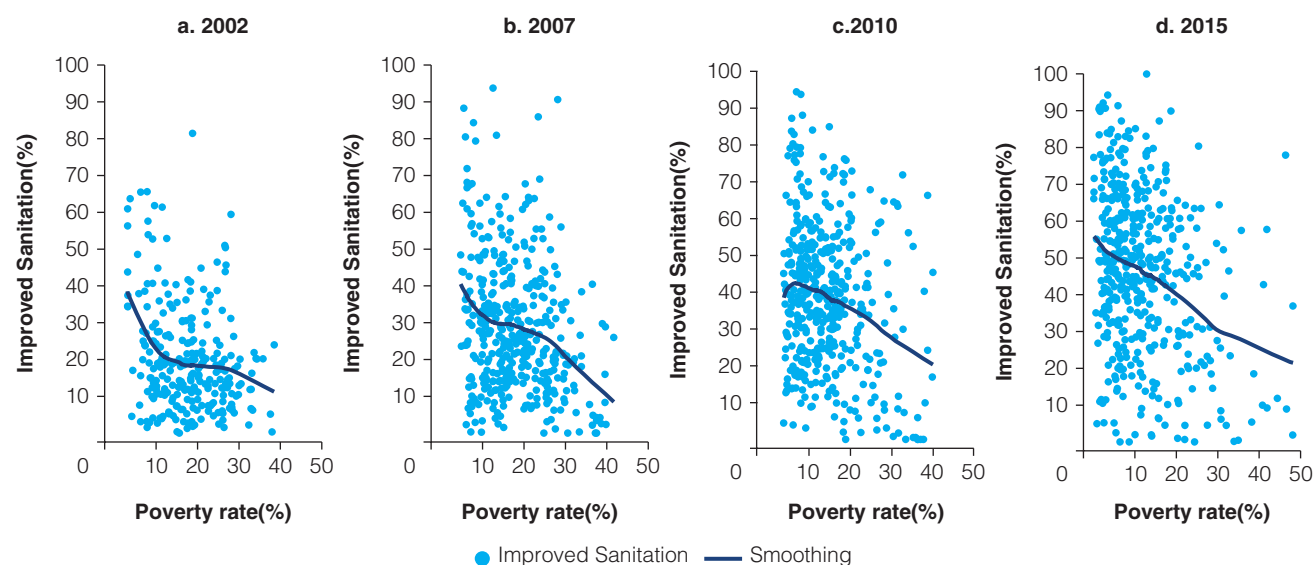
Source: Susenas.

change—an approach that may work better in some areas than others due to many underlying factors, including the quality of program implementation (Cameron et al. 2017), levels of social capital in the community (Cameron et al. 2015), and participation of local champions. Another contextual factor could be population density. Lower population density may make it more difficult to mobilize households and bring the community together to "trigger" behavior change. For rural sanitation, district investment priorities and fiscal capacity likely play a smaller role, since government expenditures on infrastructure and implementation of STBM are minor.

Poverty rates do not neatly correspond with either *levels* of access or *equity* of access to improved sanitation at the district level. Each pair of bars in figure 4.3 illustrates the share of the T60 and B40 with access to improved sanitation in the district (n=412) and the district poverty rate (the national average poverty rate in 2015 of 11.2 percent is represented by the red line). Almost all districts show higher coverage among the T60. While a larger concentration of high-poverty districts are clustered in the left side of the figure, where overall access levels are lower, both above average and below average poverty districts are found across the distribution of coverage levels.

Distinguishing between Java and non-Java districts reveals a noticeable difference in coverage levels between B40 and T60 households (figure 4.4). Despite there being no significant difference in poverty levels between Java and non-Java districts (12 and 13 percent, respectively), Java districts have achieved higher levels of coverage overall for both B40 and T60 households. The average level of improved sanitation coverage among B40 in non-Java districts is 35 percent, compared with 51 percent in Java districts, while it is 67 percent among T60 in Java districts, compared with 51 percent in non-Java. While the average gap between B40 and T60 households is similar across Java and non-Java districts, there is more variation in the gap in non-Java districts. In addition, there appears to be a slight downward trend in the gap in Java districts as higher levels of coverage are achieved.

Figure 4.3: Share of T60 and B40 with Improved Sanitation and Poverty Rate, by District (*Kabupaten*)

Legend: T60 ■ B40 ■ % poor ──
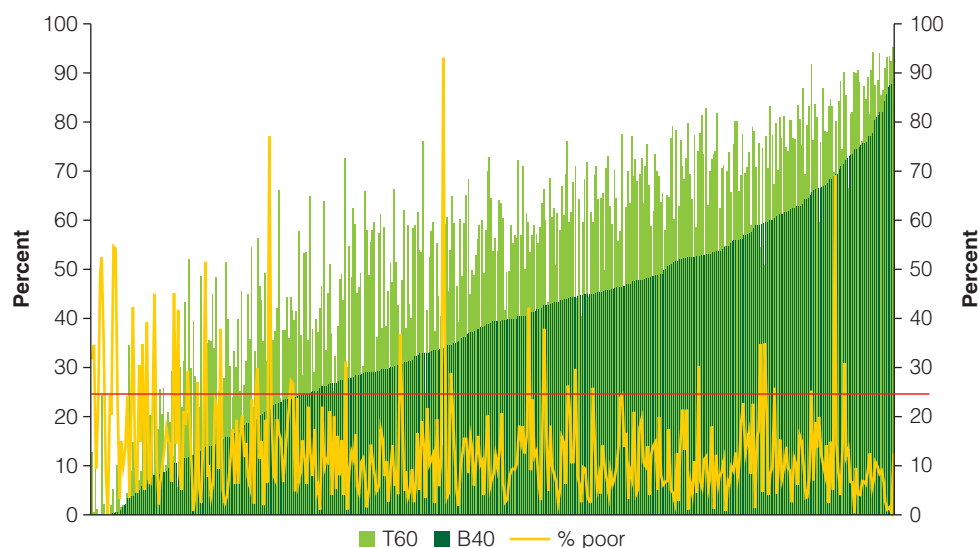
Source: Susenas.

Place seems to be a stronger driver of access to sanitation than poverty. Both urban and rural areas have achieved substantial progress in sanitation since 2002, with the steepest gains seen in rural areas—a difference likely due to those areas having had lower levels of access to begin with. In 2002 just 18 percent of the rural population had improved sanitation and 41 percent were defecating in the open. In 2015 these figures were 48 percent and 20 percent respectively. While these gains were large, rural areas have not yet reached the levels of access seen in urban areas. The most recent data for 2015 show that 76 percent of the population in urban areas have improved sanitation compared with just 48 percent in rural areas, a gap of 28 percentage points (figure 4.5).

Moreover, households in the T60 of the income distribution are more likely to have access to sanitation facilities *within* urban or rural areas, but the same is not true *across* these areas (figure 4.6). The B40 in rural areas are most likely to defecate in the open—29 percent do not have a toilet, compared with 15 percent of the T60; in urban areas, 12 percent of the B40 and 3 percent of the T60 do not have a toilet. In other words, households belonging to the top 60 percent of the income distribution in rural areas are worse off than those in the bottom 40 in urban areas. A possible explanation could be the fundamental assumptions of the STBM approach, requiring LGs to conduct community empowerment and behavior change activities, and households to seek out and procure their own materials to improve their sanitation. Low-density rural settings can make these requirements particularly challenging.

While coverage of sanitation is higher in urban areas, the location *within* a city seems to have an effect on access. Cities in Indonesia face challenges to service delivery driven by rapid population increase, inadequate planning, and underinvestment in infrastructure. In four of Indonesia's largest cities—Jakarta, Medan, Surabaya, and Makassar—the suburban or peripheries of these cities have both higher levels of poverty and lower levels of access than core urban centers (figure 4.7). In Makassar coverage is 25 percentage

Figure 4.4: Share of T60 and B40 with Improved Sanitation and Poverty Rate, by District (*Kabupaten*) in Java and Non-Java

a. Java districts

b. Non-Java districts

Legend: T60 | B40 | —— Gap
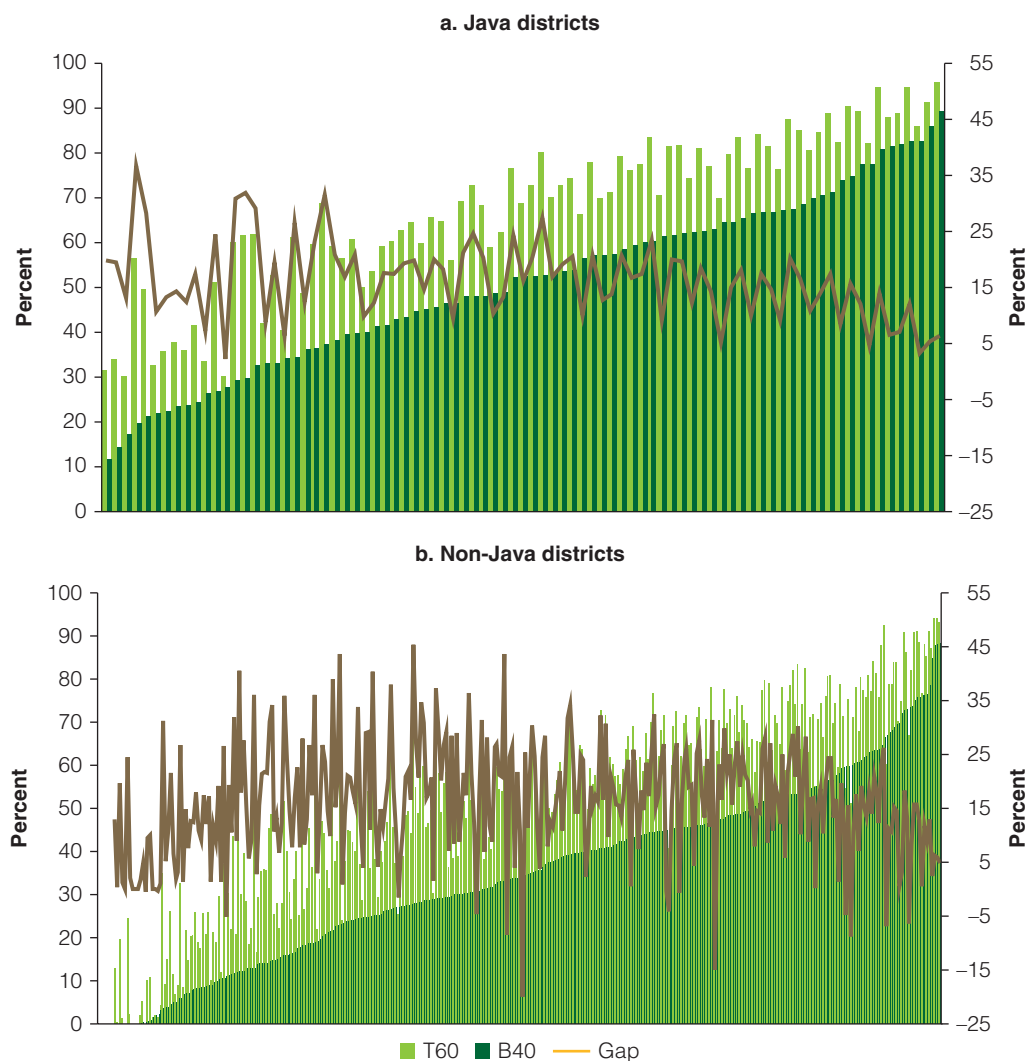
Source: Susenas.

points lower in suburban areas than in the city's core. In Jakarta the difference is 15 percentage points. Suburban areas of Makassar also have higher levels of poverty (8 percent) than does Makassar's core (1 percent). In contrast, there is a 15 percentage point gap in access between the Jakarta core and Jakarta suburban areas, yet rates of poverty are the same (3 percent). In all cities, progress is notable in the periphery areas—doubling or near doubling access since 2002. These areas now enjoy higher levels of access than the national average, although they still lag behind the urban cores. Urban slums remain a major challenge in Indonesian cities and are a visible marker of urban poverty and the gaps in access to basic infrastucture. An estimated 22 percent of Indonesia's urban population (approximately 29 million people) is living in slums with low levels of access to basic services. In 2014, it was estimated that 30 percent of slum dwellers (9 million people) lacked safe drinking water, and 37 percent (11 million people) lacked sanitation.[2]

Figure 4.5: Access to Improved Sanitation in Urban and Rural Areas, 2002–13

a. Urban

b. Rural

Open defecation   Unimproved   Improved
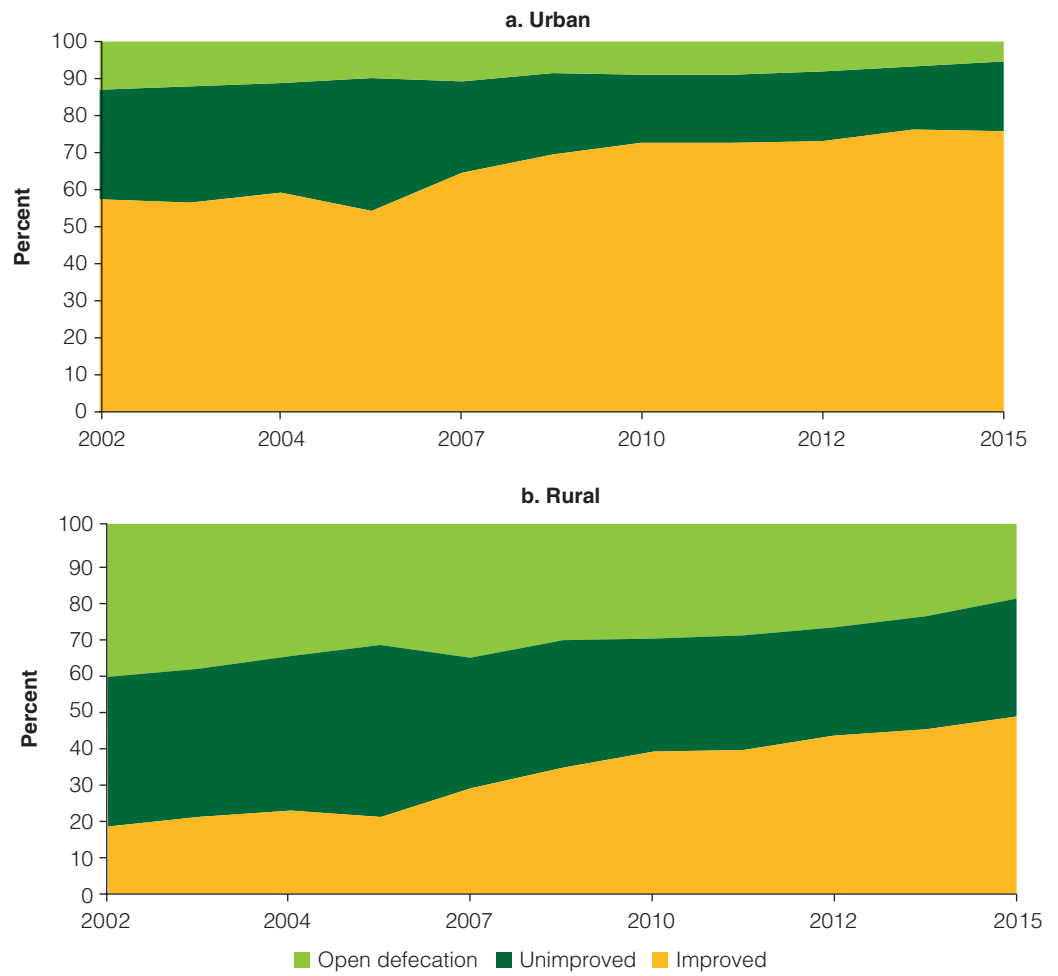
Source: Susenas.

Figure 4.6: Percentage of B40 and T60 Population Practicing Open Defecation in Urban and Rural Areas

B40-Urban   T60-Urban   B40-Rural   T60-Rural
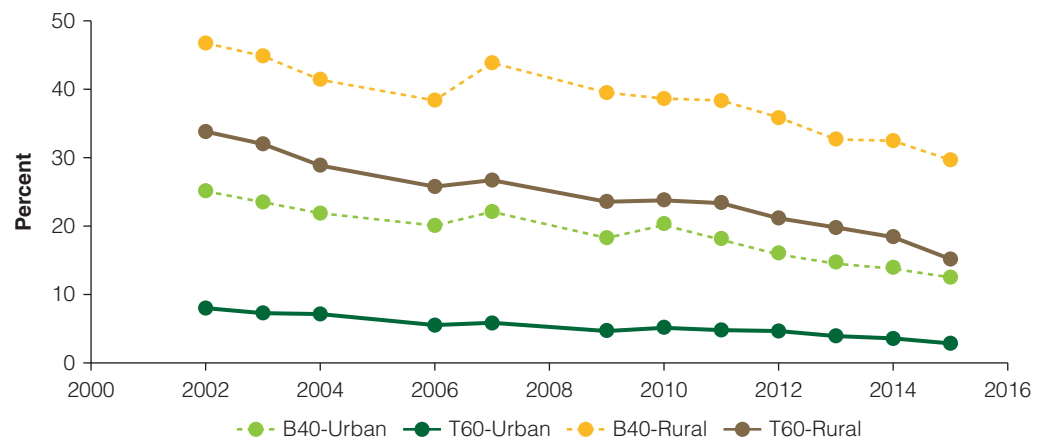
Source: Susenas.

Figure 4.7: Trend in Improved Sanitation Access in Indonesia's Largest Cities
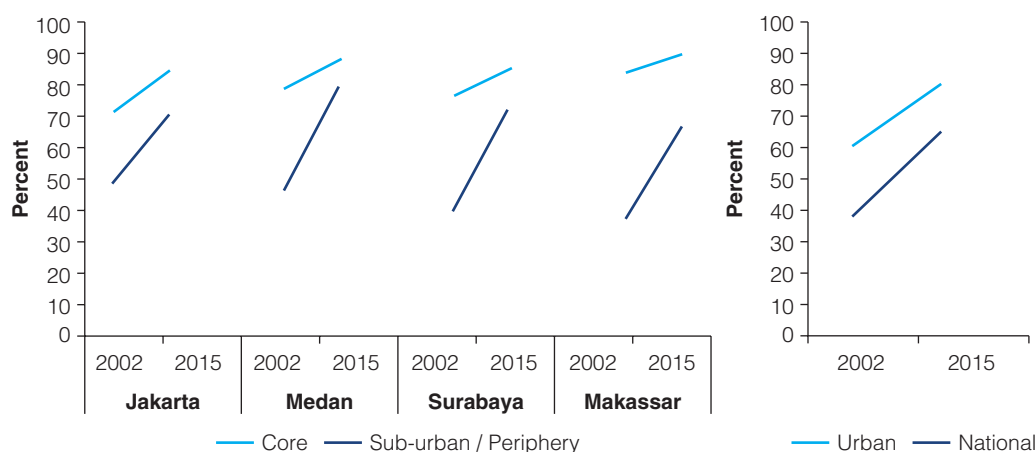
Source: Susenas.

Second Generation Challenges for Rural Indonesia: Moving up the "Sanitation Ladder"

There are still 47 million people defecating in the open in Indonesia and another 52 million using sanitation that is considered unsafe, most of these living in rural areas. When access to improved sanitation began to accelerate in 2007 on the heels of the new national strategy and total sanitation program, the acceleration for rural households was higher in the top three consumption quintiles, and that gap has persisted to the present (figure 4.8). The most recent evidence points to a gap in access to improved sanitation in rural areas of 20 percentage points (2015).

Open defecation has declined at similar rates in the B40 and T60 since 2002, but B40 households were more likely to move to basic latrines,[3] contributing to the widening gap in access to improved sanitation between the B40 and T60. This finding is consistent with a 2011 Impact Evaluation of STBM in East Java, which found that poor households— defined in the study as those in the bottom 20 percent of the distribution of non-land assets—did not improve their sanitation as a result of the program, while those in the top 80 percent were more likely to construct toilets, stop defecating in the open, and correctly dispose of child feces (Cameron and Shah 2011).

