

Annex 9A. Overview of Studies Presenting Damage Costs of Poor Water, Sanitation, and Hygiene at National Level

Supplemental material for: Hutton, G. and C. Chase. 2017. "Water Supply, Sanitation, and Hygiene." In *Disease Control Priorities* (third edition): Volume 7, *Injury Prevention and Environmental Health*, edited by C.N. Mock, R. Nugent, O. Kobusingye, and K.R. Smith. Washington, DC: World Bank.

Country (year of study)	Cost per capita	Total cost (million)	Cost as % of GDP	Included damage costs	Reference
<i>Economics of sanitation initiative (World Bank/Water and Sanitation Program)</i>					
India (2011)	US\$ 49.0	US\$ 54,000	6.4%		Tyagi 2010
Bangladesh (2011)	US\$ 29.6	US\$ 4,200	6.3%		Barkat 2011
Pakistan (2011)	US\$ 35.6	US\$ 5,700	3.9%		Nishat 2012
Cambodia (2008)	US\$ 32.4	US\$ 448	7.2%	Poor sanitation and hygiene: health (diarrheal disease,	Kov and others 2009
Indonesia (2009)	US\$28.6	US\$ 6,344	2.3%	hepatitis A and E, helminths, trachoma and infectious skin	Napitupulu and Hutton 2008
Lao PDR (2009)	US\$ 34.4	US\$ 193	5.6%	diseases), water resources, access time, tourism	Hutton, Larsen and others 2009
Philippines (2008)	US\$ 16.8	US\$ 1,412	1.5%		Rodriguez and others 2008
Vietnam (2008)	US\$ 9.3	US\$ 780	1.3%		Thang and others 2008
Mongolia (2010)	US\$ 10.0	US\$ 26	0.5%	Poor sanitation and hygiene: health and access time	Hutton and Amartuvshin 2011
Sub-Saharan Africa (2008)	US\$ 11.2	US\$ 5,500	2.0%	Poor sanitation and hygiene: health and access time	Hickling and Hutton 2014
<i>Cost of Environmental Degradation studies (World Bank/Mediterranean Environmental Technical Assistance Program)</i>					
Syria (2001)	US\$ 9.7 ^a	US\$ 158	0.9%	Contaminated water resources: diarrheal disease, water	Sarraf and others 2004
Morocco (2000)	US\$ 14.6 ^a	US\$ 420	1.2%	management and access	Sarraf and others 2003
Iran (2002)	US\$ 4.4 ^a	US\$3,200	2.2%		Sarraf and others 2005

Jordan (2002)	US\$ 18.9 ^a	US\$ 100	1.2%	Contaminated water resources: diarrheal disease, water management and access (cont.)	METAP 2005
Tunisia (1999)	US\$ 10.6 ^a	US\$ 102	0.6%		Sarraf, Larsen, and Owaygen 2004
Lebanon (1999)	US\$ 48.6 ^a	US\$ 175	1.1%		Sarraf, Larsen and Owaygen 2004
Egypt (1999)	US\$ 9.1 ^a	US\$ 630	1.0%		Sarraf and Larsen 2004
Algeria (1999)	US\$ 23.5 ^a	US\$ 730	1.5%		Sarraf 2002
<i>Country environmental analyses (World Bank/Environment Department)</i>					
Peru (2003)	US\$ 25.2 ^a	US\$ 666	1.1% ^a	Inadequate WASH, range of health impacts and water boiling costs	World Bank 2007a
Ghana (2004)	US\$ 8.6	US\$ 180	2.1%		World Bank 2007b
Senegal (2005)	US\$ 3.2 ^a	US\$ 37	0.4% ^a		World Bank 2008
Nigeria (2004)	US\$ 4.0 ^a	US\$ 618	1.3%	Inadequate WASH, diarrheal diseases only	Margulis and others 2006
Nepal (2005)	US\$ 3.2 ^a	US\$ 89	1.2% ^a		World Bank 2007c
Pakistan (2003)	US\$ 12.9 ^a	US\$ 1972 ^a	1.8%	Inadequate WASH, diarrheal and typhoid mortality and morbidity (time loss), cost of bottled water, water boiling costs, cost of hospitalization and medication due to diarrhoea and typhoid	World Bank 2006
Bangladesh (2002)	US\$ 4.2 ^a	US\$ 528 ^b	1.1% ^b	Inadequate WASH, range of health impacts	Khaliquzzaman 2006
Guatemala (2006)	US\$ 37.2 ^a	US\$ 484 ^a	1.6%	Inadequate WASH, diarrheal diseases only	Belausteguigoitia 2006
Egypt (2003)	US\$ 13.1 ^a	US\$ 911 ^a	1.8%	Inadequate WASH, health costs including morbidity and treatment, other impacts such as loss in fisheries, agriculture/infrastructure losses	Arif 2005
Tunisia (1999)	US\$0.0	US\$ 129 ^a	0.6%	Environmental damage due to water, including health costs of water-related diseases	Arif 2004

