

THE ECONOMIC IMPACTS OF  
INADEQUATE SANITATION IN INDIA

# Inadequate Sanitation Costs India Rs. 2.4 Trillion (US\$53.8 Billion)



# What were the total economic impacts due to inadequate sanitation in India?

The study estimates that the total economic impacts of inadequate sanitation in India amounts to Rs. 2.44 trillion (US\$53.8 billion) a year<sup>1</sup>—this was the equivalent of 6.4 percent of India's GDP in 2006.

This means a per person annual impact of Rs. 2,180 (US\$48).<sup>2</sup>

In recent years, the human and social handicaps that inadequate sanitation poses for people in developing countries, especially the poor, has been recognized and greater priority accorded to improving access to sanitation.

Governments and households are seeking to address the significant deficits in the provision of safe sanitation facilities. However, inadequate sanitation imposes substantial *economic losses* but these have *not been counted properly*.

A part of Water and Sanitation Program's (WSP's) Global Economics of Sanitation Initiative (ESI), the study from India analyzed the evidence on the adverse economic impacts of inadequate sanitation at the national level using information on health (deaths and diseases) and other impacts including those on availability and quality of drinking water, welfare losses, tourism, and so on. The findings are based on 2006 figures (owing to limitations of data availability) but a similar magnitude of losses is likely in later years.

## What is Inadequate Sanitation?

Sanitation is broadly defined to include management of human excreta, solid waste, and drainage. The ESI India study focused on the *safe management of human excreta and associated hygiene behavior*. This is not to discount the importance of the other aspects, but to focus on the key dimensions that cause a *substantial health burden* on Indians, especially poor people and children.

The United Nations-World Health Organization Joint Monitoring Programme for Water Supply and Sanitation defines 'improved'<sup>3</sup> sanitation as: the means that hygienically separate human excreta from human contact and hence reduces health risks to humans. Inadequate sanitation is thus the lack of improved facilities (toilets, conveyance, and treatment systems), and hygienic practices (for example, hand washing, proper water handling, personal hygiene, and so on) that exposes people to human excreta and thus to disease-causing fecal-oral pathogens through different transmission pathways. (Figure 1)

**Inadequate sanitation kills people, causes diseases, environmental pollution, and diminishes welfare—this is well-known. But the economic impacts of poor sanitation have not been counted properly**

**One gram of feces can contain: 10,000,000 viruses, 1,000,000 bacteria, 1,000 parasite cysts and 100 parasite eggs**  
(World Health Organization)

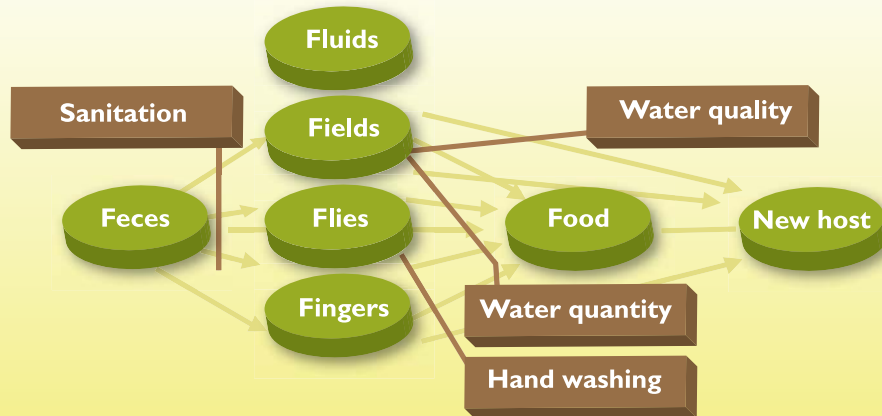
<sup>1</sup> US\$1 = Rs. 45.33 in 2006.

<sup>2</sup> In Purchasing Power Parity (PPP) terms, with the price level in India being about a third of the USA, the adverse economic impacts of inadequate sanitation in India is US\$161 billion, or US\$144 per person. Of the Rs. 2.4 trillion lost, about Rs. 1.1 trillion signifies the loss of flow of economic value of 2006, and the balance Rs. 1.3 trillion, the present value of future losses owing to the human capital lost in 2006.