In 2015 more than half (55 percent) of the households in rural areas either had no toilet or were using unimproved latrines. Poor quality pit latrines fail to adequately isolate human waste from the environment and create breeding grounds for flies and other vectors that spread disease. The largest share of unimproved sanitation for the most recent year of data (2015) are facilities that dispose of waste into fields, water bodies, or open land, essentially equivalent to open defecation. Analysis using RISKESDAS data for 2013 shows that in rural settings only 27 percent of children live in communities with sanitation coverage greater than 75 percent, but evidence from Indonesia shows that two-thirds of the gains in average height-for-age z-scores (HAZ) accrue after a threshold of around 60 percent percent coverage is surpassed, and that full benefits may only be achieved when coverage becomes universal. As a result, the majority of children in rural areas are exposed to a contaminated environment even if they themselves live in households with sanitation (Skoufias 2016).

The primary barrier to toilet construction cited by households is high cost. In the 2011 Impact Evaluation of STBM, the average reported expenditure necessary to construct a toilet was

Despite improved access to sanitation in urban areas, high levels of fecal contamination persist.

Figure 4.8: Growing Inequality in Improved Sanitation Access in Rural Settings for B40 versus T60
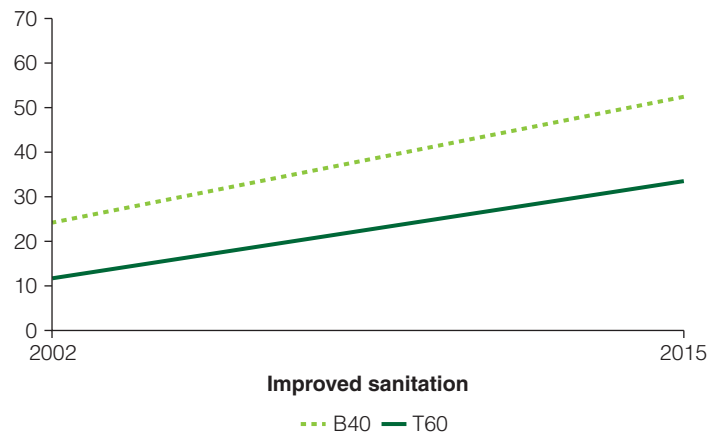
Source: Susenas.

US$119, equivalent to 94 percent of one month's average (reported) household income (Chase and Briceno unpublished report). Such a large lump sum outlay can be impossible for poor households to afford, but credit and formal savings products that would allow households to spread payments over time are not widespread, limiting the ability of poor households to invest in improved sanitation.

Why High Levels of Sanitation in Urban Settings Have Not Fully Eliminated Fecal Contamination

Despite high levels of access to improved sanitation in urban settings, low levels of service quality and a heavy reliance on households to manage their fecal waste result in massive levels of environmental contamination. The vast majority of households (78 percent) in urban areas use an improved toilet connected to a septic or sewerage system ("septic tanks" or, more often, pit latrines or soak pits); of this 78 percent, less than 2 percent are estimated to be sewerage connections. Lateral sewers and household connections are often excluded from central government and development partner investments, resulting in 50 percent idle capacity on average for existing networks in 13 cities (World Bank 2015). At the same time, while there has been an increase in construction of septage treatment plants, these investments have not been followed by improvements to fecal sludge management or upgrades to on-site sanitation. An assessment conducted by MoPWH in 2012 found that over 90 percent of existing sludge treatment plants built since 1990 (n=150) are no longer operational or are poorly performing. As a result of these conditions, most fecal waste (95 percent) makes its way into the nearby environment through the process of containment, emptying, transport, and disposal (figure 4.9). The remaining 5 percent of fecal waste is delivered to a treatment plant, but even these plants are in desperate need of improvement.

Conditions of high population density and inadequate fecal waste disposal interact to make poor sanitation particularly risky for the health of populations in urban areas. Thirty-eight percent of children in urban settings live in communities with coverage of sanitation below 75 percent (Skoufias 2016). However, the measure of "community" used in this study is less meaningful in urban settings, where biological contaminants can rapidly spread among urban populations through groundwater supplies and piped water systems, and during heavy rains and flooding.

Figure 4.9: Fecal Waste Management Flow Chart
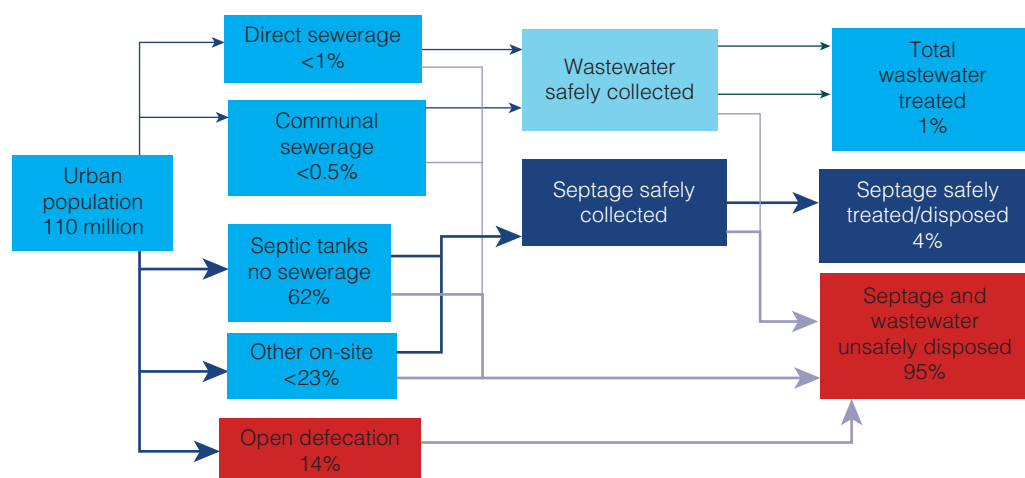
Source: EAP Urban Sanitation Review Indonesia Country Study, 2013.

For example, in Jakarta, where an estimated 63 percent of waste is being discharged into the ground untreated, four-fifths of the economic losses associated with existing sanitation conditions—estimated at US$1.4 billion per year (or US$139 per person)—can be attributed to health-related impacts (World Bank 2016c). A recent study shows that children living in households with poor fecal waste disposal practices, such as toilets that discharge directly into drains, had 3.78 times higher prevalence of enteric infection than children in other households, including those without toilets (Berendes et al. 2017).

On-site sanitation systems in Indonesian cities do not achieve effluent quality standards, especially in challenging environments.[4] Recent research has shown that not one of the seven types of on-site sanitation systems sampled in five cities was in compliance with effluent standards of less than 3,000/100 mL fecal coliform (figure 4.10). Most on-site sanitation in Indonesia is based on the anaerobic system, which does not reduce microbiological content, allowing untreated or partially treated wastewater to seep into the ground. The absence of practical national standards for on-site sanitation systems in challenging areas, inadequate quality of construction, and lack of knowledge on operations and maintenance are additional factors leading to high fecal coliform counts (World Bank 2017 Forthcoming).

The Evolution of Drinking Water Supply in Indonesia

In 2015 the WHO/UNICEF JMP concluded that Indonesia had achieved the MDG target on drinking water supply. An estimated 87 percent of the population had access to improved drinking water in 2015—a 39 percentage point increase since 1990. Due to different calculation methods, GoI estimated 70 percent coverage of improved drinking water (see box 1.1 for an explanation of the calculation method),[5] which translates into annual growth of 2.7 percent between 2002 and 2015.

Still, there are notable disparities in access to improved water supply and type of water source between urban and rural settings. While access to improved water supply has increased in parallel for urban and rural areas since 2002, in urban areas 80 percent of the population has access, compared with only 60 percent in rural areas (figure 4.11). A small share of the population (3 percent) continues to use surface water in rural areas, down from 5 percent in

Figure 4.10: Results from Study of On-Site Sanitation for Dense Urban Areas in Indonesia

E. coli content found within the effluent
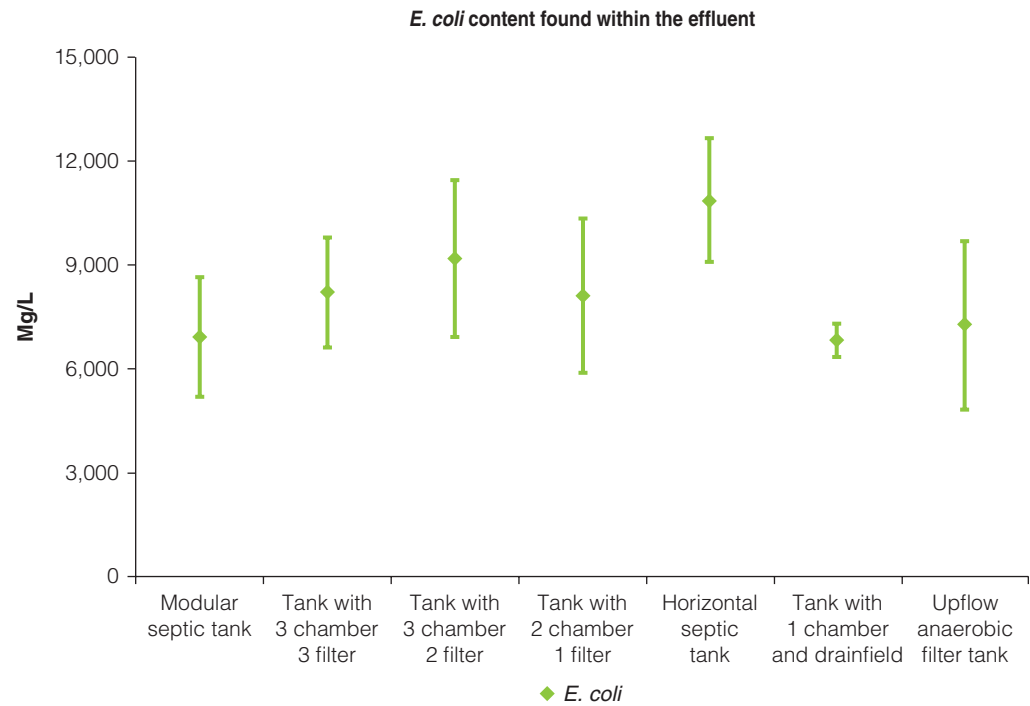
Source: World Bank 2017.

Box 4.1: Increased Bottled Water Usage Distorts Trends in Access to Piped Water Supply: Data and Definitions

The rapid expansion of bottled water usage and household preferences for drinking bottled water can distort access trends if analyses fail to account for other household sources of water.

Until 2011, bottled water for drinking was not considered an improved or sustainable source of drinking water in official statistics. However, as bottled water use began to increase—from less than 2 percent in 2002 to 29.5 percent in 2015—the rise led to distorted access figures for other water sources, most notably piped water.

In response, Susenas began collecting data in 2011 on the source of water used for bathing and washing for households whose primary drinking water source is bottled water. These surveys show that the vast majority of bottled water drinkers use another source of improved water in the home for bathing and washing (surveys available for the years 2011 to 2015). Since 2011, bottled water has been classified as an improved source *if* the household uses a safe and sustainable water source for bathing and washing. Thus, 92 percent of bottled water users are classified as having improved water.

Figure 4.11: Access to Improved Drinking Water in Urban and Rural Areas, 2002–13

a. Urban

b. Rural

☐ Surface Water ☐ Unimproved ☐ Improved
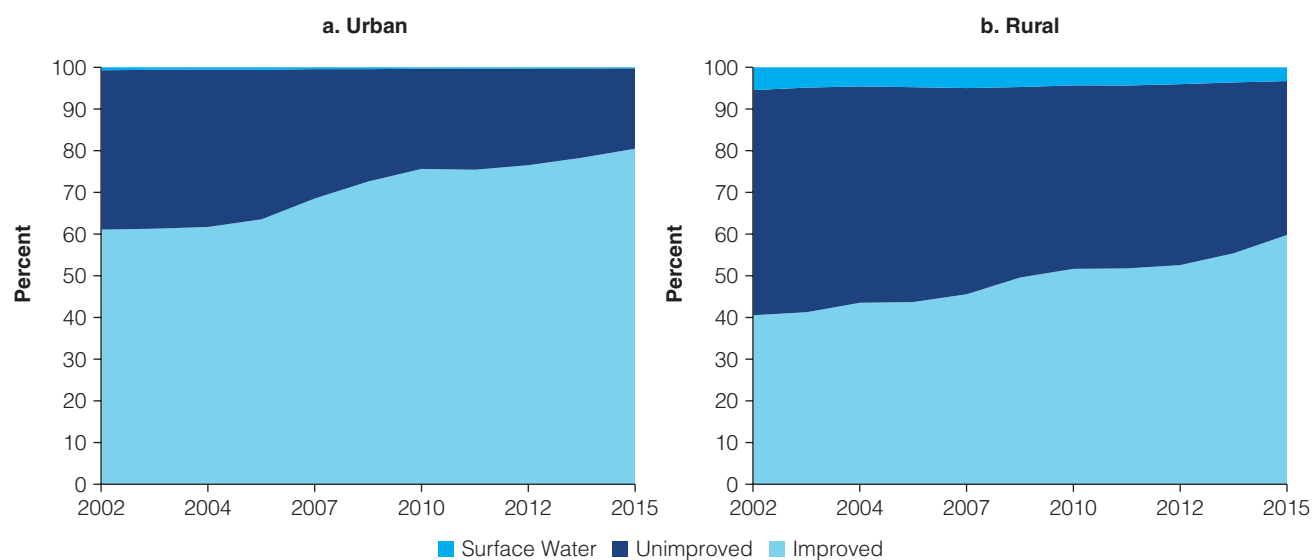
Source: Susenas.

2002; a larger share of rural households uses protected wells (28 percent) and springs (15 percent) than use them in urban areas (16 and 3 percent, respectively). Just 6 percent of rural households use tap water as their primary source of drinking water, compared with 16 percent of urban households. Notably, 44 and 14 percent of urban and rural households respectively drink bottled water as their primary source (box 4.1).

Drinking Water Access and the Poor

As of 2015 there are still an estimated 20 million households in Indonesia using unimproved drinking water sources. Of these 20 million unserved households, the majority—13.5 million— are located in rural areas, and 43 percent of these (5.8 million households) were classified as poor and vulnerable. Nevertheless, inequalities in access to improved drinking water by income distribution are modest and have lessened over time. Figure 4.12 shows the extent of income-related inequality in access to improved drinking water between households at different points along the income distribution. The diagonal line in the graph represents perfect equality—in other words, when the share of the population in the first 20 percent of the income distribution accounts for a 20 percent share of access to drinking water. Between 2002 and 2007 there was no change in inequality in access, but a trend towards greater equality in access can be seen between 2007 and 2015. In 2015 the bottom 20 percent accounted for approximately 17 percent of those with access to drinking water.

Despite these improvements, there are still gaps in access to improved water between B40 and T60 households. While the gaps are greater in urban areas, they are growing in rural areas. In 2015 the gap in access to improved water in urban areas dropped to 14 percentage points— returning to its 2002 level—although the gap had been trending at around 17 percentage points since 2010. In rural areas, there was a 10 percentage point gap between B40 and T60 in access to improved water in 2015. The gap has steadily increased from 6 percentage points in 2002.

The driver of the growing gap in access to improved water sources in rural areas is not clear from existing data. The government's main platform for expanding access to rural water supply,

Disparities persist in access to improved drinking water between poor and wealthy households, and between urban and rural populations.

Figure 4.12: Inequalities in Access to Improved Drinking Water by Income Distribution
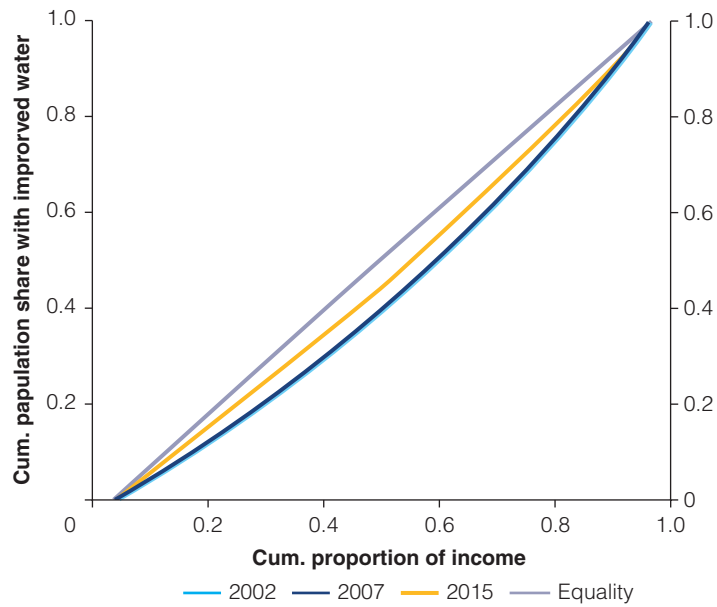
Source: Susenas.

Figure 4.13: PAMSIMAS Water Supply Beneficiaries, T60–B40, Piped–Non-Piped, 2012–15
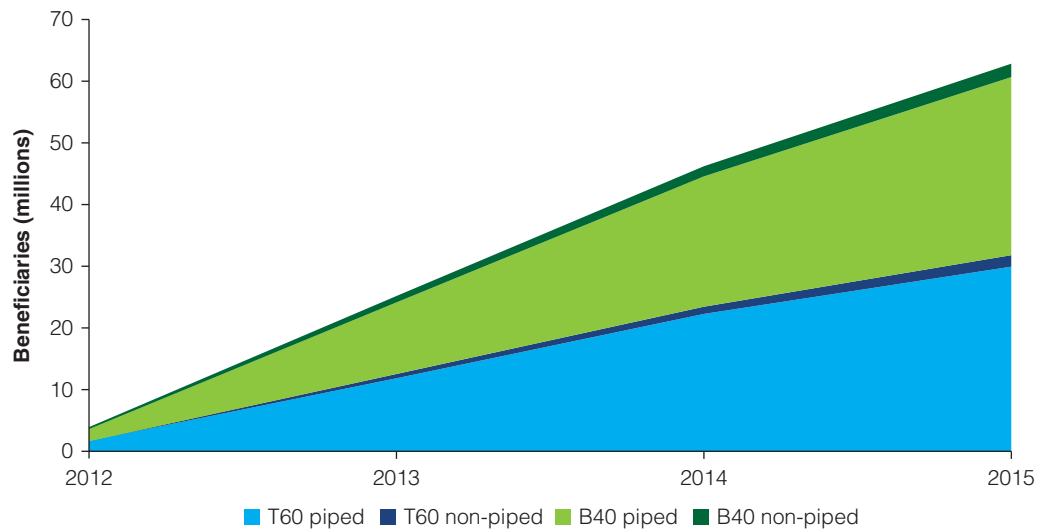
Source: Management Information System PAMSIMAS.

PAMSIMAS, targets underserved and low-income communities. The program began in 2006, and by the end of its second phase in 2015 it had reportedly provided access to clean drinking water for an estimated 9 million beneficiaries, or 3.5 percent of the population in Indonesia (PAMSIMAS 2015). Program data for the years 2012 to 2015 indicate the vast majority of water services provided were piped, with nearly equal numbers of beneficiaries identified as poor and non-poor[6] (figure 4.13).

