

# THE ECONOMIC IMPACTS OF INADEQUATE SANITATION IN PAKISTAN

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## Inadequate Sanitation Costs Pakistan 343.7 Billion PKR (US\$5.7 Billion)



An Overview of the Economic Impacts of  
Inadequate Sanitation in Pakistan

# Overview

## Who Should Read the Study

The study is intended to serve the needs of those who make decisions about resource allocations, technical expertise, as well as advocacy:

- national and sub-national policy makers,
- national, sub-national, and international donor agencies,
- multilateral organizations, and
- technical partners and stakeholders in development assistance.

In Pakistan, the deterioration of the environment continues to harm livelihoods and health, increasing the vulnerability of the nation's poor. It has long been clear that lack of access to clean water and sanitation facilities has a wide variety of impacts; however, the data and evidence needed to verify the size of the burden imposed on the people of Pakistan are limited. As a result, investment in the water and sanitation sector remains well below what is required to ensure for the population a basic minimum of services. Indeed, Pakistan's population is projected to grow by more than 2.9 percent a year, which means an additional 4.0 million people each year who will require additional clean water and sanitation facilities.

The Water and Sanitation Program undertook this study to conduct evidence-based research to help advocacy in the sanitation sector. The study aims to empirically estimate the economic impacts of current poor sanitation<sup>1</sup> conditions in Pakistan as well as the economic benefits of options for improved conditions. The study's ultimate goal is to provide policy makers at both national and local levels with evidence to justify larger investments in improving the sanitation conditions in the country. It also provides recommendations, again based on empirical evidence, for effectively planning and implementing sustainable sanitation and hygiene programs.

## How this study was conducted

The study conducted both quantitative and qualitative assessments of the impacts of poor sanitation on health, water, tourism, and other aspects of welfare, based on analyses of secondary data. Health impacts are included based on well-established links between sanitation and disease incidence. Water impacts are deemed important because poor sanitation is one of the causes of water pollution that, in turn, leads to costly avertive behaviors by households seeking clean water. Other welfare impacts are included as well, such as the productivity lost at work and in schools in the absence of convenient sanitary facilities when people must spend extra time accessing distant facilities. Finally, tourism is included in the study because poor sanitation facilities can influence a country's attractiveness as a tourist destination. The analysis has interpreted sanitation to comprise activities related to human waste, particularly excreta. In measuring impacts, it has used standard peer-reviewed methodologies. An attempt has also been made to distinguish between financial and economic costs.

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**The total economic cost of poor sanitation is equivalent to 3.94 percent of GDP in Pakistan**

<sup>1</sup> Throughout this report, the phrase *poor sanitation* is used broadly to include both sanitation and water facilities and practices that are poor in availability or effectiveness. *Poor sanitation* therefore includes both *unimproved* sanitation and lack of sanitation.





Based on availability of data, the study includes the following components:

- **Impacts related to health:** These include the attributed costs due to the effects of sanitation-linked illnesses, including premature mortality, cost of health care, productivity-time lost, and time lost to care for sick household members.
- **Impacts related to drinking water and domestic water:** These include the attributed costs of the following avertive measures: household treatment of drinking water; use of bottled water; piped water costs attributed to sanitation; and time spent hauling cleaner water from distant sources.
- **Impacts related to user preferences and welfare:** These include the cost of additional time required for accessing shared toilets and open defecation sites; and the cost of school absences due to inadequate or unavailable toilets for girls and work absences among women for the same reasons.
- **Impacts on tourism:** These include lost tourism revenues as well as economic impacts of illness among tourists.



## Data Sources

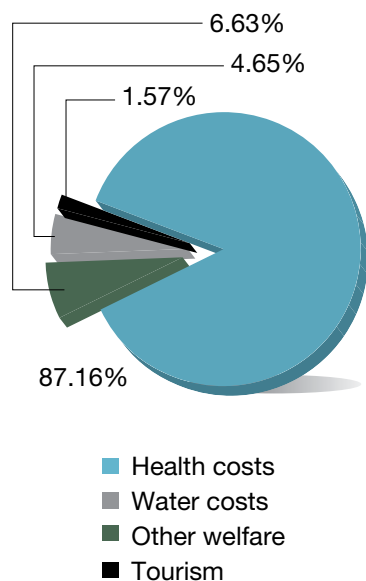
The detailed estimations in this study are based on disaggregated data, including actual incidence numbers for diseases, such as diarrheal illnesses, and for related premature deaths.