<sup>3</sup> UN-WHO JMP (2008, 2010) lists systems that flush or pour-flush to piped sewer system, septic tanks or pit latrines; or ventilated improved pit (VIP) latrines, pit latrines with a slab or composting toilets as 'improved' sanitation arrangements. 'Unimproved' facilities include open defecation, bucket or hanging latrines, open pit latrines or those without a slab, and facilities draining into or open areas (that is, not to piped sewer system, septic tank or pit latrine); and shared toilets. In addition, unhygienic practices further expose people to health risks.



Figure 1: Transmission pathways of diseases carried by feces



Source: After Wagner and Laniox. 1958. Cited in Hutton et al, 2008.

*Diseases such as diarrhea have conventionally been called ‘water-borne diseases’ but many communicable diseases are overwhelmingly explained by inadequate sanitation (that is, having fecal origin) rather than water that acts as a medium to spread diseases*

## Methodology of Measuring the Economic Impacts of Inadequate Sanitation

The methodology adopted by the study included disaggregating the economic impacts of inadequate sanitation into the following categories:

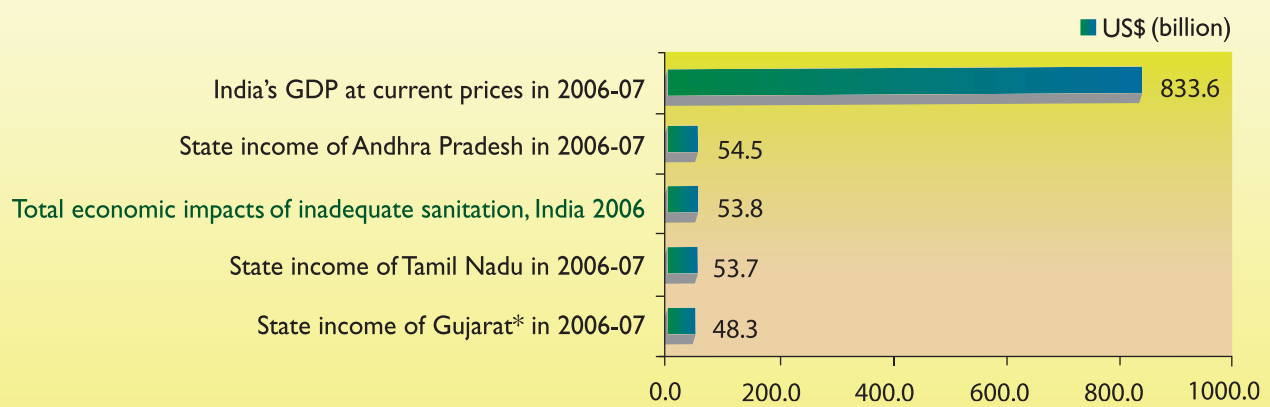
- **Health-related impacts:** Premature deaths, costs of treating diseases; productive time lost due to people falling ill, and time lost by caregivers who look after them.
- **Domestic water-related impacts:** Household treatment of water; use of bottled water; a portion of costs of obtaining piped water; and time costs of fetching cleaner water from a distance.
- **Access time impacts:** Cost of additional time spent for accessing shared toilets or open defecation sites; absence of children (mainly girls) from school and women from their workplaces.
- **Tourism impacts:** Potential loss of tourism revenues and economic impacts of gastrointestinal illnesses among foreign tourists.

National data on incidence or actual numbers for the indicators in the above sub-categories (for example, diarrheal diseases, deaths, and so on) were compiled from secondary data sources (National Family Health Survey 2005-06, WHO Demographic and Health Surveys, National Sample Surveys, Census of India). Based on the review of scientific literature, attribution factors were used to estimate the populations impacted by inadequate sanitation and, finally, the economic valuation was carried out using costs/prices based on other secondary studies. Conservative assumptions have been used in economic valuation and the analysis has been done for 2006 for want of comprehensive data for later years.

## What is the magnitude of loss? More than Gujarat's state income!

Losses incurred on account of inadequate sanitation were as high as the state incomes\* of Andhra Pradesh or Tamil Nadu and were more than Gujarat's state income in 2006-07.