Figure 4.14: Change in Primary Source of Drinking Water by Consumption Quintile, 2002–15
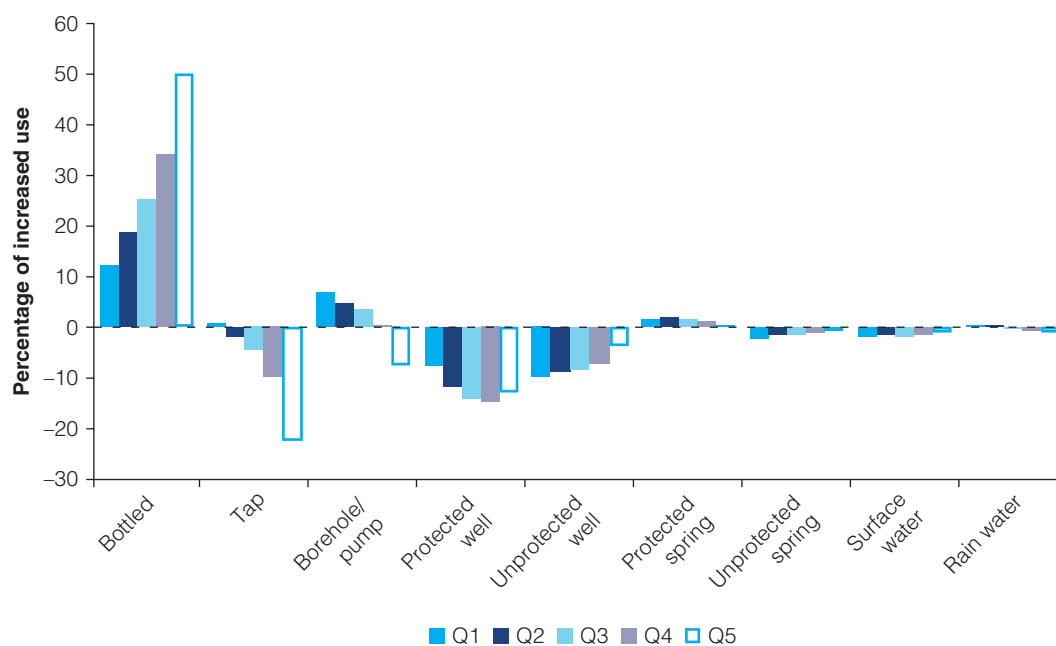
Source: Susenas.

Whether improved or unimproved, the source of drinking water reported by households differs by consumption quintile. Household data by consumption quintile show that the use of piped (tap) water for drinking has declined across all quintiles, but most dramatically in the top-most quintile. There were also large declines in the use of well water, both protected and unprotected, across all quintiles. Using bottled water for drinking has increased by 50 percentage points in the top quintile and 12 percentage points in the poorest 20 percent of households by consumption (figure 4.14).

Location Matters: Subnational Estimates of Access to Water Supply and Associations with Poverty

As with sanitation, access to improved drinking water is strongly determined by geographic location. Coverage of improved drinking water is higher in T60 households than in B40 households. However, being in an urban setting is a stronger determinant of access: B40 households in urban areas are better off than T60 households in rural settings (figure 4.15). In 2015, 37 percent of rural households drank unimproved water. Households in high-poverty rural districts were less likely to drink piped water as their primary source, and the overall proportion of piped water (including public taps from small rural piped systems) is low (7 percent) compared with urban areas.

There is not a clear association between district poverty rates and access to *piped* water in urban districts (*kotas*). Each pair of bars in figure 4.16 illustrates the share of T60 and B40 households with access to piped water (including primary and secondary sources) in that district, with the district poverty rate represented by a diamond. In the majority of *kotas* there is little to no gap; 29 percent of *kotas* have higher levels of access among the T60, and 34

Figure 4.15: Drinking Water Access in Rural and Urban Settings for B40 versus T60, 2002–15
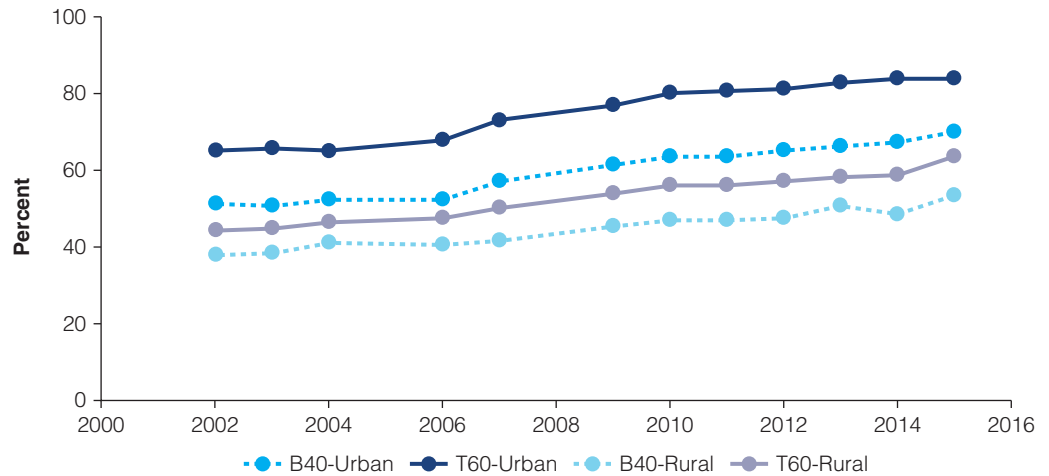
Source: Susenas.

Figure 4.16: Share of T60 and B40 with Piped Water Access (Primary and Secondary) and Poverty Rate in Urban Districts (*Kota*)
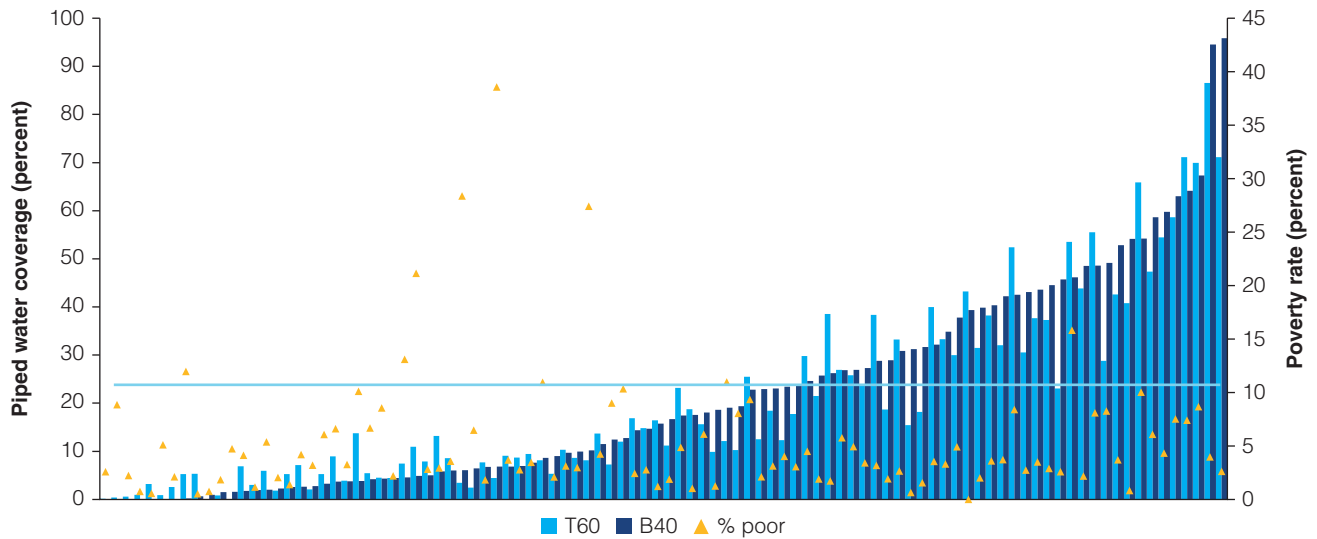
Source: Susenas 2015.

percent of *kotas* have higher levels of access among the B40. Districts with above average poverty rates are mostly clustered in the lower half of the distribution, but most of the *kotas* have below average poverty. Some districts are doing much better than others, irrespective of poverty.

Hibah-participating *kotas* show higher, but not necessarily more equitable, access to piped water supply. The performance-based Water *Hibah* program has contributed to an estimated 265,000 piped water supply connections for poor urban households in 151 LGs since 2012 (Indii 2014a). For the 26 *Hibah*-participating *kotas*, access to piped water supply is significantly higher (5 percent) than in non-*Hibah* participating *kotas* for both T60 and B40 households.

However, there is no statistically significant difference in the average gap in access between T60 and B40 households (figure 4.17) across the two groups of districts.[7] *Hibah*-participating districts had a larger gap in access between T60 and B40 than non-*Hibah* participating districts did in 2012 (13.5 percent vs. 10.3 percent p=0.13). The gap declined for both groups of districts in 2015, but remained larger in *Hibah*-participating districts (11.0 percent vs. 8.4 percent p=0.20). However, this does not necessarily imply that the *Hibah* program is not achieving its pro-poor objectives, since the evidence suggests that the program indeed targets *kota*s with larger gaps in access to begin with.

Small and big cities increased the share of households with piped water connections between 2011 and 2015, despite rapid population growth averaging around 2 percent per year (figure 4.18). Piped water connections in metropolitan areas declined by 2.8 percentage points over the period between 2011 and 2015, and these cities also experienced growth of 2.5 percentage points per year. While Jakarta experienced one of the lowest population growth rates (1.2 percent) among cities categories,[8] the share of households in Jakarta with piped connections declined by 1 percentage point. Medium-sized cities of between 100,000 and

Figure 4.17: Share of T60 and B40 with Piped Water Access (Primary and Secondary) by *Hibah* and Non-*Hibah* Participating Urban Districts (*Kota*)
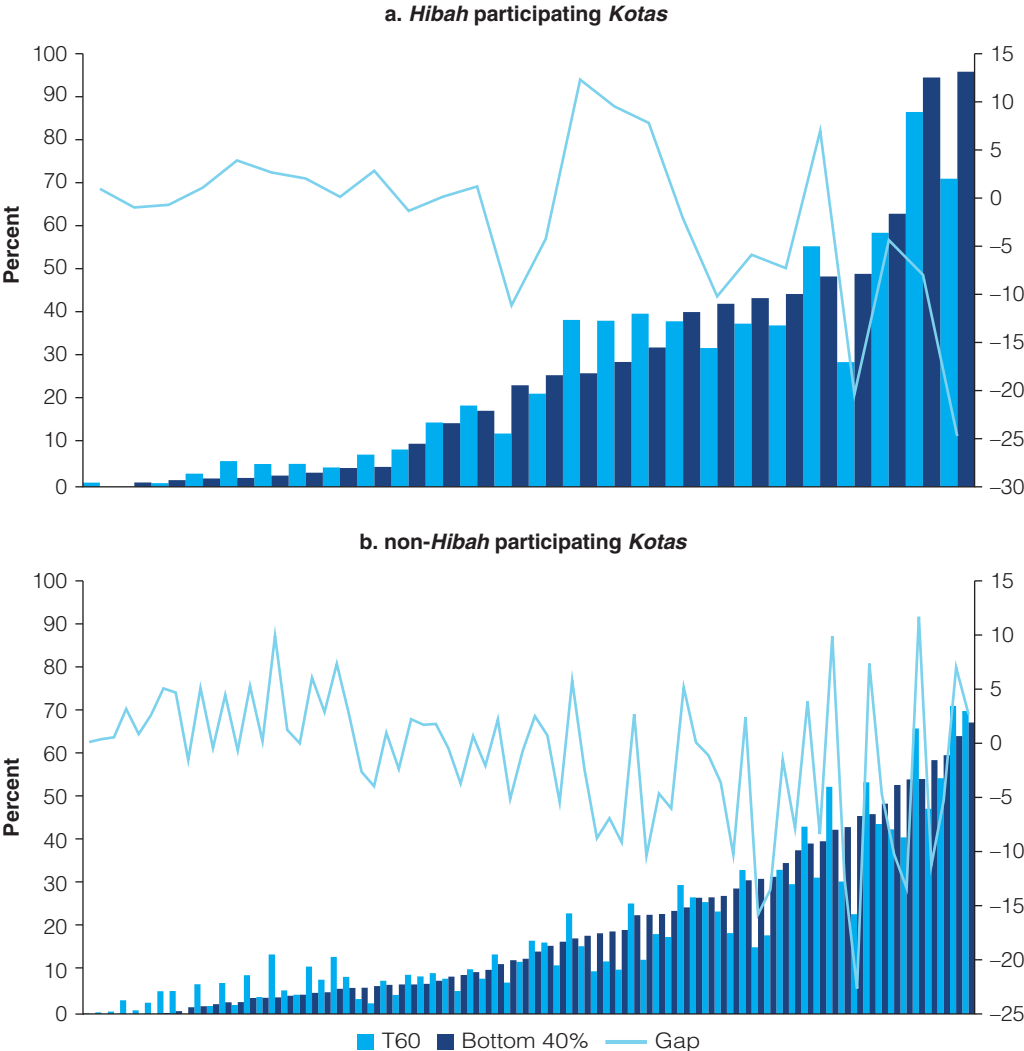
a. *Hibah* participating *Kotas*

b. non-*Hibah* participating *Kotas*

Legend: ■ T60   ■ Bottom 40%   — Gap
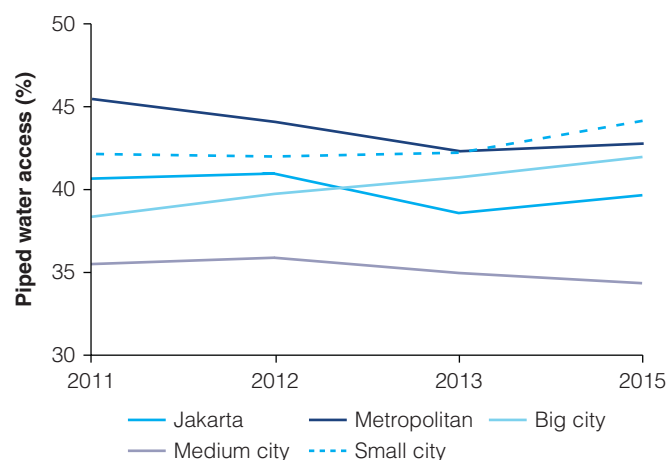
City category	Rate of change 2011–15 (%)	Average population growth rate (%)
Jakarta	−0.6%	1.2%
Metropolitan	−1.5%	2.5%
Big city	2.3%	2.1%
Medium city	−0.8%	2.3%
Small city	1.2%	2.0%

Source: Susenas.
Note: Results are not representative at levels below district level.

500,000 inhabitants have, at 35 percent, the lowest share of piped water connections, while small cities have the highest at 45 percent.

Small, medium, and big cities—all experiencing annual growth of over 2 percent per year since 2011— maintain the widest gaps in access to piped water between the B40 and T60 households (figure 4.19). In small cities 37 percent of B40 households have piped water connections compared with 49 percent of T60. Meanwhile, inequality gaps are closing in metropolitan cities and have reversed in Jakarta, where 42 percent of B40 households have piped water connections compared with 39 percent of T60.

Water Quality: Little Information on a Potentially Widespread Problem

A recent water quality survey was conducted in the city of Yogyakarta, finding that nearly all sources of improved water were contaminated with *E. coli*.[9] Wells, boreholes, and protected springs had the highest levels of contamination (90 percent), while piped water was lower at 77 percent. Ready-to-drink samples that were reportedly treated by boiling, filtration, or another method, showed similarly high levels of fecal contamination: 68.9 percent for water coming from wells, boreholes and protected springs; 73 percent for piped water; and 52 percent for bottled water. The fact that 73 percent of samples from piped water sources were contaminated even after reported treatment suggests that the water is not being properly treated, is not treated to the same degree as water from other sources, or is becoming re-contaminated due to unhygienic storage (not covered and/or exposed to direct contact with flies, dust, and dirt).

Available evidence suggests that PDAM water quality is likely to be a significant problem, especially with dilapidated piped networks, groundwater contamination, intermittent service, and low pressure. There is limited public transparency regarding PDAM water quality results, and MoH reports that only 23 percent of drinking water is currently tested for quality, with a target of just 50 percent by 2019 (MoH 2015). Indeed, District water utility (PDAMs) are not

Figure 4.19: Piped Water Access (Primary and Secondary Source) for B40 versus T60, by City Category, 2011–15
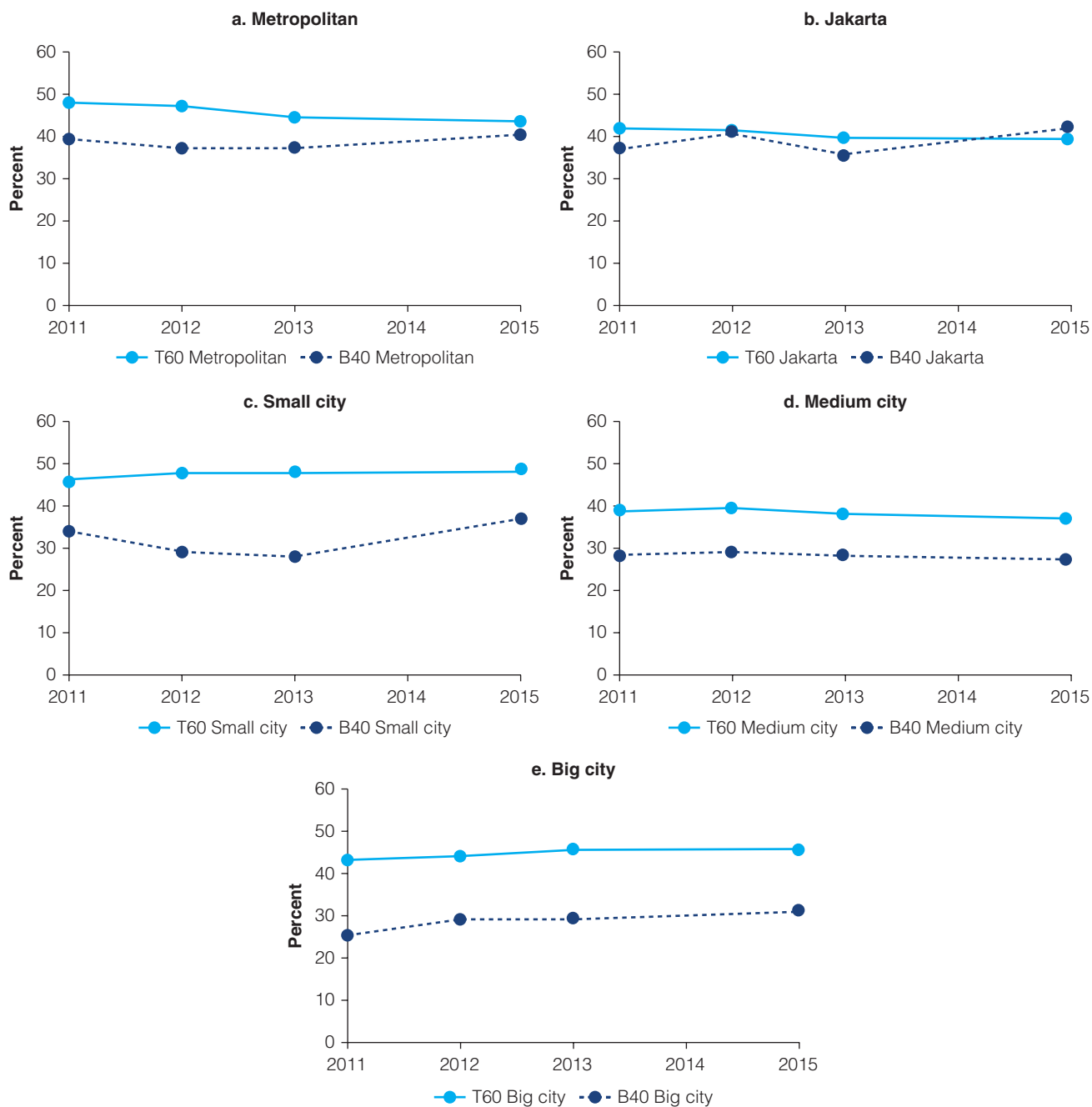
Source: Susenas.

legally required to provide clean water: the current Regulation on Drinking Water Supply Systems (Government Regulation No. 122/2015) allows PDAMs to provide water that requires one further stage of treatment before drinking, placing the burden on households to treat piped water before drinking.