The data were obtained and determined from various relevant secondary sources, including Pakistan's Demographic and Health Surveys; WHO *Global Burden of Disease* reports; health statistics from the Government of Pakistan for priority diseases; and the Pakistan Social and Living Standard Measurement Survey.

Since the study drew on available nationally representative surveys and on routine data sources, adjustments were made to ensure comparability during the same time periods. For example, when data were not available for 2006, older or more recent data were used to obtain the estimates for the estimation year of 2006.



**Figure 1: Breakdown of total economic impact on Pakistan of poor sanitation, by cost area**



# Key Findings

## Status of sanitation and hygiene: resources and practices

The current status of sanitation and poor hygiene practices has led to significant public costs, such as premature deaths, economic and financial costs due to diseases attributable to poor sanitation, environmental costs, and other welfare costs. For example, as of 2006:

- The coverage level for sewage collection was estimated at 50 percent nationally (with only 20 percent coverage in rural areas), and only 10 percent of sewerage was being effectively treated. Treatment plants existed only in a few cities, and few of them were fully functional.
- Forty-two percent of the population were living with unimproved toilet facilities in 2006 out of which 11 percent had access to facilities that were either shared and/or unimproved.
- Approximately 50.1 percent of households had access to improved toilets, of which 55.8 percent had a sewer connected to a flush toilet, and 29.1 percent had a flush toilet connected to a septic tank.
- Of the total population, approximately 50 million people (31 percent) defecated in the open, and an estimated 8 million people (5 percent) used shared toilets. If we combine both groups, we find that 58 million people (36 percent) either defecated in the open or had access to shared toilets.
- National figures hide rural-urban disparities. While 90 percent of the urban population had access to improved sanitation (that is, the kind that hygienically separates human excreta from human contact), this compares with just 40 percent of the rural population. In rural areas, 45 percent of the population still practiced open defecation.

All these data indicate the degree of inadequate sanitation conditions that expose the population to fecal-oral diseases.

## Health costs

The total economic cost of poor sanitation for the year 2006 was estimated as 343.7 billion PKR (US\$5.7 billion). This amount is equivalent to 3.94 percent of GDP in Pakistan. Of this cost, 69.52 billion PKR (US\$1.15 billion) constitutes the direct financial cost, which is equivalent to 0.8 percent of GDP.

Health impacts accounted for the vast majority of total economic costs. They constituted 87.16 percent of the total quantified economic costs, equating to the equivalent of 3.43 percent of GDP. The total economic impact on health is estimated to cost 299.55 billion PKR (US\$4.93 billion), of which 48.76 billion PKR (US\$801.53 million) represents financial costs.





The major component of total health-related costs was from premature mortality. The cost of premature mortality is estimated at 216.29 billion PKR (US\$3.56 billion), equivalent to 2.48 percent of GDP. The cost of premature mortality comprises 72 percent of total health costs and 63 percent of total economic costs.

Productivity losses due to illness are estimated at 40.55 billion PKR (US\$666.61 million) or 0.46 percent of GDP. Total productivity losses contributed 11.80 percent of the total health costs. The major component (70.61 percent) of productivity losses was due to diarrhea, accounting for 8.33 percent of total health costs. The second largest share (21.64 percent) of productivity losses was from ALRI, which accounted for 2.55 percent of total health costs.

Total health care costs or cost of treatment comprised 12.42 percent of total health costs. The largest share (50 percent) in health care costs was the cost of treating diarrhea (6.16 percent of total costs), followed by ALRI (38 percent of health care costs and 4.78 percent of total costs).

### Water costs

The water-related economic cost of poor sanitation is estimated as 15.98 billion PKR (US\$262.68 million), equivalent to 0.18 percent of GDP. This represents 4.65 percent of the total impact; of this amount, 15.51 billion PKR (US\$254.85 million) were financial costs.

Piped-water costs (the excess cost made necessary by poor sanitation, which is estimated in this study as 50 percent of all piped-water cost) were the largest component of water-related costs, estimated as 7.47 billion PKR (US\$122.89 million). The cost of piped water accounts for 47 percent of all water-related costs (and 2.18 percent of total economic cost) due to poor sanitation.