**Figure 2: Economic impacts of inadequate sanitation in India 2006—how do these compare with some economic indicators?**



\* Net state domestic product at factor cost (at current prices, base year 1999-2000), CSO/RBI, 2010. In 2006-07, India's GDP was Rs. 37.79 trillion and state incomes of Gujarat were Rs. 2.2, Rs. 2.4, and Rs. 2.5 trillion, respectively.



## Estimates of Economic Impacts Under Each Category

The health-related economic impacts of inadequate sanitation, at Rs. 1.75 trillion (US\$38.5 billion), accounts for the largest category of impacts. Access time (productive time lost to access sanitation facilities—shared or public toilets—or sites for defecation) and drinking water-related impacts are the other two main losses, at Rs. 487 billion (US\$10.7 billion) and Rs. 191 billion (US\$4.2 billion), respectively. (Figure 3)



**Figure 3: Composition of the economic impacts of inadequate sanitation**

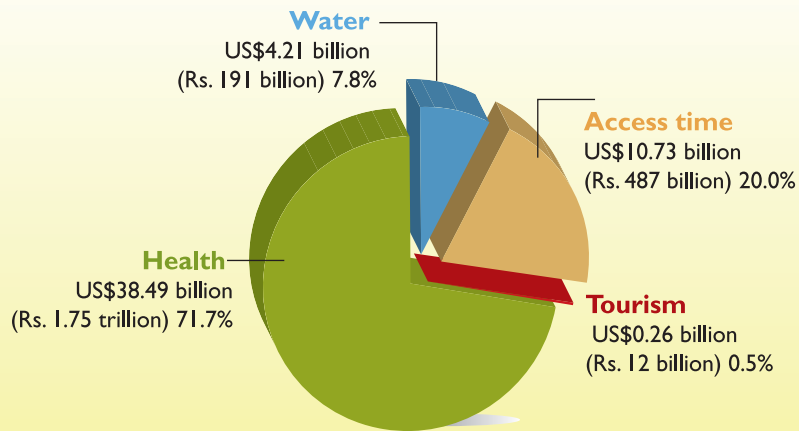
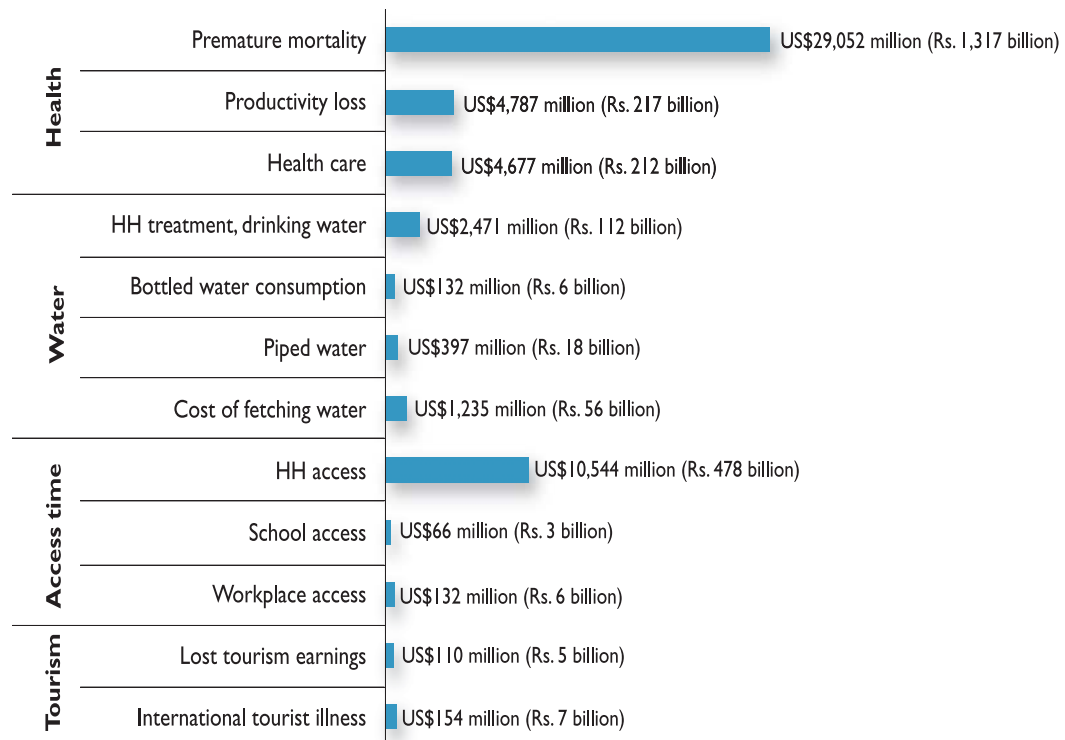