Groundwater quality is not consistently monitored, but available evidence indicates that the potential risk for contamination is severe, especially in dense urban settings. A study of groundwater quality in large cities in Java shows high levels of contamination from septic

Figure 4.20: Households Using Groundwater as Primary Drinking Water Source and Distance to Feces Containment B40 versus T60 in Urban Areas
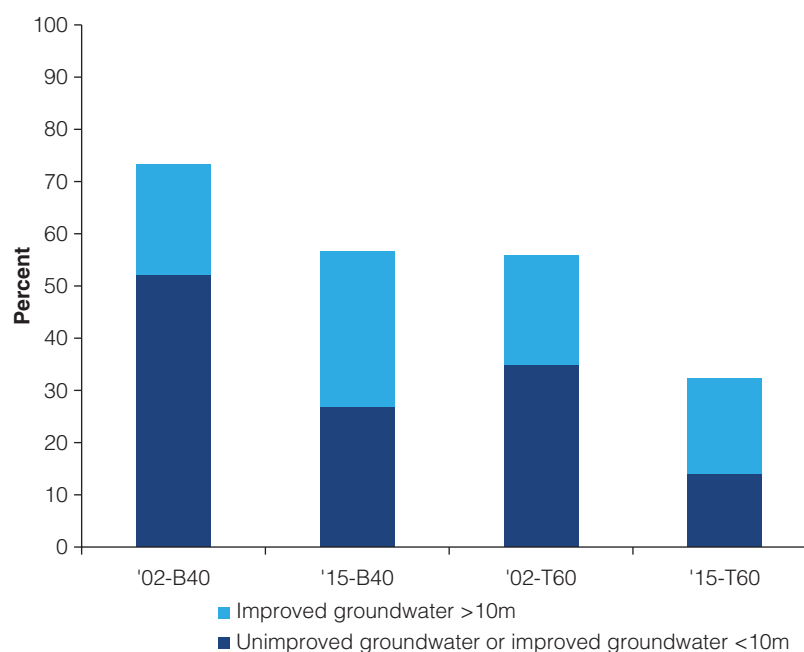
Source: Susenas.

tanks and untreated domestic wastewater, as well as landfill and industrial effluent contamination.[10] In 2015, 57 percent of the B40 in urban areas used groundwater sources, a decline from 73 percent in 2002. A smaller proportion of the T60, 32 percent, used groundwater sources (figure 4.20). Although use of groundwater for drinking is declining, estimates show an increasing share of households are using a protected groundwater source for purposes other than drinking. Leaving aside industrial and other forms of contamination, nearly half (43 percent) of "protected" groundwater sources used by the B40 are less than 10 meters from an excreta disposal site such as a *cubluk* (wet pit latrine) or septic tank (often poorly constructed and not properly sealed). Adding these to the unprotected sources implies that in 2015 over a quarter (27 percent) of the B40 drink unsafe groundwater, though this has fallen from over half (52 percent) in 2002. For the T60, meanwhile, the share has fallen from 35 to 14 percent. Contaminated groundwater is particularly an issue in urban settings where there is overcrowding, poor quality septic tanks, and lack of fecal waste management.

Building on the challenges identified in this chapter, the following chapter will outline the constraints on, and opportunities for, delivery of piped water services to the poor in urban settings. Although piped water service delivery in urban settings is not the only challenge facing the water sector and the GoI, it was prioritized for deeper investigation on the basis of current patterns in equity of access, rapid urbanization in Indonesian cities, and the underlying financial and performance hurdles in the urban water sector, which together present a unique challenge to extending access to low-income households.

Notes

1. The GoI applies stricter criteria to classify improved sanitation and only considers private or shared pour flush latrines that dispose of feces in a septic tank as improved, estimating that 62 percent of the population had access to improved sanitation in 2015.

2. World Bank, Project Appraisal Document of national Slum Upgrading Project, June 2016.
3. A basic latrine is one that does not hygienically separate feces from the environment as opposed to an improved latrine.
4. environments such as dense urban areas, high groundwater, frequently flooded areas, and housing built along the coastline or beside rivers and lakes.
5. GoI exclusively uses Susenas to calculate estimates of access to water supply and requires that groundwater sources (borehole, well, or spring) are located at least 10 meters distance from the feces containment structure (see box 1.1) in order to be considered improved.
6. PAMSIMAS management information system identifies "poor" and "non-poor" beneficiaries.
7. Eligibility criteria for *Hibah* is based on a household's power voltage and household assets, rather than income poverty.
8. Categories are based on government regulation No.26 Year 2008 and enforced through Policy and Strategy for National Urban Development (KSPPN) issued by Bappenas as a basis for urban development for 2015–45.
9. Survey was conducted alongside March 2016 Susenas data collection by BPS, UNICEF, Bappenas and MoH.
10. World Bank, Java Water Resources Strategies Study Report, 2012.

References

Berendes, D., A. Kirby, J. A. Clennon, S. Raj, H. Yakubu, J. Leon, K. Robb, A. Kartikeyan, P. Hemavathy, A. Gunasekaran, and B. Ghale. 2017. "The Influence of Household-and Community-Level Sanitation and Fecal Sludge Management on Urban Fecal Contamination in Households and Drains and Enteric Infection in Children." *The American Journal of Tropical Medicine and Hygiene* 96 (6): 1404–14.

Cameron, L., and M. Shah. 2011. "Risk-Taking Behavior in the Wake of Natural Disasters." Discussion paper. University of California, Irvine.

Cameron, Lisa A., Susan Olivia, and Manisha Shah. 2015. "Initial Conditions Matter: Social Capital and Participatory Development." IZA Discussion Paper 9563. Available at SSRN: https://ssrn.com/abstract=2708376

Cameron, Lisa A., and Manisha Shah. 2017. "Scaling Up Sanitation: Evidence from an RCT in Indonesia." IZA Discussion Paper 10619. Available at SSRN: https://ssrn.com /abstract=2940609

IndII (Indonesia Infrastructure Initiative). 2014a. *Output-based Financing for Urban Water Supply, Towards a Nationwide Water and Sanitation Hibah in 2015-2019*.

———. 2014b. *Journal of the Indonesia Infrastructure Initiative—PRAKARSA*. Jakarta: Australia Indonesia Partnership.

MoH. 2015. Mewujudkan Aksesibilitas Air Minum dan Sanitasi yang Aman dan Berkelanjutan Bagi Semua. BPS, Bappenas, MoH and UNICEF.

PAMSIMAS. 2015. *Management Information System PAMSIMAS*. http://mis.pamsimas.org /report/kpi_new/ (accessed October 25, 2016).

Skoufias, E. 2016. *Operationalizing a Multi-Sectoral Approach for the Reduction of Malnutrition in Indonesia: An Application using the 2007 and 2013 RISKESDAS*. Washington DC: World Bank.

Susenas. 2015. Survei Ekonomi Nasional. Badan Pusat Statistik.

WHO and UNICEF. 2015. *Progress on Drinking Water and Sanitation: 2015 Update and MDG Assessment*. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Geneva: WHO and New York: UNICEF.

World Bank. 2015. *An Unfair Start: How Unequal Opportunities Affect Indonesia's Children*. Jakarta: World Bank.

———. 2016c. *Poor Sanitation Costs Jakarta about IDR 16.2 Trillion (USD 1.4 Billion) per Year— The Economic Impacts of Sanitation*. Jakarta: World Bank.

———. 2017. "Study on Small Onsite Sanitation in High Dense and Challenging Areas in Indonesia." Jakarta: World Bank.

Chapter 5
Urban Water Service Delivery Constraints on and Opportunities for Reaching the Poor

Core Question: What are the WASH service-delivery constraints and potential solutions to improving services to the poor and bottom 40 percent?

Key facts

- The GoI's 100-0-100 target is for universal access to improved water supply, but current patterns in equity of access to piped water suggest that low-income households are likely to remain on a non-piped service for longer than T60 households.

- The barriers preventing low-income households from accessing piped water connections include (a) government budget allocation and spending; (b) financial sustainability and performance of PDAMs; (c) perceptions and behavioral constraints; and (d) legal frameworks for equitable service delivery.

- At current levels, government budget allocation to water supply is insufficient to achieve the universal access target by 2019; it is also dominated by central government financing and is limited in the extent to which it can incentivize subnational spending on poor-inclusive investments.

- A large share of PDAMs perform poorly on core sector diagnostics and face a number of challenges to turning around performance, including political and financial interdependencies between local government and PDAMs, lack of incentives to improve performance, and limited mechanisms to sustain service delivery for the poor.

- Low-income consumers are viewed as costly and risky to serve. They are perceived as unwilling to pay for piped water services, despite the fact that they pay a higher price for water in the informal market. The *Hibah* scheme is designed to counteract some of these perceptions, but analysis suggests it is not necessarily leading to more equitable coverage.

- There is a lack of overall legal frameworks for equitable service delivery, complicated by the fact that poor residents in urban areas often live in informal settlements, lacking the formal registration and legal documents required for utility service.

Why Urban Water?

The focus on urban water for in-depth institutional and political economy analysis is timely and opportunistic. There is a clear historical trend of utilities facing challenges in trying to keep up with rising demand resulting from population growth and rapid urbanization. Half the population of Indonesia resided in urban areas in 2010, and this figure is projected to rise to 68 percent by 2025 (UN-DESA 2014). In the absence of adequate planning, the growth of cities can introduce a number of challenges, including disparities in income and access to services, which exacerbate inequalities.

Despite these trends, focused efforts are being made by urban water government counterparts to tackle the issue of utility underperformance in order to meet universal access targets for improved water by 2019. Reaching the target of 60 percent coverage of piped and 40 percent coverage of non-piped improved water sources in urban areas will require 16.5 million new household piped water connections by 2019. But non-piped sources, such as groundwater, will remain a key means for extending improved access in order to reach the target. Currently, of the 29.6 percent of urban households with access to piped water supply, the B40 make up just 7.5 percent, while the T60 make up 22.1 percent. Given current patterns in equity of access to piped water (figure 5.1), B40 customers may be more likely to remain on a non-piped service for longer than T60 customers. This disparity indicates an urgent need to support the water sector and the GoI to develop viable strategies to help overcome challenges to increasing piped water access among the poor, as well as to ensure that the groundwater sources that make up the other 40 percent of improved coverage meet the 4K standards of quality, quantity, continuity, and affordability (*kualitas, kuantitas, kontinuitas dan keterjangkauan*).

The current challenges facing the urban piped water sector have negative impacts on poor people, whether they have a connection or not. Piped water, especially that provided by PDAMs, represents the most economically efficient route to safe, affordable, and environmentally sustainable water services in urban areas. At present, alternative sources such as wells and boreholes are unlikely to be consistently safe in urban areas (Foster, Lawrence, and Morris 1998), especially given the large share of urban households (78 percent) using on-site pit latrines and soak pits that are a source of groundwater contamination. Moreover, the poor already pay several times more than the official tariff for vendor-supplied water; a piped water connection could thus result in substantial cost savings for poor households, if they are able to overcome the initial connection fee barrier through subsidies (World Bank 2006b).

Figure 5.1: Access to Piped Water by Income Quintile (Q1–Q5) in Urban Areas
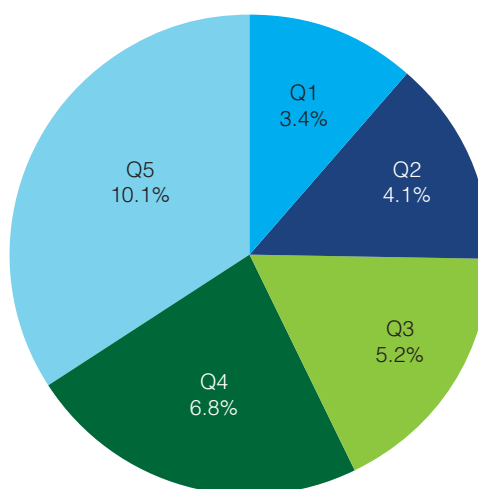
Source: Susenas 2015.

The aim of this chapter is to outline the current insitutional and service delivery context for urban water supply and the constraints on extending piped water access to the poor in urban settings. The chapter will provide key recommended actions for improving the delivery of this service.

Urban Water Institutional and Service Delivery Context

Responsibility for basic service provision, which includes water supply and sanitation, has been decentralized to the district level through laws such as 23/2014 on Regional Government and 33/2004 on Fiscal Balance between Central Government and Regional Governments. In the case of water supply, it is now well established in legal terms that local (District) governments must provide a minimum standard of water service to citizens. Provincial governments are required to mediate on issues spanning district government boundaries, and central government retains a mandate for overall coordination, strategy, and policy formulation, as well as for safeguarding the availability of services to all. Within this broad framework, roles and responsibilities in the sub-sector are distributed across a wide variety of actors at different levels of government (figure 5.2).

National level: The **Ministry of Public Works and Housing** (MoPWH) and the **Ministry of Energy and Mineral Resources** (MoEMR) have, respectively, responsibilities for policy and technical standards of surface and ground waters. MoPWH, and particularly its **Directorate General of Human Settlements** (DGHS) and **Support Agency for the Development of Drinking Water Supply System** (BPPSPAM), is the key ministry for technical and implementation issues on water supply and sanitation. DGHS has responsibility at the national level for facilitating the provision of water throughout the country—key units within it include the **Directorate of Water Supply Systems** (DITPAM). The BPPSPAM focuses more on monitoring the performance of the PDAMs. Standards for drinking water quality are set by **Ministry of Health** (MoH), whereas the **Ministry of Environment and Forestry** (MoEF) monitors the quality of water bodies, especially river water. A set of high level "4K" standards has also been issued by the **National Development and Planning Agency** (Bappenas) and enforced by Presidential Regulation No. 185/2014, and covers quality, quantity, continuity, and affordability (*kualitas, kuantitas, kontinuitas dan keterjangkauan*). The **Ministry of Finance** (MoF) has a key role in determining national budget envelopes, and is therefore central to water supply (and sanitation) planning. Preparation of National Plans (*Rencana Pembangunan Jangka Menengah Nasional*, RPJMN), including the current RPJMN 2015-2019, is led by Bappenas and reflects the vision of the elected president. Finally, the **Ministry of Home Affairs** (MoHA) is responsible for promoting institutional improvements in subnational governments, setting up the monitoring on minimum service standards, and supporting the financial management for local government (LG) enterprises, including PDAMs (ADB 2012; key informants).

Provincial level: A **Technical Implementation Unit** (Satker), appointed by MoPWH, is required to receive and consolidate requests from district governments for water and sanitation infrastructure investment projects. These form the basis for most of MoPWH's investment programs (strategic projects can also be determined by central government). The Satker coordinates with the national level to select projects to be supported (World Bank 2016b).

District governments: Governments at district level are assigned powers over their own budget and planning processes in a manner that broadly reflects the national process, involving LG working units (*Satuan Kerja Perangkat Daerah*, SKPD), which include district-level planning and finance departments (equivalent to MoF and Bappenas at national level) and relevant *dinas* or local service offices (e.g., for public works, *dinas pekerjaan umum*, or for health, *dinas kesehatan*). The district head wields significant influence over investment priorities within the sector at the local level, whereas the local parliament (DPRD) works with the district head on budgeting, and also monitors implementation.

Figure 5.2: Overview of Government of Indonesia Actors Involved in Urban Water Service Delivery

National pokja AMPL
- Bappenas (pokja lead)
- Ministry of finance
- Ministry of home affairs
- Ministry of health
- Ministry of public works
- Ministry of environment
- Bureau of statistics
- Other ministries

Target setting and policy development

DG of cipta karya

Support Agency for the development of drinking water supply services (BPPSPAM)

Finance and development controller bureau (BPKP)

DG for regional finances

DG for public health

Effluent standard and water resource quality

Sector monitoring

Annual audit of PDAM performance

Tariff guidance

DG of water Resources

- Finacial assistance
- Capacity building for LGs and PDAMs

Drinking Water quality standard

Monitor PDAM performance based on BPKP's audit report

Water resources management

- Develop relationship within members
- Support performance improvement

National water utilities association (PERPAMSI)

Province government

Regional water supply system

District government
- Local legistlative (DPRD)
- District head/mayor

Annual budget process

Leadership appointment

PDAM

Tariff payment, opting out, etc

Client/Citizen

Market choices

Political parties

Alternative providers

Note:
- - - - Guidance/support   ——— Oversight   ——— Coordination

With decentralization, governance responsibility for basic services falls under the category of "concurrent government affairs" (*Urusan pemerintahan konkuren*), implying a division of responsibility between central and district governments (Law 23/2014). Ultimately, the district head/mayor has significant oversight authority as a result of his/her influence over strategic human and financial resource decisions, if not day-to-day operations and management of PDAMs. District heads also have regulatory responsibility for water tariffs, which involves signing off on proposals submitted by the PDAM directors and approved by the supervisory board. Some mayors also draw up performance contracts with PDAMs as a basis for more clearly defined oversight responsibilities.

In urban areas, the provision of clean drinking water is undertaken predominately by PDAMs,[1] each providing clean water connections to households within a single district or city. Out of a total of 512 districts across Indonesia, 423 have water utilities providing services in their area. Although the majority (386) are PDAMs, owned and managed by district/city governments, an additional 37 water companies are owned and managed by MoPWH or by the private sector. Taken together, these 423 water utilities have reported serving more than 9 million households as of 2015—equivalent to about 42 million individuals, or 16 percent of the total population of Indonesia (MoPWH, 2015).

Constraints On and Opportunities for Connecting the Poor to Urban Water Services

Why Urban B40 Households Have Lower Access to Piped Water than T60 Households

There are a number of barriers preventing low-income households from accessing piped water connections. These include (a) government budget allocation and spending; (b) financial sustainability and performance of PDAMs; (c) perceptions and behavioral constraints; and (d) legal frameworks for equitable service delivery.

Government Budget Allocation and Spending

Despite decentralization of water and sanitation service delivery to the district level beginning in 2001, financing continues to be dominated by central government investments. Finance from both national and local governments to urban water services has been increasing in recent years, but it remains a small share of total and infrastructure spending. Coordinating between investments by different parts of government—with central government mainly investing "upstream" in urban water networks, and LGs funding "downstream" components—is a continuing challenge. In 2013 government expenditure for water supply totaled US$476 million (IDR7.0 trillion), and was largely sourced from the central government budget, with only 0.3 percent of sector expenditure coming from LGs. Central government spending (adjusted for inflation/real and nominal) has increased both in absolute terms (figure 5.3) and as a proportion of total allocations—though spending on water supply is still a modest share of total infrastructure spending, at less than 10 percent (table 5.1).[2]

The available data on sector financing suggests that current levels of government spending, although they have significantly increased, are inadequate to achieve universal access. The cost of universal access to water supply is estimated by the Directorate General of Human Settlements, MoPWH (Cipta Karya) to be approximately US$26 billion (IDR254 trillion), of which central government contributes US$1.4 billion (IDR13.5 trillion) annually up to 2019 through national budget allocation (APBN), for a total expenditure of

Government budget allocation for water supply isn't enough to meet universal access targets, and local government spending is insufficient to bridge the financing gap.

Table 5.1: Central Government Water Supply Spending as Percentage of Total Spending/Infrastructure Spending

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Central government spending	0.13	0.2	0.28	0.31	0.5	0.43	0.34	0.37	0.62
Infrastructure spending	3.1	3.5	5.5	5.3	6.1	6.6	4.8	4.9	9.3

Source: World Bank 2016b.