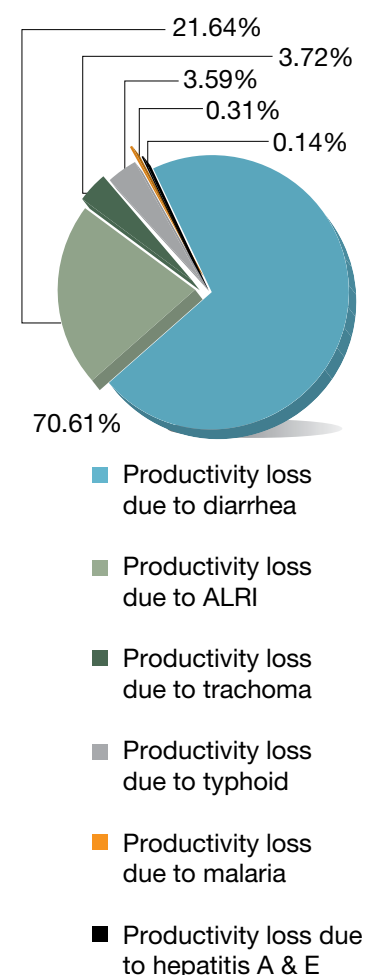
Bottled water consumption comprised 29 percent of water-related costs, equivalent to 1.4 percent of total economic costs and 0.05 percent of GDP. The cost of bottled water consumption was 4.67 billion PKR (US\$76.72 million).

The cost of household water treatment was 3.36 billion PKR (US\$55.23 million), equivalent to 21 percent of water-related costs, 1 percent of total costs, and 0.04 percent of GDP.

### Welfare costs

Other welfare losses, such as user preferences (which, while intangible or difficult to quantify, include comfort and acceptability, privacy and convenience, security, avoidance of conflict, and status and prestige) and time loss, are estimated as 22.77 billion PKR (US\$374.4 million), equivalent to 6.63 percent of total impacts and 0.26 percent of GDP. The major share is from the time loss due to household access to open defecation sites (which was 16.5 billion PKR [US\$271.6 million]), equivalent to 73 percent of total welfare costs or 5 percent of total costs.

**Figure 2: Breakdown of health costs due to productivity loss, by type of illness**



**Only a few cities have sewage treatment plants and most of them are not fully functional**



**Sanitation and hygiene-related interventions could prevent 52 percent of these economic losses, equivalent to 2.05 percent of GDP**

The second largest share is from time loss due to household access to shared toilets (5.64 billion PKR [US\$92.74 million]).

*Losses to tourism* accounted for 5.38 billion PKR (US\$84.03 million), equivalent to 1.57 percent of the total impact and to 0.06 percent of GDP. The financial costs included in tourism losses account for 4.98 billion PKR (US\$81.99 million) or 7.1 percent of total financial losses.

Among total tourism losses of 5.38 billion PKR, 93 percent was due to lost tourism revenue, while the remaining 7 percent was due to tourist illness. Tourism revenue losses make up 1.5 percent and tourist illness costs make up 0.1 percent of the total costs.

*User cost for solid waste management* was estimated as 147.87 million PKR (US\$2.43 million). All of this cost consisted of the financial burden on households. The cost of solid waste management is not, however, included in the total cost of poor sanitation. User cost of household solid waste management was found to be 147.87 million PKR (US\$2.4 million) which is equivalent to 0.05 percent of total costs and 0.01 percent of GDP.

### **Economic impact of interventions**

Interventions that could be carried out to mitigate economic losses due to poor sanitation will not only reduce the sanitation-related losses but may also provide improvements in non-sanitation areas such as water supply and so on. Sanitation and hygiene-related interventions could mitigate 52 percent of economic impacts, which amounts to 1,125 PKR per capita and 2.05 percent of GDP.

Mitigation through the provision of improved access to toilets is estimated to cost 124.02 billion PKR (US\$2.04 billion), equivalent to 1.42 percent of GDP and 36 percent of total economic cost.

Mitigation through improved hygiene behavior is estimated to be 157.57 billion PKR (US\$2.59 billion), equivalent to 1.81 percent of GDP or 46 percent of total economic impact.

Improved access to adequate quantity and improved quality of water could mitigate 30 percent and 36 percent of economic losses, respectively, while safe confinement and disposal of fecal matter could mitigate 30 percent of economic losses, equivalent to 1.19 percent of GDP or 653 PKR per capita (US\$1.71 billion).