Figure 4 presents the economic impact by sub-categories within each of the four impact categories. More than Rs. 1.3 trillion (US\$29 billion) was lost due to premature mortality—the single-largest sub-category. Access time costs for households, estimated at Rs. 478 billion (US\$10.5 billion), are the second-largest impact; and health care costs (Rs. 212 billion, US\$4.7 billion) and health-related productivity losses (Rs. 217 billion, US\$4.8 billion) are the other main sub-categories.

**Figure 4: Economic impacts of inadequate sanitation in India by categories, 2006**

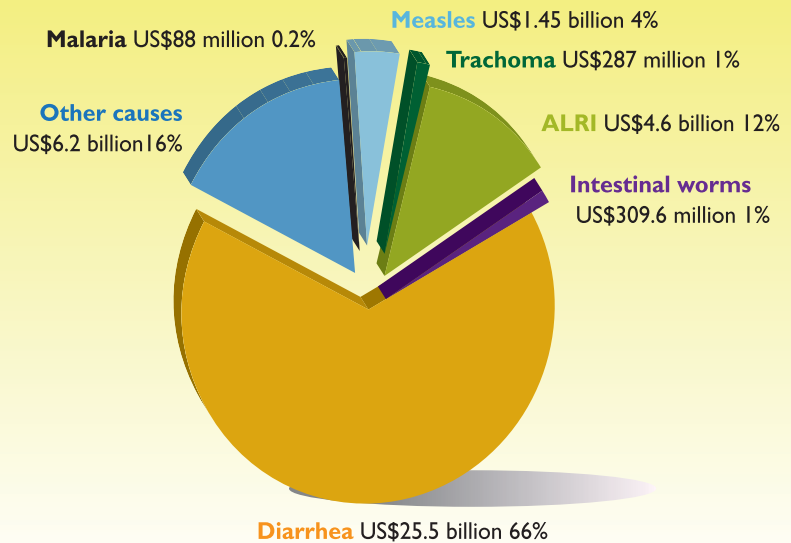




## Health-related Economic Impacts of Diseases

Under the health-related impact of Rs. 1.75 trillion (US\$38.5 billion), diarrhea is the largest contributor, amounting to two-thirds of the total impact. This is followed by Acute Lower Respiratory Infection (ALRI), accounting for 12 percent of the health-related impacts. (Figure 5)

**Figure 5: Distribution of the health impact of inadequate sanitation by disease in India in 2006**



## Children and Poor Households are Hit the Hardest

Seventy-nine percent of the premature mortality-related economic losses, under health impacts (US\$23 of US\$29 billion, or Rs. 1.04 of Rs. 1.3 trillion) was due to deaths and diseases in children below five years. Diarrhea in children below five years accounted for more than 47 percent (Rs. 824 billion, US\$18 billion) of the total health-related economic impacts.

Comprehensive mortality-related data are not available across wealth and income classes but even conservative estimates (based on economic impacts of diseases only) show that poor households bear the maximum brunt of inadequate sanitation. The poorest 20 percent households living in urban areas bear the highest *per capita* economic impacts of inadequate sanitation of Rs. 1,699 (US\$37.5)—this is 75 percent more than the national average per capita losses (Rs. 961 or US\$21, that exclude mortality impacts), and 60 percent more than the urban average (Rs. 1,037, US\$22.9). Rural households in the poorest quintile bear per capita losses in excess of Rs. 1,000 (US\$22)—which is 8 percent more than the average loss for households in rural areas (Rs. 930, \$20.5). The *total* losses for the rural households in the poorest quintile is substantial (Rs. 204 billion, US\$4.5 billion) as compared to their counterparts in urban areas (Rs. 16 billion, US\$0.35 billion).