Figure 5.3: Central Government Patterns of Spending on Water Supply and Sanitation, 2001–13
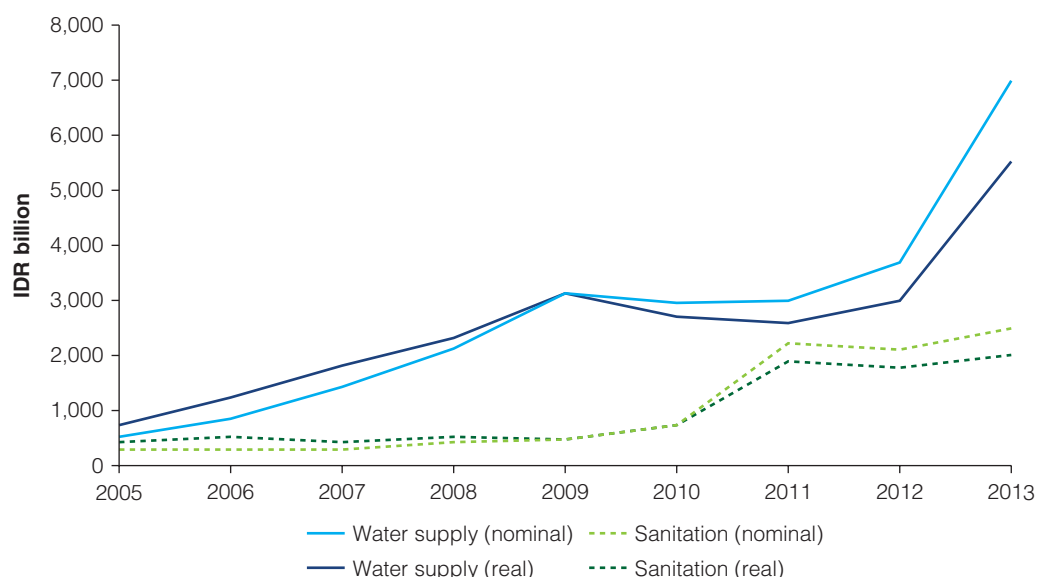
Source: World Bank, 2016b.

US$7 billion (IDR67.5 trillion) (MoPWH 2015).[3] Bridging the financing gap will require accessing provincial and LG budgets (APBD), PDAM internal resources, public multilateral and bilateral development financing, commercial loans, and private investments—as well as household out-of-pocket spending, which is currently estimated to be approximately one-third of total expenditure on water supply from all sources (World Bank 2016b). In particular, the government aims to attract US$1.5 billion in private sector financing through PPPs and business-to-business schemes, and US$860 million in commercial financing. The efforts to mobilize diverse funding sources in partnership toward achieving the shared goal of universal access has led the GoI to adopt common sectoral policies through national platforms of delivery that apply regardless of the source of funds.

Current local government spending for water and sanitation is not sufficient to meet the financing gap for universal access. Provincial and district (subnational) government is expected to finance nearly half (47 percent) of expenditures required to meet universal access targets for water supply—a total of US$12.4 billion (IDR119 trillion), or US$2.5 billion (IDR24 trillion) annually (MoPWH 2015). Although subnational expenditures for the water and sanitation sector have doubled in real terms since 2001, by 2013 they were US$0.9 billion (just over IDR9 trillion) (figure 5.4). Taking these past expenditures for water supply and sanitation as a guide, a substantial financing gap remains.

National Government has limited leverage to incentivize subnational spending on urban water supply. The vertical imbalance characteristic of the *Reformasi*-era[4] fiscal-federal system has helped to promote state cohesion (Harris & Foresti 2010), but has also had important implications for investments in urban water supply—including the extent to which national government can push for prioritization of pro-poor investments by district governments. Most transfers to LGs (General Purpose Grants or *Dana Alokasi Umum*, DAU) go to support general expenditure, and are not earmarked (figure 5.5). The Special Allocation Fund (Specific Purpose Grants or *Dana Alokasi Khusus*, DAK), on the other hand, is allocated by region and earmarked for specific projects according to national priorities. It also includes some pro-poor criteria

Figure 5.4: Subnational Government Patterns of Spending on Water Supply and Sanitation, 2001–13

Legend:
- Sub national (nominal)
- Sub national (real)
- Province (nominal)
- Province (real)
- District (nominal)
- District (real)
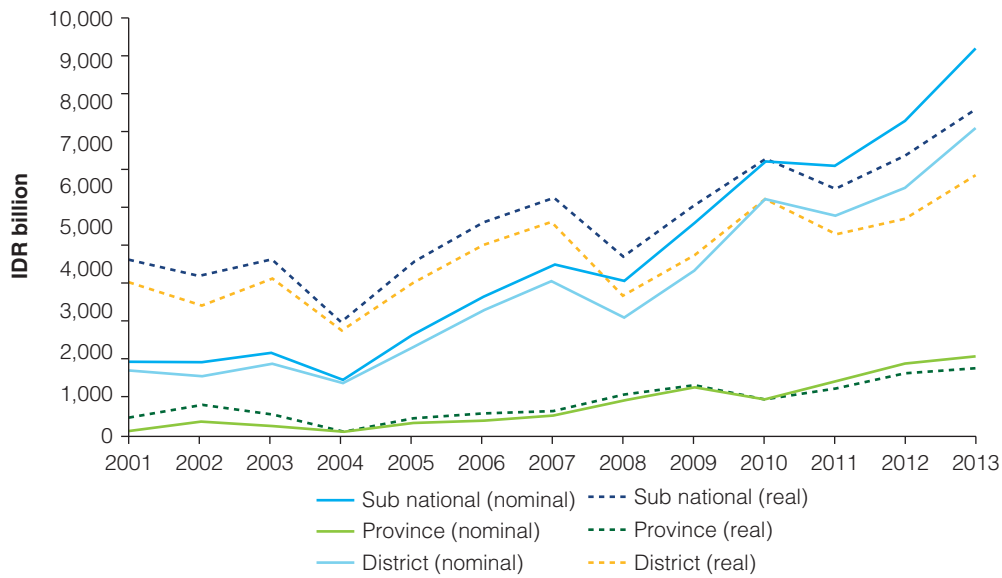
Source: World Bank 2016b.

Figure 5.5: Capital/Investment Mapping

Note:
- Cash transfer
- Asset transfer
- Technical assistance
- Service provision

Ministry of finance
Ministry of public works
Other ministries
Donor
DAU
DAK
Grant
Province government
Satker at province
Local government
Asset transfer
Captial Injection through additional equity
Asset transfer
PDAM
Service
Client
Service
There's no direct transfer to LG- all on budget and/or on treasury
Annual remittance treated as local revenue follows criterias based on current regulation
Other providers (Non-PDAM)

Source: Harries et al. 2016.

regarding how it is distributed among districts. The DAK, however, is relatively modest in relation to total LG financing, and the portion that is earmarked to water supply and sanitation is even smaller (most recently 0.15 percent) (World Bank 2016b). The national government's ability to incentivize subnational governments to target poor households is, in particular, even more limited; it has increased with the national roll-out of the Water *Hibah* program from 2015, but eligibility criteria for LGs and PDAMs (such as sufficient raw water supplies and adequate treatment) has, along with other issues, limited the expansion of the program.

Despite an increase in DAK transfers from central government, transfers are still not aligned to needs and there is limited accountability for fund allocation. DAK transfers have increased significantly over the past several years. In 2013, DAK for water supply was approximately US$62 million (IDR600 billion), and increased to US$104 million (IDR1 trillion) in 2015 and

Figure 5.6: DAK Water Allocation per Capita in 2015 and 2017 versus Water Access
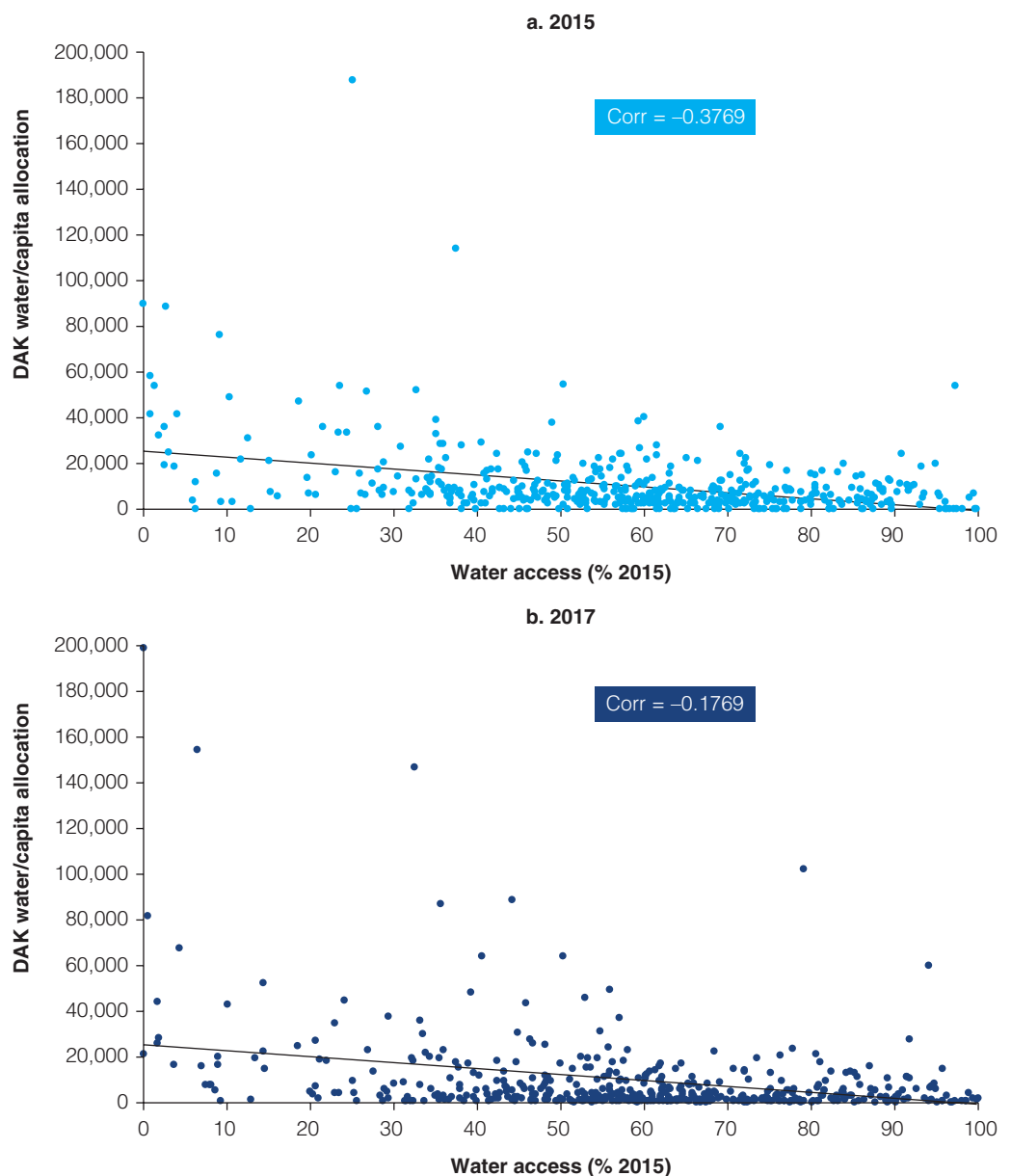
Source: World Bank calculation, Ministry of Finance.

US$118 million (IDR1.14 trillion) in 2017[5]. The number of districts receiving DAK also declined, from 430 cities/districts in 2015 to 269 in 2017[6]. Two challenges persist with DAK transfers. The first is that DAK water supply allocations are not aligned to needs.

Figure 5.6 shows the correlation between the DAK allocation for water in 2015 and 2017, and the coverage of improved water in districts in 2013 and 2015. As DAK allocations have increased over time, there is a weaker association between allocations and improved water access figures. The second challenge is that DAK allocations are not based on performance—though this appears to be changing as of 2017. Funds are released upon submission of reports on absorption, rather than on the basis of how funds have been used and what has been achieved.

Financial Sustainability and Performance of PDAMs

Efforts to incentivize poor-inclusive service delivery need to factor in the overall financial health, efficiency, and performance of PDAMs. A major challenge to extending connections to low-income households is the perception that doing so would put the financial and technical health of the PDAM in jeopardy, especially if not accompanied by targeted technical assistance and capacity building. Utilities require economies of scale for sustainable operation and cost recovery from across the customer base. However, as illustrated in this section, a large share of PDAMs perform poorly on core sector diagnostics and face numerous challenges to turning around performance—including the political and financial interdependencies between LGs and PDAMs, and the lack of broader incentives to improve performance.

PDAMs play a big part in the provision of drinking water, but they lack incentives to improve performance and are not obligated to serve the poor.

Financial Sustainability

Current PDAM water tariffs are not economically efficient in managing demand and resources, do not raise enough revenues for the PDAMs to become financially independent, tend to benefit high-income rather than low-income households, and are complex and difficult to administer effectively, creating opportunities for fraud and corruption. District heads have regulatory responsibility for water tariffs. For water utilities this is guided by the recent MoHA Regulation 71/2016, which requires tariffs to achieve full cost recovery and includes specific measures to protect poor customers to ensure that tariffs do not exceed 4 percent of household income. The new regulation lacks detail, however, on how compliance will be enforced across districts. Increasing Block Tariffs (IBTs) have been criticized for failing to achieve cross-subsidy, because high-volume consumers are not necessarily wealthier than lower volume consumers. The Regulation acknowledges this and allows for charges to vary according to a household's classification. Households classified as MBR (*Masyarakat Berpenghasilan Rendah* or low-income household) would pay lower rates across the consumption blocks. Government Regulation 122/2015 includes more general provisions on tariff-setting, including affordability and the provision that national government should retain an overarching responsibility for ensuring access for low-income groups.

The rationale behind the tariff calculation is generally not well understood by local governing bodies, creating an incentive to push tariffs down rather than allow for cost recovery. In some cities water tariffs for the poor ("social tariffs") are set so artificially low (US$0.03/m³) that even with cross-subsidies from higher paying customers, PDAMs are forced to sell water to the poor at a loss. This ends up disadvantaging the poor because PDAMs are discouraged from serving predominantly poor areas. PDAMs can propose tariff levels and structures based on guidelines issued by MoHA, with the head of local government given the authority to approve them. Although no DPRD approval is needed, LGs, and even the PDAMs' management, still prefer to seek DPRD agreement on tariff increase, so as not to be responsible for the decision. Guiding legislation and processes for tariff approval may be insufficient to mitigate the strong political incentive of elected officials to suppress tariffs. However, a new MoHA regulation, No 70/2016, will require LGs to subsidize the difference if tariffs are set below cost-recovery levels.

Whether or not tariff increases are approved may still depend on the nature of the relationship between an individual mayor and the respective PDAM, and the level of understanding of both PDAMs and LGs on the need for cost-recovery tariffs.

Connection fees required to fund capital investments are a barrier for low-income households, but have so far only been addressed through the *Hibah*. The government's output-based grant (*Hibah*) scheme for household water connections is meant to circumvent this barrier, by reimbursing district government for connection fees for low-income households. The program was rolled out nationwide in 2015, but still only covers a fraction of the eligible population. In part, this is due to strict eligibility criteria that LGs and PDAMs are required to meet in order to participate. The criteria includes PDAMs achieving "healthy" performance status, and having adequate spare production capacity and the ability to pre-finance capital investments. Other barriers to participation include a lack of tools and information to identify eligible low-income households, concern that targeting such households under the water *Hibah* will damage the financial position of the PDAM, and a generally limited understanding of the purpose of the *Hibah* and how to incorporate the program into an overall business plan.

Technical Aspects

Available performance data[7] suggest that a large share of PDAMs lag on key sector performance indicators, but that some progress has been made. For the three years shown in table 5.2, a little over 50 percent of PDAMs are classified as "healthy" based on the multi-indicator rating system of BPPSPAM, whereas around 20 percent are classified as "sick." Data available for 2015 indicate water consumption of 18.9m^3 per household (connection) per month, and an average number of operating hours per day of 19.2. Water losses hovered at around a third of the distributed total in 2015,[8] and only around 26 percent of PDAMs evaluated in 2014 and 2015 were applying full cost-recovery tariffs. The financial position of most PDAMs remains precarious, with the majority loss-making.[9]

There is wide variation in performance measures between "top performers" and the rest of PDAMs. Using BPPSPAM data for the period 2011–14, utilities were categorized as top, bottom, or middle performers on each performance indicator, using the following composition:

   i.   The Top 10 percent performers—utilities whose average performance on an indicator for the period 2011–14 (or 2010–15, depending on availability of data) was greater than the 90th percentile (or less than the 10th percentile in the case of non-revenue water);

  ii.   The Bottom 10 percent performers—utilities whose average performance on an indicator was less than the 10th percentile (or greater than the 90th percentile in the case of non-revenue water) for the same period; and

 iii.   The Middle 80 percent performers—utilities whose average performance on an indicator was between the 10th and the 90th percentile.

As shown in figure 5.7, the top 10 percent performers on each indicator are doing much better than the middle 80 percent and bottom 10 percent—achieving full performance on quality and duration of supply hours. Service coverage, average revenue, and number of connections for the top 10 percent performers increased between 2011 and 2014, whereas other indicators remained stable. On the other hand, PDAMs in the bottom 10 percent of performers for duration of supply did worse over time, and none passed quality standards under MoH regulations. The middle 80 percent of performers on water quality also showed a sharp decline in the percentage of samples meeting the required standards over the period.

Despite the poor performance of many PDAMs, most PDAMs and their owners lack incentives to improve performance. Although performance targets are included in some GoI programs, these are only for the duration of the program and there is no incentive to maintain performance

Table 5.2: Summary of PDAM Performance Indicators, 2013–15

	2013	2014	2015
Total number of PDAMs	383	383	386
Number of PDAMs evaluated by BPPSPAM	350	359	368
Category			
Healthy	176	182	196
Unhealthy	104	103	100
Sick	70	74	72
Total residents in administrative areas served by PDAMs	229,564,729	232,402,248	232,670,949
Total residents in service areas served by PDAMs	141,378,957	146,958,850	149,380,197
Number of subscribing customers	8,816,286	9,260,268	9,828,054
Population served	57,588,990	61,489,535	64,155,423
Domestic water consumption (m3/customer household/month)	17.4	19.23	18.87
Non-revenue water	33.00%	32.79%	32.47%
Billing collection efficiency	86.8%	94.47%	94.05%
Total PDAMs applying full cost recovery tariffs[a]	105	93	96
Service operating hours per day	18.4	18.6	19.22
Number of PDAMs by category: number of subscribing customers			
<10,000	155	157	154
10,000–50,000	160	165	174
50,000–100,000	19	22	25
>100,0000	16	15	15

Source: BPPSPAM 2013–15.

a. Tariffs are assessed to provide full cost recovery on the basis of an assumed 100% billing collection efficiency. As can be seen from the table, collection efficiency has fallen below 100% in recent years. The calculations also assume a generic level of non revenue water (NRW) of 20%, which is lower than recorded levels. As such, the proportion of PDAMs achieving full cost recovery is likely to be lower than the figures reported here suggest.

levels. In addition, although BPPSPAM conducts performance audits of PDAMs, there is no systematic monitoring or evaluation of performance in relation to program participation, resulting in broken feedback loops. With regard to LGs, the power of the district head to approve budget allocation and tariffs, and to appoint PDAM leadership, appears to be a key source of dysfunction in the former's oversight role—resulting in a reluctance to raise tariffs to full cost-recovery levels or to disconnect illegal connections, and leading to losses in revenue. Consequently, utilities are often caught in a negative downward spiral of poor cost recovery, low investment in existing infrastructure (let alone network expansion), deteriorating service levels, and falling customer satisfaction and willingness to pay. These factors constrain the ability of PDAMs to sustainably serve low-income customers.