Serbia (2002-2007)	X	US\$ 470	X	Investment costs of improved waste water treatment	Capcelea 2003
El Salvador (2005)	X	X	1% 2.5%	Inadequate WASH, health costs of waterborne diseases Health costs of environmental degradation	Belausteguigoitia 2006
Honduras (2007)	US \$13.7 ^a	US \$97 ^a	1%	Inadequate WASH, mortality in children, morbidity in children and adults, bottled water consumption, water chlorination, and water boiling	Strukova 2007
Philippines (2007)	US\$ 14.7 ^a	US\$ 1,250	0.9% ^a	Inadequate WASH, range of health impacts, including malnutrition	Bojö and Villaluz 2009
<i>Other studies</i>					
Pakistan (2005)			5.0%	Inadequate WASH health impacts, including effects on malnutrition	Acharya, Paunio, and Ahmed 2008
Ghana (2005)			5.2%		Acharya, Paunio, and Ahmed 2008
China (2003)	US\$ 6.2 ^a	US\$ 1,200	0.6% ^a	Water pollution health costs	World Bank 2007d
India (1995)	US\$ 6.1 ^a	US\$ 5,710	1.6% ^a	Water pollution urban and rural health impacts, especially diarrhoeal diseases	Brandon 1996
India (2009)	US\$ 9.3 ^a	US\$ 11,103 ^a	0.8%	Inadequate WASH, environmental damage costs	Mani 2013
Peru (1990)	US\$ 7.4 ^a	US\$ 200	0.4% ^a	Cholera epidemic: health, tourism, fish exports	Suarez and Bradford 1991
Africa (2007)	-	US\$ 73	-	Cholera health cost (110,000 cases)	Kirigia, Sambo, and others 2009
Urban slums in Mumbai, India (2011)	US\$ 9.1 ^c	-	-	Cost of diarrhoeal illness per urban slum household in Mumbai, including direct health care costs; avoidance costs such as extra water, kerosene and toilet fees; lost wages from income; and homemaker's productivity loss	Patel 2013
Tanzania (2009)	US\$103.2	-	-	Mean cost of illness per cholera episode in Zanzibar, including public fixed and	Schaetti 2012

				variable treatment costs, and private direct and indirect costs	
Dhaka, Bangladesh (2011)	US\$ 30.40 ^d	-	-	Cost of illness per cholera episode, including direct medical and non-medical costs (\$7.40) and indirect costs due to patient's and caregiver's income loss (\$23)	Sarker 2013
Bangladesh (2011)	US\$ 1.82 ^d	-	-	Mean cost per episode including direct medical costs, direct non-medical costs and productivity losses	Rheingans and 2012
India (2011)	US\$ 3.33 ^d				
Pakistan (2011)	US\$ 6.47 ^d				

^a Estimated based on total impact, using exchange rates, population and GDP values from year of estimate.

^b Average savings of 15 scenarios, representing costs as % of GNI.

^c Estimate based on cost per household, using the average exchange rate for the study period, July 2011 (1 USD = 45 INR).

^d Represents cost of illness per household.

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