## What can India Gain by Improving Sanitation?

This study estimates that a package of comprehensive sanitation and hygiene interventions<sup>4</sup> can result in averting 45 percent of adverse health impacts, and avoid all the adverse impacts of inadequate sanitation related to water, welfare, and tourism losses.

**As a result of comprehensive interventions, this study estimates a potential gain of about Rs. 1.48 trillion (US\$32.6 billion, which was the equivalent of 3.9 percent of GDP in 2006). This signifies a potential gain of Rs. 1,321 (US\$29) per capita.**

## Improving Sanitation can also Increase Economic Activity

Estimates of the potential sanitation market<sup>5</sup> were made assuming expansion in access to improved toilets and wastewater treatment as a result of increased investments by the Government (in infrastructure creation and operations and maintenance) and households (investing in improved sanitation facilities). **The national cumulative sanitation market has the potential of Rs. 6.87 trillion (US\$152 billion) over the 2007-2020 period, with Rs. 4.4 trillion (US\$97 billion or 64 percent) in infrastructure and Rs. 2.5 trillion (US\$54 billion or 36 percent) in operations and maintenance services. The annual sanitation market is estimated to grow from Rs. 300 billion (US\$6.6 billion) in 2007, to Rs. 683 billion (US\$15.1 billion) in 2020.**

<sup>4</sup>This will include increased use of toilets, hygiene promotion (including hand washing with soap and safe water management), and improved access to water. This is based on meta-studies that estimated the relative risk-reduction to diarrhea by adopting these measures. It may be noted, however, that a number of external factors prevent elimination of risks completely and therefore, potential gains in sanitation are a sub-set of the losses.

<sup>5</sup>These are estimates of increased economic activity hence, 'market'; and do not purport to be net additions to GDP.

## What Does the Study Tell Us?

The results of the current exercise highlight the *substantial economic losses* to the country as a result of inadequate sanitation. The Government of India (GOI) has been alive to this issue and has made major investments in rural sanitation since the mid-1980s (under the national flagship program Total Sanitation Campaign or TSC); and the National Urban Sanitation Policy (NUSP, 2008) is also likely to elevate the importance of sanitation in urban areas.

***This study underlines that not only are substantial investments needed but that these can become effective only when they result in reducing morbidity and mortality, mitigating impacts on drinking water, improving welfare, and reducing impacts on tourism, and so on, which are associated with inadequate sanitation.***

The study recommends a new monitoring framework at the national and local levels—one that measures not just toilet coverage and use, or coverage of sewerage and number of wastewater treatment plants, but also the improvements in the overall health, water-related, environmental, and welfare indicators that are caused by inadequate sanitation.



## Acknowledgments

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## Economics of Sanitation

The Economics of Sanitation Initiative was launched in 2007 as a response by the Water and Sanitation Program ([www.wsp.org](http://www.wsp.org)) to address major gaps in evidence among developing countries on the economic aspects of sanitation. The study aims to provide evidence that supports sanitation advocacy, elevates the profile of sanitation, and acts as an effective tool to convince governments to take action.

The first study completed in Southeast Asia found that the economic costs of poor sanitation and hygiene amounted to over US\$9.2 billion a year (2005 prices) in Cambodia, Indonesia, Lao PDR, the Philippines, and Vietnam. Its second phase analyzes the cost-benefit of alternative sanitation interventions and will enable stakeholders to make decisions on how to spend funds allocated to sanitation more efficiently.

Due to the study's successful traction, WSP has now carried out an ESI study in India, with others in progress for Bangladesh and Pakistan. ESI studies are also planned for countries in Africa, Latin America, and the Caribbean.

### WSP FUNDING PARTNERS

The Water and Sanitation Program (WSP) is a multi-donor partnership created in 1978 and administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services. WSP provides technical assistance, facilitates knowledge exchange, and promotes evidence-based advancements in sector dialog. WSP has offices in 25 countries across Africa, East Asia and the Pacific, Latin America and the Caribbean, South Asia, and in Washington, DC. WSP's donors include Australia, Austria, Canada, Denmark, Finland, France, the Bill and Melinda Gates Foundation, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, the United Kingdom, the United States, and the World Bank.



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