Perceptions and Behavioral Constraints

Low-income consumers are less likely to be served by piped providers, and have less of a voice, politically, compared to high-income groups. There are few, if any, intermediary institutions bringing together the poor, PDAMs, and LG officers. This situation is complicated by the fact that the poor are generally ill informed about the advantages of piped water connections or about the disadvantages, in terms of cost and quality, of alternatives (see box 5.1). They are

Overcoming the reluctance of piped water providers to serve the poor means addressing perceived and actual disincentives.

also distrustful of the service provided by PDAMs, and are reluctant to get locked into a contract for water services that are unreliable.

Piped providers reportedly perceive low-income customers as costly and risky to serve. There are a number of issues that create a disincentive for piped providers to actively extend access to B40 households, in particular:

- limited expectations that low-income households will behave as "good customers";

- perception that poor households are reluctant or are unable to commit funds for a water connection since they are vulnerable to shocks, such as inflation, job layoff, or sudden illness;

Figure 5.7: Top 10 Percent versus Bottom 10 Percent Performance Average (Unweighted)

Service coverage

Non-revenue water

Staff productivity

Consumption of water

Duration of supply

Quality

Bottom 10% ── Middle 80% ── Top 10%
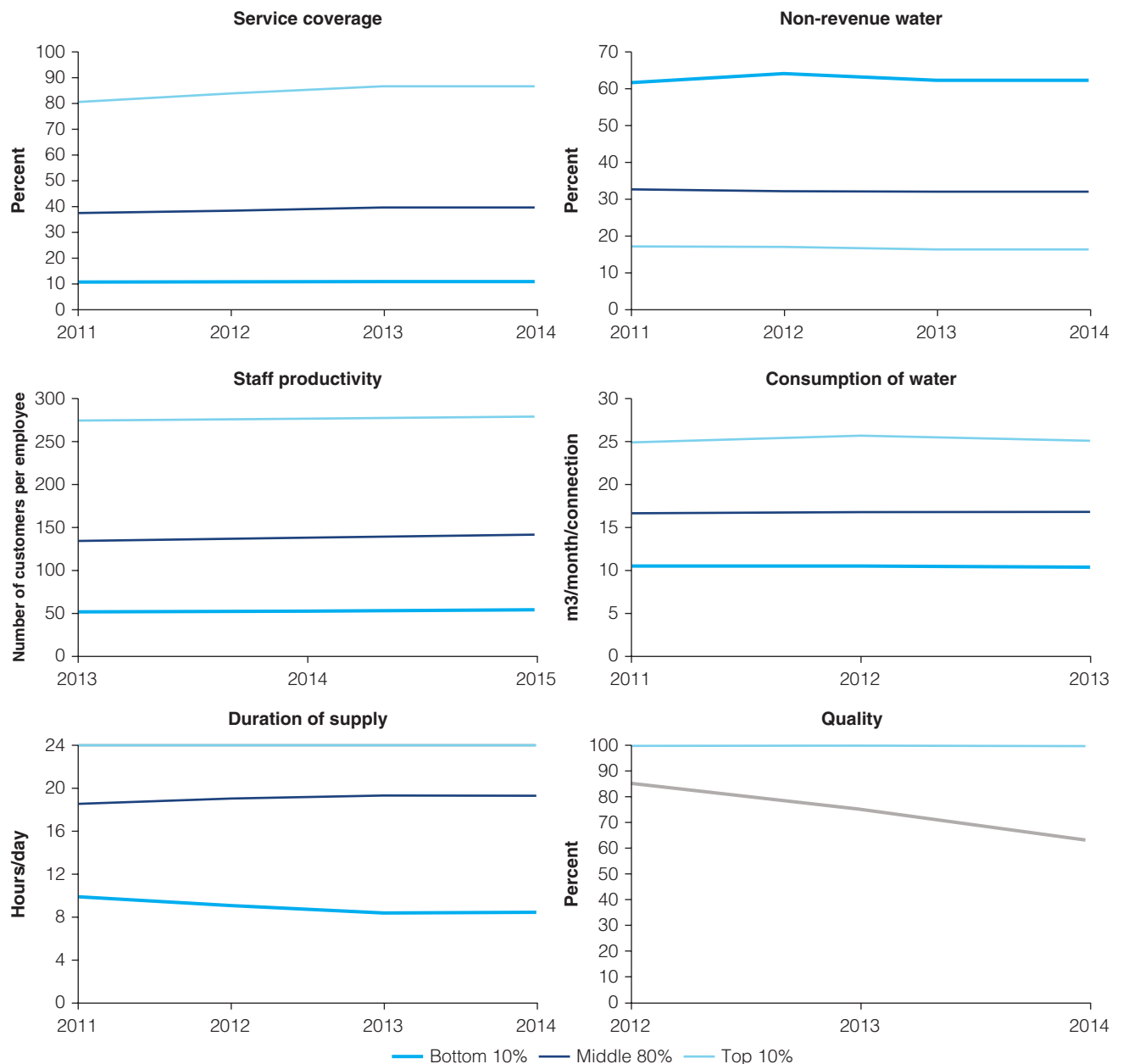
figure continues next page

Figure 5.7: Continued

Cost coverage

Average revenue

Unit costs

Number of connections

Bottom 10% — Middle 80% — Top 10%
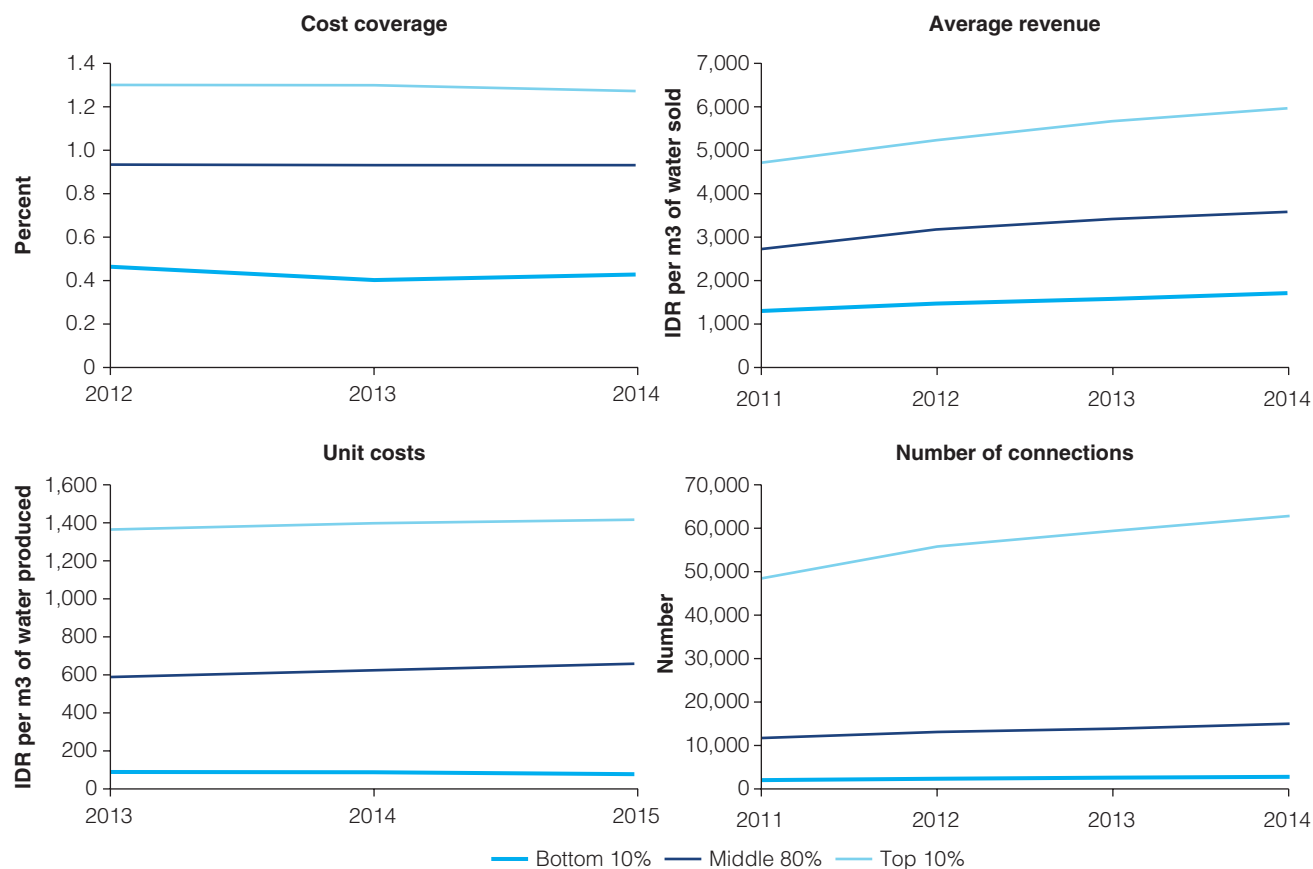
Source: Calculations based on BPPSPAM Performance Audits (2011–14).
Note: a) based on unweighted observations; b) changes are computed based on the same composition of utilities in two consecutive years; c) the trends are based on data for at least 20 utilities.

Box 5.1: The Benefits of a Household Piped Water Connection

- Health effect: convenient water supply linked to better hygiene, improved health and development outcomes, and a cleaner environment;

- Small enterprise effect: opportunities to open small businesses, such as catering services, drink packaging, seed farms, soybean cake production, etc.;

- Wealth effect: increase in property values due to availability of piped water (for owner-beneficiaries);

- Prestige effect: increase in sense of self-worth through better and more convenient facilities; and

- Income effect: savings in unit price of water, savings in storage, and time savings in purchasing vended water

- perception that low-income households are unwilling to pay cost-recovery tariffs, and that "social" tariffs will damage the financial position of the PDAM;

- uncertainty around tenure and ownership rights (largely left to LGs to resolve);

- perception that low-income communities are more territorially dispersed within the administrative area;

- perceived lack of sophistication in filling out forms;

- perception that poor households do not understand PDAM constraints and are quick to protest when service delivery fails to meet expectations.

It is not known to what extent these perceptions reflect unconscious bias or the actual situation.[10]

The *Hibah* scheme is designed to counteract some of the tendencies on the part of district government to view poor households as costly and risky to serve. The *Hibah* incentivizes PDAMs and district government to overcome governance and financial barriers (real and perceived) to serving low-income households, since connection fees are reimbursed to PDAMs once the connection has been independently verified. Analysis of *Hibah*- versus non-*Hibah*-participating *kotas* does not indicate more equitable coverage between T60 and B40 in *Hibah*-participating *kotas*, although this could be due to different baseline coverage among the two groups, as previously discussed. Moreover, because the *Hibah* only reimburses for connection fees, LGs and PDAMs participating in the program tend to target expansion to areas where additional capital investments in piped networks would not be needed[11]—a tendency that could result in some remote low-income settlements being excluded. It appears that the purpose of the *Hibah* program is still not well understood by some LGs and PDAMs, which also limits expansion.

Poor households are likewise at a disadvantage as a result of their own perceptions and behaviors. They may lack awareness of the risks of drinking contaminated water (whether groundwater or vendor-supplied) and so do not demand improvements in public services. Although poor households perceive water tariffs as costly, they fail to calculate the full cost of buying water from informal vendors, both in terms of direct expenditure and time spent. Analysis of cost-recovery tariffs suggests that low-income households paying tariffs would save between 5 and 12 percent of their income compared to expenditure on vendor-supplied water (World Bank 2006b).

Legal and Regulatory Frameworks for Equitable Service Delivery

Currently, there is no clearly stated poor-inclusive mission underlying the 2019 universal access target for water supply. Although the 100-0-100 program target is universal access, given current trends, and in the absence of an explicit approach for reducing inequality in access, it is likely that B40 households will remain on non-piped sources for longer than T60 households. Moreover, although affordability targets for water supply aim for water tariffs that do not exceed 4 percent of household income, and regulations are in place for achieving this (Regulation 71/2016 and Regulation 122/2015), an explicit strategy to enforce this at LG level has not yet been outlined.

There are no laws, regulations, or contractual requirements for PDAMs to consistently serve the poor. The lack of legal guidance on equitable service delivery is further complicated by the fact that poor residents in urban areas are more likely to live in informal settlements, lacking formal registration and legal documents required for utility service. If these settlements occupy government-owned land, utilities do not have legal authority to build infrastructure or extend services. In such cases, PDAMs rely on LGs to pave the way to service delivery. However, in most cases LGs do not articulate any poor-inclusive or pro-poor strategy as part of the planning process required by MoPWH in its Master Plan for Water Supply System (RISPAMS).

Regulatory control of alternative water service providers is fragmented, with local government responsible for enforcing the regulations. Currently B40 households are more likely to use alternative sources for drinking (with the exception of bottled water, now the preferred drinking water source for T60 households in urban areas), which are harder to regulate—most notably groundwater sources such as private wells and boreholes, and branded or non-branded (refill) bottled water. There is little clarity on who holds ultimate responsibility for regulation of abstraction and quality of water resources, on which all forms of urban access depend. Law 7/2004 on Water Resources and a new government regulation (PP No.122/2015 on Cultivation for Water Resources) left ground/surface water management coordination unresolved, with responsibility for surface water assigned to MoPWH, and for groundwater to LGs, in coordination with MoEMR. Though the annulment of Law 7/2004 in 2015 and resinstatement of the previous Law on Water Resources (11/1974) provides an opportunity for a more integrated approach, signs are not promising that the annulment is leading to greater integration, particularly with regard to the relationship of water resources to urban water supply. Regulations do exist for bottled water, including under MoI Decree 705/2003 for branded bottled water, and MoH Decree No. 492/2010 for unbranded/offered by refill kiosks. There is, however, no regulatory control of private tanker operators, smaller mobile vendors, or piped customers who resell water informally to neighbors. The full extent of this informal water market is not clear—Susenas data imply it is a minor component of service provision, but it may be significant in some cities, such as Jakarta (Kooy 2014).

In the following chapter the report will conclude with a presentation of key recommended actions to orient future water supply and sanitation policy and investment toward a more inclusive approach. Recommendations are prioritized based on their expected impact on the development goals of (a) reducing inequality; (b) enhancing health and well-being; and (c) promoting economic growth and prosperity, as well as on the strength of the evidence base for the solution proposed.

Notes

1. There are also small urban water utilities that are not constituted as PDAMs (that is, as LG-owned but officially independent enterprises), including community-based organisations, and technical units housed within District Government with varying degrees of autonomy: "A UPTD (Unit Pelaksana Teknis Daerah) is a Regional Technical Implementation Unit attached to an LG agency that is responsible for service provision but has no autonomy to retain income for expenses. A BLUD (*Badan Layanan Umum Daerah*) is also a technical operation unit of an LG agency that is allowed to operate with flexibilities or exemptions from rules applicable to the Dinas. It has some additional degree of autonomy to a UPTD, but is more complicated to establish." (World Bank and AusAid 2013, 21). We nonetheless focus on PDAMs in this study, as the most prominent form of piped water provider.
2. All estimates exclude transfers to sub-national government.
3. Historical (2013) exchange rate was used; if current (2016) exchange rate is used, the US$ figures will be lower.
4. The reform era following the fall of Suharto in 1998 and encompassing a process of democratic decentralization as the centerpiece of a broad but fundamental set of reforms to the formal institutions of the Indonesian state, the most significant of these being the model of decentralization for service delivery.
5. Historical (2013) exchange rate was used; if current (2016) exchange rate is used, the US$ figures will be lower.
6. The smaller number of districts receiving DAK funding in 2017 may be due to changes in the procedures on submission of requests and evaluation of proposals by Bappenas, MoPWH, and MoF. Proposals are now required to go through a stringent review process, covering the number of beneficiaries, alignment with national priorities, readiness criteria, local fiscal capacity, and prior performance.
7. Based on audited reports collated the by the Support Agency for PDAMs (*Badan Pendukung Pengembangan Sistem Penyediaan Air Minum*, BPPSPAM) and analyzed by the Financial

and Development Supervisory Agency (*Badan Pengawasan Keuangan dan Pembangunan*, BPKP), with additional analysis by the World Bank. The data are not fully reliable due to measurement and sampling issues and missing values in some years but remain the only available source of PDAM performance indicators.

8. The rating system evaluates performance on the basis of audited reports from BPKP. Indicators, which are incorporated into a total score, include: financial measurements such as return on equity; service aspects such as coverage and customer growth; metrics of operational performance such as non-revenue water; and human resource aspects such as staff to customer ratio.

9. Analysis of data from 386 PDAMs (BPPSPAM).

10. The evidence of perceptions and behavioral constraints in this section is sourced from (World Bank 2006b) and World Bank, Project Appraisal Document of National Urban Water Supply Project, April 2017. Further qualitative research is recommended to fully substantiate the claims.

11. Central Project Management Unit (CPMU) *Hibah*. (2016). Program *Hibah* Air Minum dan Sanitasi—Progress Report. Jakarta: Ministry of Public Works and Housing.

References

ADB. 2012. Water Supply and Sanitation Assessment, Strategy, and Road Map. Manila: ADB. Available online at: https://www.adb.org/sites/default/files/institutional-document/33808/files/indonesia-water-supply-sector-assessment.pdf.

Foster, S.S., A. Lawrence, and B. Morris, B. 1998. *Groundwater in Urban Development: Assessing Management Needs and Formulating Policy Strategies*. Vol. 390. Washington, DC: World Bank.

Harris, D., and M. Foresti. 2010. *Indonesia's Progress on Governance: State Cohesion and Strategic Institutional Reform*. London: ODI.

Harris, D., Mason, N., Rimbatmaja, R. 2016. *Identifying and Overcoming Binding Constraints to Piped Urban Water Services for the B40 in Indonesia*. London: ODI.

Kooy, M. 2014. "Developing Informality: The Production of Jakarta's Urban Waterscape." *Water Alternatives* 7 (1): 35–53.

MoPWH (Ministry of Public Works and Public Housing). 2015. *Rencana Pencapaian Air Minum dan Sanitasi 2015-2019.* Jakarta: MoPWH.

Susenas. 2015. Survei Ekonomi Nasional. Badan Pusat Statistik.

UN-DESA 2014 (2014). Revision of World Urbanization Prospects. New York: United Nations Department of Economic and Social Affairs.

World Bank. 2006b. *Enabling Water Utilities to Serve the Urban Poor*. Washington, DC: World Bank Group.

———. 2016b. *More and Better Spending: Connecting People to Improved Water Supply and Sanitation in Indonesia, Water Supply and Sanitation Public Expenditure Review (WSS-PER)*. Jakarta: World Bank.

Chapter 6
Priorities for Future Policy and Investments in Water Supply and Sanitation

> ### Key Recommended Actions
>
> - Expand piped water services to a larger share of the B40 in urban areas.
>
> - Improve the quality of alternative water sources for those who will remain on non-piped water supply.
>
> - Support the B40 in gaining access to improved sanitation.
>
> - Bring more households into the full sanitation and fecal waste service chain in urban areas.
>
> - Champion multisectoral approaches to reduce child stunting.
>
> - Enhance water supply and sanitation interventions to have greater impact on nutrition outcomes.

The water and sanitation sector in Indonesia is at a pivotal juncture in the post-2015 SDG era, where success will be defined by service quality, sustainability, and equitable distribution of services. The GoI has established its own ambitious target to achieve universal access to water supply and sanitation by 2019—11 years ahead of the SDG target. The existing challenges to achieving these targets, let alone achieving them on schedule, are compounded by rising income inequality and rapid urbanization in Indonesia. The recommendations outlined in this chapter aim to support the GoI in achieving its universal access target, with a particular focus on the needs and constraints of the B40. The goal is to orient future water and sanitation investments around three sector priorities: (a) reduce inequalities in access and quality of water and sanitation services; (b) enhance the health and nutritional impact of water and sanitation investments; and (c) promote economic growth and vibrant cities through more sustainable service delivery in urban areas.