# Conclusions

Priority treatment needs to be given to the issue of poor sanitation at all administrative levels—local, provincial, and national—and investments should be made to build moderately improved and hygienic latrines in both urban and rural areas. These investments could include increased sanitation coverage, as already targeted in various government policy papers.

Special treatment and attention are needed in the areas where the poor population lives and in rural areas, where children are more at risk from diarrhea and malnutrition. Education and awareness campaigns are needed at all levels, particularly in schools, to promote personal hygiene, such as hand-washing, and other inexpensive means to minimize the incidence of diseases and the impact of poor sanitation indirectly.

This study was conducted on the basis of secondary data and hence was constrained by the non-availability of relevant data in many cases. It would be preferable that information on health education and sanitation-related information be incorporated in future national surveys. There is still a need to empirically establish the attributable impact factors based on primary data from Pakistan surveys for a variety of topics, in order to ensure that estimates are as accurate as possible.

## Excluded from this Study

This study has excluded various important aspects of sanitation due to the non-availability of reliable relevant data to determine the physical units of impact and to estimate the related economic and financial costs. These include estimations for various diseases, including polio, skin diseases, urinary tract infections, and oral diseases that are identified in medical literature as caused by poor hygiene practices and sanitation, particularly in Pakistan's rural areas. The cost of informal health care and traditional/home remedies is not included. Health costs arising from poor sanitary management of livestock, agricultural waste, and fisheries and pisciculture are not included. Furthermore, other intangible welfare benefits—including benefits from the acceptability of improved sanitation arrangements (e.g., privacy, security, status and dignity, and social acceptability) are not included, nor is the cost of environmental conditions stemming from poor sanitation, such as air quality and odor, or the cost of other aesthetic values. Similarly, costs associated with lost trade and business, property value, and many other related welfare, social, and environmental costs are not captured in this study.

In summary, this study provides the evidence about the adverse economic impact of lack of sanitation at the national level. It also provides estimates of ill-effects of inadequate sanitation that can be mitigated with sanitation interventions. This study is intended to serve the needs of those who make decisions about resource allocations, technical expertise and advocacy: national policymakers, national and international donor agencies, multilateral organizations, and technical partners working in the area of development assistance. Decision makers and stakeholders below the national level are also an audience for this study where the information is relevant for their work. For this reason some estimates are provided at rural and urban levels. However, given the structure in Pakistan and to inform decision makers at the local level, additional studies are needed to further disaggregate the results in future.

## Acknowledgments

Dr Mohammed Nishat, Professor of Economics and Finance and Associate Dean of the Institute of Business Administration at Karachi, Pakistan, was the lead analyst and author of the ESI study summarized here, *The Economic Impacts of Inadequate Sanitation in Pakistan*. A sincere appreciation to the Government of Pakistan especially the Planning Commission, Statistics Division of the Ministry of Finance and the Ministry of Environment whose support and data has helped us formulate the local basis of the statistics. We are also thankful to the federal Ministry of Environment for their review and collaboration and the provincial governments especially Local Government Departments, Public Health Engineering Departments, Health Departments and Public Utilities for their availability to discuss and clarify many technical issues. Rachid Benmessoud, Country Director, World Bank, Islamabad, led the peer review process across World Bank experts whose able inputs helped improve the draft study. All peer-reviewers spent their valuable time in re-examining a complex assignment and provided deep-rooted and long-term vision and comments. Farhan Sami, Country Team Leader, WSP, guided the Pakistan study through all processes and led coordination with the guidance of Christopher Juan Costain, Regional Team Leader, WSP in South Asia, Guy Hutton, WSP and Vandana Mehra, Communications Specialist, WSP.

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## Water and Sanitation Program Funding Partners

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.

## Economics of Sanitation

The Economics of Sanitation Initiative (ESI) is a multi-country initiative of the Water and Sanitation Program (WSP). ESI 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 that study's successful traction, WSP has carried out ESI studies in India and Bangladesh as well as the Pakistan study summarized here. ESI studies have also been carried out for countries in Africa, Latin America, and the Caribbean.

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### Water and Sanitation Program

20 A Shahrah-e-Jamhuriat, Ramna 5, G-5/1, Islamabad, Pakistan  
Phone: (92-51) 2279641-46  
E-mail: [wsp@worldbank.org](mailto:wsp@worldbank.org)  
Web site: [www.wsp.org](http://www.wsp.org)