Going forward, the Government of Indonesia will establish several national platforms of service delivery to bridge the gap between policy and implementation. These platforms include (a) rural water supply—community-based and institutionally driven; (b) urban water supply through LGs and PDAMs; (c) regional water supply systems[1]; and (d) urban sanitation[2] (figure 6.1). The platforms allow for (a) one national policy applicable to all sources of financing; (b) common planning documents at LG level; and (c) one monitoring system. In addition, the platforms include flexible funding arrangements and management that will no longer rely solely on national government funding (APBN); support for the development of regulations and guidelines;

Figure 6.1: Government of Indonesia 2019 Universal Access Targets and Service Delivery Platforms
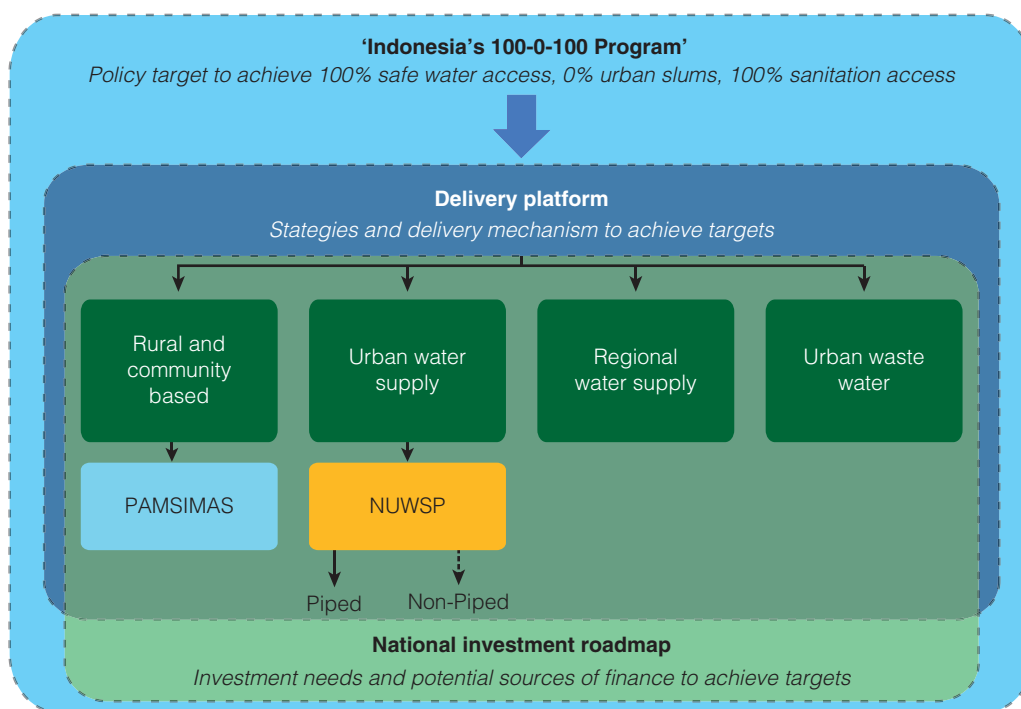
Source: Development of Urban Water Supply Investment and Service Improvement Framework, Final Report, 2016.

and capacity building at all levels of government. This common policy framework will provide a consistent basis to inform all infrastructure investments, regardless of the source of financing (APBN, APBD, bilateral and multi-lateral development banks, and local banks). Additionally, local government will be in the driver's seat with the flexibility to involve communities and other donors, NGOs, universities, and private sector actors.

The 100-0-100 program and strategy to achieve universal access should adopt a poor-inclusive approach to ensure that Indonesia not only achieves its service delivery targets, but that water supply and sanitation become key drivers of reduced inequality, enhanced health and well-being, and economic growth and prosperity. A poor-inclusive approach is one that improves the ability and opportunity of the poor and vulnerable to benefit from water supply and sanitation services, using the tools of financing, targeting, legal frameworks, and institutions. For water supply, this implies the need for a fifth standard of *keadilan* (equity) alongside the 4K standards of quality, quantity, continuity, and affordability (*kualitas, kuantitas, kontinuitas dan keterjangkauan*), as well as an explicit strategy for achieving this standard. The evidence in this report aims to provide an empirical basis for shifting the approach toward more inclusive and equitable service delivery in the water and sanitation sector. A key input for policy and recommendations is a dynamic dashboard that provides visual perspective of the overlaps between poverty, lack of access, and child health and nutrition (see appendix A).[3] Disaggregation to sub-district level, and mapping capabilities for informal settlements and urban slums, could further advance poor-inclusive service delivery.

Recommendations are grounded in the findings of the WASH Poverty Diagnostic and, for urban water, in the institutional and political economy analysis described in chapter 5. Even though a similar in-depth analysis was not conducted for urban sanitation, rural sanitation, or rural water as part of the WASH Poverty Diagnostic, the recommendations that are specific to these

subsectors benefit from recent sector studies and reports, as well as global experience and evidence. Future analytical work could address these subsectors in depth, especially regarding targeted financial subsidies and urban sanitation service delivery challenges.

Key Recommended Actions

Expand Piped Water Services to A Larger Share of the B40 in Urban Areas

Improve the efficiency and performance of PDAMs to generate a virtuous cycle of performance, tariff increases, cost recovery, and expansion of connections, especially to poor households. NUWSP is the delivery mechanism for the urban water supply platform and already includes a robust emphasis on performance improvement of PDAMs through a number of program components, including:

- Incentives and performance-based approaches, including a comprehensive framework of performance incentives that tie sources of additional financing to achievement of performance targets;

- Joint performance monitoring assessment of LGs and PDAMs using a universal and integrated monitoring and information system accessible to financing partners;

- Capacity building and technical assistance to LGs and PDAMs, covering technical, human resources management, utility reform, financing, good water governance, citizen engagement, and the identification, development, and preparation of projects and project proposals;

- Performance-based contracts/agreements between LGs and PDAMs to formalize the relationship and provide reassurance to central government that performance of PDAMs is being monitored by asset owners.

These components of the NUWSP framework will be tested by the GoI, especially MoPWH, under the Directorate General of Human Settlements, and Bappenas, in select provinces that are home to a wide range of PDAMs with various capabilities.

A critical input into the performance-improvement cycle of PDAMs will be the establishment of cost-recovery tariffs, but tariff schedules need to adopt realistic affordability benchmarks for low-income households. The affordability target under the 100-0-100 program aims for water tariffs that do not exceed 4 percent of household income. More evidence is needed to evaluate whether 4 percent is a reasonable expectation for households living below the poverty line. Capacity building for LGs and PDAMs on tariff-setting must include specific provisions to incorporate equity and social concerns into tariff structures, as well as guidance on how tariffs can be structured to allow for cross-subsidization between customers in order to protect the poor and vulnerable. Additional capacity building on project preparation and project proposal development, undertaken through the CoE program managed by the MoPWH, should cover (a) how to assess affordability of water tariffs; (b) willingness among poor households to pay for piped water connections; and (c) incorporation of low-income households, including Water *Hibah* customers, in the overall performance improvement and investment plan.

Additional financing mechanisms are needed to ease the financial and liquidity constraints faced by the poor. Piped water connection fees are unaffordable for households living near or below the poverty line. These costs, and the ability of poor households to pay them, need to be factored into investment decisions. The output-based grant *Hibah* scheme for piped water has incentivized more poor-inclusive service delivery, but not all PDAMs are eligible to

participate, leaving a large share of poor households unable to connect to piped water services. Subsidized credit and savings schemes are alternatives that allow households to spread the cost of the connection over time. Over the past several years, microfinance for household water facilities has become more common. An initiative of USAID's IUWASH program has financed connection fees for approximately 15,000 households in low-income communities of North Sumatra, DKI/West Java/Banten, Central Java, East Java, and South Sulawesi.[4] Despite government support for microfinance, the scale-up of the approach has been constrained by chronic raw water shortages (particularly in Java and Sumatra), the protracted development of distribution networks, and the availability of alternative mechanisms (such as *Hibah*) covering the connection fee. Firstly, better coordination between *Hibah* and other microfinance schemes can be achieved through the platform approach, taking advantage of a common policy framework regardless of the source of financing and more flexibility at the local government level to partner with private sector actors. Secondly, the existing targeting mechanism for *Hibah* beneficiaries that is based on electricity usage could be combined with income targeting to better identify eligible low-income households for financial subsidies.

Improving the performance of PDAMs and setting cost-recovery tariffs the poor can afford will help increase piped water access for the poor.

Increasing demand and raising awareness of the benefits of piped water—among both consumers and local government actors—is needed to shift consumer behavior and dependence on alternatives, and to build the political will for improvements in water supply to poor households. Awareness-raising could increase demand for efficient, sustainable water supply services, but has been missing from most water supply programs. Most households treat their water before drinking through boiling or filtration, but are unaware of the potential for recontamination during storage. Awareness and behavior change campaigns, coordinated by MoPWH and MoH, and implemented in part by PDAMs, can help increase demand for clean water and put pressure on PDAMs and LGs to expand provision of piped water services to unserved communities and/or improve the quality of existing services. Importantly, technical assistance provided through NUWSP should emphasize the health and economic benefits of supplying clean water to poor households to help raise the profile of WASH investments in district decision-making.

The current intergovernmental transfer system must better align transfers to needs.

Adjustments to the current intergovernmental fiscal transfer system are needed to better align transfers to needs. While current levels of government budget allocation to water supply are insufficient to achieve the universal access targets for water supply, existing fiscal transfers could be allocated more efficiently to address needs. Basic information on water access is readily available; however, data on DAK transfers show a declining association between DAK allocations and water coverage at the district level. Additional considerations for aligning fiscal transfers to needs through DAU point to population growth in urban centers, and suburban districts in particular. To better align fiscal transfers with population growth trends will require adoption of a per capita calculation—rather than the current per region calculation—to ensure equitable distribution of public resources according to population density of cities and districts. This alignment does not address the need for more financing for the sector overall. Commercial loans, private investment, and business-to-business collaboration should be explored to better understand how these additional sources of financing can help bridge the gap.

Improve the Quality of Alternative Water Sources for those who Will Remain on Non-Piped Water Supply

Drinking water supplies, whether piped or non-piped, need to be consistently monitored for water quality risks, and this information made publicly available. Consumers are largely unaware of the quality of drinking water from different sources and the particular risks posed by poor household water storage practices and poor fecal waste management. Water sector strategy should account for the potential water quality risks of poor sanitation, and the respective investments of the water and sanitation sub-sectors should be aligned. This alignment is especially important in areas facing technical barriers to piped water. At city level, Bappeda can ensure that the needed alignment on water and sanitation is reflected in the respective strategy documents (Master Plan for Drinking Water and City Sanitation Strategy). Bappeda could also oversee integration of data from the two sub-sectors into planning, implementation, and monitoring.

Regulatory control for small scale water providers should be strengthened to ensure that regulations on drinking water quality are met. For refilled bottled water, this could be accomplished by linking the water quality monitoring (under the responsibility of MoH) with the licensing process (under MoI).

Support the B40 to Gain Access to Improved Sanitation

Indonesia achieved substantial progress in reducing open defecation and now faces the second generation challenge of moving households up the sanitation ladder. Achieving universal access will require Indonesia to strengthen the STBM program by revisiting the zero-subsidy approach to sanitation and linking it with subsidized credit and savings mechanisms to reach the poorest households. Global practice suggests that subsidies can harm sanitation behavior-change efforts; however, experience shows that when subsidies are well targeted, delivered through an efficient channel, and affordable, they can be an effective mechanism for reaching poor households who otherwise cannot afford the high lump sum cost of a toilet. Septic tanks are a desirable level of service, but the cost is often prohibitive for poor households. Targeting subsidized credit and savings schemes through existing targeting systems that are already working well to identify low-income households for social assistance (e.g., the UDB operated by TNP2K and MoSA) can be an efficient and transparent way to reach households most in need of subsidies in order to achieve higher levels of service. The UDB contains socioeconomic and demographic information for approximately 40 percent of the population with lowest welfare status, the equivalent of 24 million households, or 96 million individuals. Moreover, this approach would accommodate a multisectoral strategy for targeting poor households, since the UDB is used for targeting other social assistance, including Subsidized Rice for the Poor (Raskin), Public Health Insurance (Jamkesmas), Cash Assistance to Poor Students (*Bantuan Siswa Miskin*), and the Family Hope Programme (*Program Keluarga Harapan*, or PKH), which has a nutrition component. The MoH should take a leadership role in adapting the existing policy on sanitation subsidies to address the financial constraints of poor households, whereas MoPWH should work with TNP2K and MoSA to adopt the UDB for targeting assistance under PAMSIMAS.

Bring More Households into the Full Sanitation and Fecal Waste Service Chain in Urban Areas

The range of solutions required to meet universal access targets in urban areas in a cost-effective manner demands that cities and towns take a more holistic and inclusive approach to planning for citywide sanitation. Planning needs to cover the full fecal waste service chain and outline a progressive roadmap for bringing the entire population into this service chain. Local solutions are complex, requiring a combination of piped and non-piped technologies, such as septic tanks, sewerage, decentralized small-scale wastewater treatment plants, and fecal sludge management. District heads and mayors need to be given responsibility for ensuring consistency in planning, budgeting, and execution; flexible funding arrangements; and technical assistance and capacity building where needed. This approach requires a delicate balance between the national government's fiscal leverage to incentivize investment in sanitation, and granting greater autonomy to LGs to decide where and how to invest those resources.

Behavior change has been the cornerstone of a successful effort to stop open defecation in Indonesia, but needs to be adapted to behavioral issues common in the urban sanitation space. The universal access targets will be met primarily through on-site sanitation systems with fecal sludge management (72.5 percent), whereas smaller shares will be met by centralized and decentralized sewerage (12.5 percent), and basic sanitation (15 percent). Currently, although 78 percent of the population in urban areas uses a septic tank, 95 percent of fecal waste ends up in the nearby environment. Low consumer demand for fecal waste management services is a reflection of both the lack of integrated services and the lack of knowledge about safe management and disposal practices. Part of the solution will require generating the

Regulatory control must be strengthened and water quality monitoring improved.

A holistic and inclusive approach to citywide sanitation will bring more households into the service chain.

necessary demand and changing the behavior of individuals, communities, and providers. But behavior change cannot happen in a vacuum—it requires a coherent policy framework, clarity regarding institutional arrangements, and adequate enforcement of local government ordinances for design, construction, and desludging (World Bank and Australian Aid 2013). Coordination between MoH and MoPWH will be needed for effective implementation of STBM in urban areas, along with enforcement by MoEF of new regulations on effluent standards.

Elevating the profile of sanitation in political and fiscal discussions, as well as in intra-household decision-making, will be crucial to achieving universal access targets. This change may require a shift in the narrative around urban sanitation to emphasize not only elements of modernity and competitiveness, but also the lifelong effects on intellectual and economic potential of early-life stunting, caused in part by poor sanitation. AKKOPSI could lead advocacy efforts with mayors and district heads.

Champion Multisectoral Approaches to Reduce Child Stunting

> A multisectoral approach is critical if early life outcomes are to be improved and stunting reduced.

Efforts to improve early-life outcomes for children, especially reducing stunting in Indonesia, should capitalize on the synergies of multisectoral approaches. Progress toward reducing stunting in Indonesia can be enhanced by coordinated multisectoral interventions that address effectively the four key underlying determinants of nutrition.[5] Evidence shows the effects will vary by the wealth status of the household, and across rural and urban areas. Thus, a one-size-fits-all approach to multisectoral programming is not likely to be as effective as multisectoral programs that are tailored and targeted to specific geographic locations and poverty levels. Geographic targeting can be used to reach areas where undernutrition and underlying deprivations are prevalent. In these areas, interventions should be co-located to achieve service improvements across multiple sectors that impact stunting (see box 6.2). PAMSIMAS could serve as the main platform for multisectoral convergence between WASH and other programs addressing nutrition outcomes in young children, while implementation across relevant sectors could be coordinated through Bappenas. In addition, the strengthening of social and behavior-change communication, including development and execution of country plans and communication strategies for improving nutrition as part of the Scaling Up Nutrition (SUN) Movement, is needed at national level (see box 6.1).

Enhance Water Supply and Sanitation Interventions to Have Greater Impact on Nutrition Outcomes

An overarching message of the WASH Poverty Diagnostic in Indonesia is that existing WASH interventions are failing to produce outcomes of sufficient quality to impact child nutrition.

Box 6.1: Access to Water Supply and Sanitation under the 2019 Universal Health Coverage Target for Indonesia

Indonesia plans to attain Universal Health Coverage (UHC) by 2019, whereby all people receive the quality, essential health services they need, without being exposed to financial hardship. The World Bank and WHO have proposed a dashboard (known as the UHC Dashboard) of common and comparable indicators across countries to track coverage of prevention and treatment interventions related to the health SDGs. Improved water and improved sanitation are included in the dashboard of eight core tracer indicators covering health promotion, illness prevention, treatment, rehabilitation, and palliative care.

Box 6.2: Strengthening Nutrition-Sensitive Actions in PAMSIMAS to Reduce Stunting in Children under 5

PAMSIMAS, which targets 27,000 villages, is the GoI's platform approach for bringing sustainable clean drinking water and sanitation services to rural communities. The program adopts the STBM approach, focused on behavior change at the household and community level, including 5 pillars of (a) stopping open defecation; (b) handwashing with soap; (c) household safe water treatment, storage, and food handling; (d) safe disposal and management of solid waste; and (e) safe disposal and management of wastewater.

Nutrition-sensitive actions will be piloted through PAMSIMAS across four districts in two provinces. The objective of the pilot is to gain implementation knowledge, strengthen the evidence base, and derive lessons for scaling up multisectoral interventions impacting child nutrition outcomes. The key performance indicators are:

a. Increased coverage of WASH interventions for households with pregnant women, lactating mothers, and children under five

b. Increased number of ODF villages

c. Increased number of villages practicing all five pillars of STBM

d. Increased demand and uptake of health and nutrition services in the pilot villages

e. Increased number of villages leveraging village funds (*Dana Desa*) for WASH and nutrition activities

The proposed pilot will leverage the operational mechanisms instituted under PAMSIMAS, combining the strengths of STBM with Infant and Young Child Nutrition (IYCN) practices implemented at the village level by:

a. Prioritizing villages with high malnutrition rates

b. Enhancing the community-action planning process of PAMSIMAS to prioritize households with pregnant women, lactating mothers and children under five

c. Implementing Community-wide Behavior-Change Communication campaigns for ODF, embedded with nutrition messages; reinforcing WASH messages through local health/nutrition centers (Puskesmas, Posyandu, etc.)

d. Monitoring progress of WASH access and usage by target groups and nutrition programs using citizen engagement tools such as social audits, community score cards, feedback loops, etc.

Evidence from the Diagnostic shows that one way to enhance sanitation interventions for greater nutritional impact is to crowd in resources until communities exceed a high threshold of coverage of improved sanitation. There is now compelling evidence, both within Indonesia and globally, that sanitation levels of a community are more important than those of any one household. The evidence shows that health and nutritional benefits mainly accrue after a threshold level of coverage is surpassed, and that full benefits may only be achieved as sanitation becomes universal. This evidence supports existing practice, which aims for ODF areas, and it suggests that resources should be spent on bringing as many communities as possible to universal or near universal levels of coverage in order to realize the health benefits of sanitation.

Water and sanitation interventions could have a greater impact on nutrition by adopting a "child-centric" approach. The five pillars of STBM are comprehensive across WASH services, but may still bypass some of the dominant fecal contamination pathways that affect small children. An emerging approach known as "baby WASH" or "child-centered WASH" focuses on interrupting exposure pathways that are most strongly associated with subsequent diarrheal disease. Sanitation interventions need to include measures that ensure cleanliness of a child's play environment (such as safe disposal of child and animal feces), and separation of livestock and domestic animals from the main housing compound. Equally important are washing hands with soap before preparing food and feeding/breast feeding, and after handling child feces, and using only treated drinking water for preparation of liquid and solid food for infants and young children. Importantly, these recommendations go deeper and are more targeted to child-related exposures than the existing pillars of the STBM program. MoH should adapt existing STBM behavior-change communication materials and local government capacity building to incorporate baby WASH, while implementation of the approach should be aligned with the current nutrition-sensitive pilot of PAMSIMAS.

Resources need to be crowded in until communities reach a coverage level high enough to impact health and nutrition outcomes.

Multisectoral approaches need to be adapted to work in densely populated urban slums, where conditions of poverty, overcrowding, and poor quality services interact to magnify the risks of poor water and sanitation. Representative data are not available for urban slums in Indonesia, but RISKESDAS data from 2013 show that stunting rates among children in the bottom income quintile in urban areas are nearly 1.5 times those for urban children as a whole (48 vs. 33 percent) and higher than those for children in rural areas (42 percent). Multisectoral approaches have largely focused on rural areas, but the challenge in urban slums and informal settlements is complex, as an effective response involves a multitude of actors and is complicated by institutional constraints and tenure insecurity. Additional analytical work is needed to investigate the WASH characteristics and other nutritional determinants in urban slums and informal settlements and to determine how to effectively engage different actors under the National Slum Upgrading Program (*Kotaku*). In particular, a better understanding is needed of the contamination pathways unique to these settings, where the typical play environment of children includes solid waste disposal sites and contaminated water bodies, and the disease vectors include not just flies, but also cockroaches and rats.

Table 6.1 summarizes the key recommended actions that will support the GoI to achieve the universal access target, with a particular focus on the needs and constraints of the B40. Suggestions are made as to the appropriate responsible agency/stakeholder, based on consultation with government actors and stakeholders.

The WASH Poverty Diagnostic in Indonesia covered a broad range of challenges facing the Water Supply and Sanitation Sector in meeting the Universal Access Targets. However, the diagnostic is not exhaustive. Specific challenges recommended for further analytical work include:

- Water tariff affordability and impact of changes in tariffs on households living below the poverty line;

- Economic benefits of WASH provision for reducing income inequality, to include benefit incidence of net public spending on WASH;

- Relationship between poor WASH, disease environment, and child nutrition in dense urban informal settlements, and implementation of multisectoral approaches in these settings;

- Water Resources and Water Security Diagnostics, and the relationship with poverty;

- Institutional and political economy analysis of service delivery of urban sanitation, and of rural water and sanitation.

Table 6.1: Key Recommended Actions and Responsible Agencies

What	Who
Reduce Inequalities in Access and Quality	
Expand piped water services to a larger share of the B40 in urban areas	
Improve the efficiency and performance of PDAMs	MoPWH, Bappenas, MoHA, private sector
Enhance the capacity of LGs and PDAMs on tariff-setting to support the establishment of cost-recovery tariffs • Conduct analytical work on the implementation of new regulations on tariffs and subsidies • Add specific tariff-setting content to existing capacity building programs	MoHA, MoPWH, donor agencies, Center of Excellence (CoE) program, Association of PDAMs (Persatuan Perusahaan Air Minum Seluruh Indonesia, or PERPAMSI), NUWSP
Additional financing mechanisms to ease the financial and liquidity constraints faced by the poor • Continue and improve the Water *Hibah* scheme by linking with investment on capacity improvement • Scale up microfinance and similar mechanisms • Encourage collaboration between *Hibah* and microfinance schemes • Combine existing targeting mechanism with income targeting to better identify eligible low-income households	Bappenas, MoPWH projects, NGOs, local financing institutions
Increase demand and raise consumer awareness of the benefits of piped water	MoPWH, MoH, PDAMs
Adjustments to the current intergovernmental fiscal transfer system to better align transfers to needs • Exercise alternative approach in the allocation of DAK and DAU • Diagnose private sector involvement in water sector, including commercial loans, private investment, and business-to-business collaboration in bridging the financing gap	Bappenas, MoPWH, MoF, donor agencies
Improve the quality of alternative water sources for those who will remain on non-piped water supply	
Consistently monitor water quality risks to drinking water supplies, piped or non-piped, and make this information publicly available • Strengthen the critical link across water and sanitation sub-sectors—e.g., ensure the alignment of the Master Plan for Drinking Water and City Sanitation Strategy	MoH, District Health Office, Bappeda

table continues next page

What	Who
Strengthen regulatory control for small water providers to ensure that regulations on drinking water quality are met • Link water quality monitoring with licensing process for refilled bottled water providers	MoH, MoI
Support the B40 in gaining access to improved sanitation	
• Strengthen STBM strategy by revisiting the "zero-subsidy" for poor households	Bappenas, MoH
• Identify various financial schemes to move up the sanitation ladder, such as DAK, Sanitation *Hibah*, Village Grant, and community social responsibility (CSR) funds	Bappenas, MoH, MoPWH
• Explore the possibility of targeted subsidy for the poorest segment of people to move up the sanitation ladder (from basic to improved latrines)	Bappenas, MoH, MoPWH, PAMSIMAS
• Adopt existing targeting systems that are already working well identifying low-income households (such as the UDB from TNP2K) to ongoing programs, including STBM, PAMSIMAS, etc.	Bappenas, MoH, MoPWH, Ministry of Social Protection
Bring more households into full sanitation and fecal waste service chain in urban areas	
Take holistic approach to planning in implementing citywide sanitation-inclusive approach • Apply the fecal waste diagram as a tool to assess citywide sanitation and identify priorities for city sanitation strategy • Ensure consistency in sanitation management at local level through PPSP (Acceleration of Urban Sanitation Development Program) and link it with decision-making on investment using central budget	Bappenas, MoPWH, Bappeda, PPSP
Adapt approach to behavior issues in urban sanitation, including enforcing the effluent standard • Effective implementation of STBM in urban areas • Enforce new regulations on effluent standards	MoH, MoPWH, MoEF
Elevate the profile of sanitation in political and fiscal discussion	MoHA, Bappenas, MoPWH, MoH, AKKOPSI
Improve Health, Nutrition, and Early Child Development	
Champion multisectoral approaches to reduce child stunting	
Capitalize on synergies of multisectoral approaches, including strengthening the existing scaling up nutrition (SUN) program and alignment with non-cash nutrition support	Bappenas, MoPWH, MoH, Ministry of Social Protection

table continues next page

Table 6.1: Continued

What	Who
Crowd in resources until communities achieve high coverage of sanitation	Bappenas, MoH, MoPWH, Bappeda
Adapt water and sanitation interventions to be more "child-centric" • Adapt existing STBM behavior-change communication materials and LGs capacity building programs to incorporate "baby WASH" • Ensure that the implementation of the "baby WASH" approach aligns with current nutrition-sensitive pilot of PAMSIMAS	MoH, PAMSIMAS
Enhance water supply and sanitation interventions to be more impactful on nutrition outcomes	MoH, Bappenas, STBM
Target slum areas and informal settlements with multisectoral action	Bappenas, MoPWH, Vice President's Office

Notes

1. The Regional water systems platform is still at early development stage. These systems are planned for areas facing water scarcity. Despite Indonesia having relatively high rainfall, water shortages may result from insufficient storage capacity, poor water quality, and competing water demands. If a PDAM has insufficient water resources within its jurisdiction, it may seek water from neighboring LGs. Regional water systems would fall under the mandate of the Province, which may develop the system to supply multiple PDAMs. The facilities are constructed by DG Cipta Karya and then managed by provincial water institutions.
2. The urban sanitation platform is centered around three major areas of activities: (a) national community-based sanitation program (SANIMAS); (b) national urban sewerage; (c) septage management, including upgrading on-site sanitation and developing new septage treatment plants (IPLTs).
3. http://witiestudio.com/worldbank-map/.
4. IUWASH Annual Progress Report 2013, 2014, 2015.
5. A Multisectoral Nutrition Framework and Action Plan (MNFAP) has already been developed, which serves to guide internal World Bank multisectoral engagement for nutrition in Indonesia. The MNFAP identifies specific opportunities for multisectoral action, incorporates nutrition activities into multisectoral programs and analytical work, strengthens integration, and develops concrete implementation plans. The MNFAP is aligned with the recommendations of the WASH Poverty Diagnostic.

Reference

World Bank and Australian Aid. 2013. *Urban Sanitation Review: Indonesia Country Study*. Washington, DC: World Bank.

Appendix A
Interactive Dashboard

Indonesia Water Supply, Sanitation, and Hygiene Poverty Diagnostics

Spatial Analysis to Guide Pro-Poor and Poor-Inclusive Water and Sanitation Interventions in Indonesia

Two of the main challenges in implementing pro-poor and poor-inclusive water supply, sanitation, and hygiene (WASH) interventions and adopting a multisectoral approach to reducing stunting is the coordination of multiple stakeholders across many sectors and the use of many different data sets. Ensuring that decision-makers have the tools to identify locations with multiple deprivations—high poverty, low access to improved water, lack of access of improved sanitation—is essential for the future well-being of these disadvantaged communities. Data and analysis can inform and facilitate actions that optimize efforts to reduce poverty and stunting along with efforts to increase access to WASH and maximize the use of available resources.

The WASH-Poverty dashboard offers a new tool that provides information through maps—at both province and district levels—that visualize access to improved water and sanitation, poverty rates, and health outcomes (diarrhea and stunting) to help monitor inequalities in WASH services; this information can be used by the government, the World Bank, and other development partners. The dashboard illustrates how such data can inform geographic targeting to extend coverage and improve service quality for more pro-poor and poor-inclusive interventions (and the associated sanitation and hygiene efforts) to have the most impact on Indonesia's health. Furthermore, the dashboard can be used to identify areas where further inquiry is needed to understand why service delivery fails within geographic areas. The dashboard can also model how changes in variables might influence the districts in which poverty, access to WASH, and health outcomes would overlap.

For each variable presented, the dashboard provides different choices to allow the user to select the scope (overall, urban, or rural), category (all population, T60, B40), data year (from 2102 to 2015), and data unit (households or individuals). For easier selection, each column has a drop-down button with choices (see figure A.1).

There are two different types of spatial analysis:

a. Double Maps
    The double map screen (maps A.1–A.3) allows the user to make a comparison of two different variables in a particular year, such as "access to improved water—all population—2015—urban—households" with "poverty rate 2015," or "open defecation 2013" with "stunting 2013," or "access to piped water 2014" with "access to improved sanitation." Once both variables have been selected, the dashboard will automatically display the variables next to one another. Map keys are provided in the bottom left-hand corner of each map as a guide to the color coding. In addition, the map will show the title of each province or district and its numbers for easier identification.

Figure A.1: Panels for Selecting the Variables

| Overall ⌄ | Bottom-40% ⌄ | Unimproved Sanitation ⌄ | 2013 ⌄ | Household ⌄ |

Map A.1: Double Map Province: Access to Improved Sanitation and Stunting, 2013

Access to improved sanitation – all population – 2013 – overall household

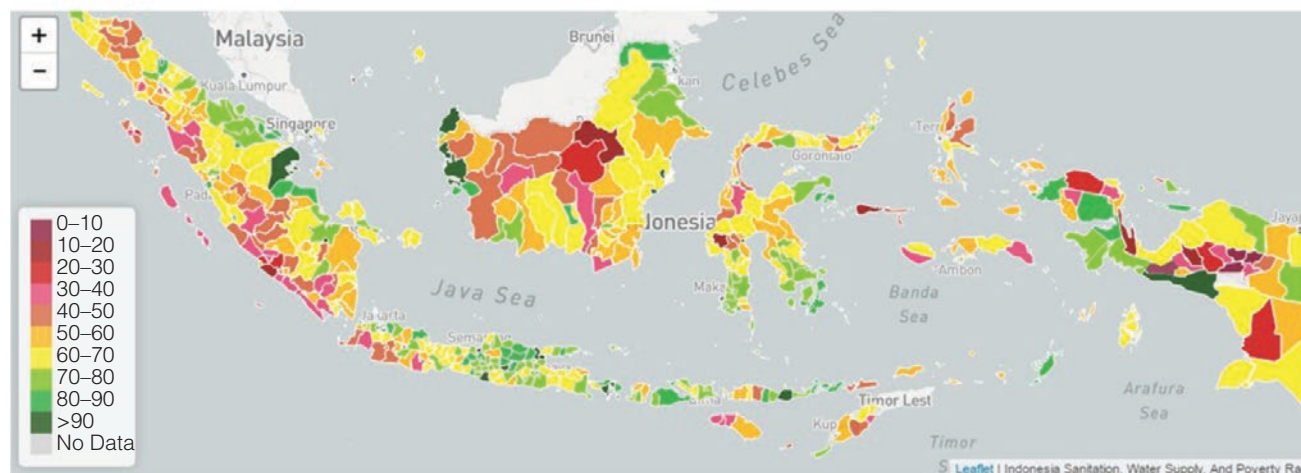**Stunting - all population - 2013 - overall - household**


b. Single Maps

The single map screen allows the user to see the display of the overlay from two different variables, with the desirable range of each variable based on the latest data (Year 2015 for poverty and WASH access; and Year 2013 for health outcomes). Once both variables and the range have been selected, the tool will automatically display the variables geographically on the map with the map guide provided in the bottom left-hand corner. Provinces or districts that meet the selected first variable will be highlighted in yellow,

Map A.2: Double Map Districts: Access to Improved Water and Access to Piped Water, 2015

Access to improved water – all population – 2015 – overall-household

Access to piped water – all population – 2015 – overall-household
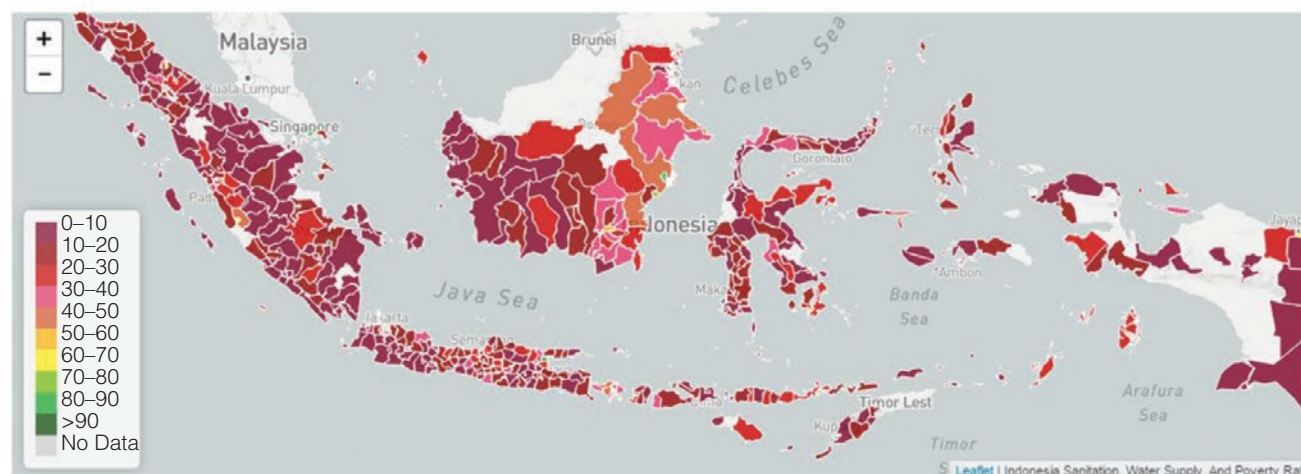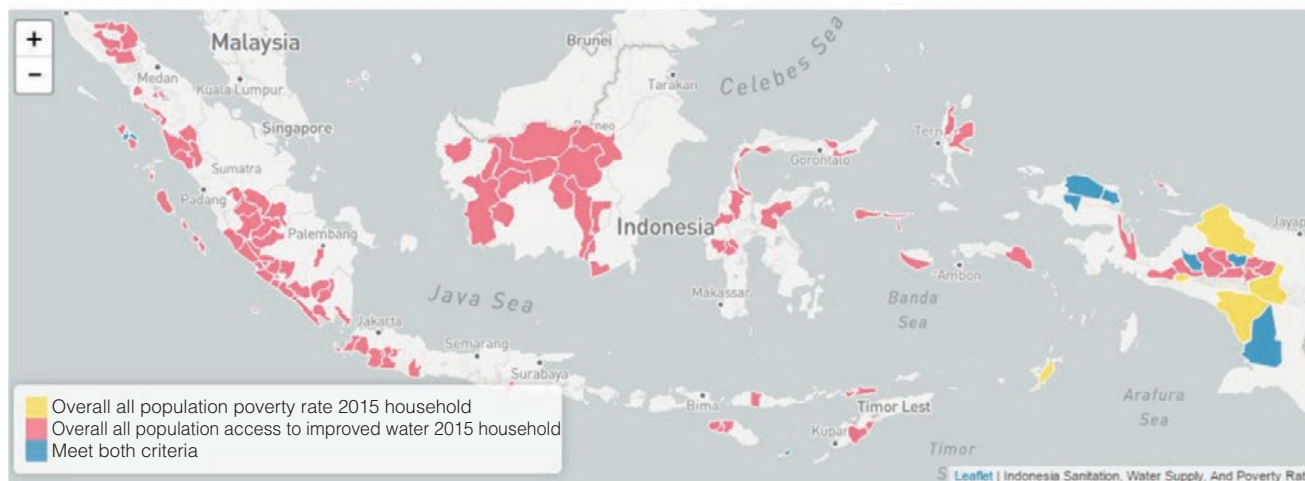

and provinces or districts that meet the second parameter are highlighted in green. Provinces or districts that meet both variables are highlighted in blue and will be displayed in tabular form. Changing the variables or ranges allows the user to explore different dimensions of poverty, WASH access, and health outcomes, which may impact geographic targeting of the poor with water and sanitation interventions.

The datasets were taken from Susenas (for poverty rate and access to water and sanitation) from 2012 to 2015, and from RISKESDAS (for diarrhea and stunting rate) for 2013, and data on open defecation is taken from STBM monitoring data. The dashboard was designed to be open to future improvement, such as (a) adding more time series for existing data sets; (b) adding new data sets, such as nutrition and health data; (c) lowering the level of data analysis below district level (e.g., village); (d) translation into Bahasa Indonesia; or (e) fully customized index/rating for legend.

To ensure its sustainable operation and maintenance, the dashboard will be linked to, and integrated with, the Government-led National Water and Sanitation Information Services (NAWASIS) under Bappenas leadership. Bappenas has agreed to host the dashboard.

Map A.3: Single Map District: Poverty Rate and Access to Improved Water

Districts with poverty rate >40% and access to improved water <50%

Overall all population poverty rate 2015 household
Overall all population access to improved water 2015 household
Meet both criteria

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Province	District	Overall All Population Poverty Rate 2015 Household		Overall All Population Access to Improved Water 2015 Household	
		Percentage	Amount	Percentage	Amount
NUSA TENGGARA TIMUR	SABU RAIJUA	45%	9,298	46%	9,399
PAPUA	MAPPI	43%	9,408	23%	5,166
PAPUA	TOLIKARA	55%	19,337	6%	2,213
PAPUA	INTAN JAYA	42%	6,020	15%	2,186
PAPUA BARAT	TAMBRAUW	70%	2,292	29%	969
PAPUA BARAT	MAYBRAT	41%	3,836	32%	2,954
PAPUA BARAT	MANOKWARI	94%	7,898	32%	2,671
SUMATERA UTARA	NIAS	45%	12,248	26%	7,090
SUMATERA UTARA	NIAS BARAT	52%	9,099	37%	6,542