

Global cost-benefit analysis of water supply and sanitation interventions

Guy Hutton, Laurence Haller and Jamie Bartram

ABSTRACT

The aim of this study was to estimate the economic benefits and costs of a range of interventions to improve access to water supply and sanitation facilities in the developing world. Results are presented for eleven developing country WHO sub-regions as well as at the global level, in United States Dollars (US\$) for the year 2000. Five different types of water supply and sanitation improvement were modelled: achieving the water millennium development goal of reducing by half in 2015 those without improved water supply in the year 1990; achieving the combined water supply and sanitation MDG; universal basic access to water supply and sanitation; universal basic access plus water purification at the point-of-use; and regulated piped water supply and sewer connection. Predicted reductions in the incidence of diarrhoeal disease were calculated based on the expected population receiving these interventions. The costs of the interventions included estimations of the full investment and annual running costs. The benefits of the interventions included time savings due to easier access, gain in productive time and reduced health care costs saved due to less illness, and prevented deaths. The results show that all water and sanitation improvements are cost-beneficial in all developing world sub-regions. In developing regions, the return on a US\$1 investment was in the range US\$5 to US\$46, depending on the intervention. For the least developed regions, investing every US\$1 to meet the combined water supply and sanitation MDG lead to a return of at least US\$5 (AFR-D, AFR-E, SEAR-D) or US\$12 (AMR-B; EMR-B; WPR-B). The main contributor to economic benefits was time savings associated with better access to water and sanitation services, contributing at least 80% to overall economic benefits. One-way sensitivity analysis showed that even under pessimistic data assumptions the potential economic benefits outweighed the costs in all developing world regions. Further country case-studies are recommended as a follow up to this global analysis.

Key words | cost-benefit analysis, costs, economic benefits, sanitation, water supply

Guy Hutton (corresponding author)
Swiss Tropical Institute,
Basel,
Switzerland
Tel.: +41 61 271 5900
E-mail: guy.hutton@dev-sol-int.com;
<http://www.sti.ch>

Laurence Haller
Institute F.-A. Forel, University of Geneva,
Switzerland
Tel.: +41 22 950 92 10
Fax: +41 22 755 13 82

Jamie Bartram
World Health Organization,
Geneva,
Switzerland

INTRODUCTION

In the developing world, diseases, associated with poor water and sanitation have considerable public health significance. In 2004, it was estimated that 4% of the global burden of disease and 1.6 million deaths per year were attributed to unsafe water supply and sanitation (WS&S), including inadequate personal and domestic hygiene (Prüss *et al.* 2002; World Health Organization 2003). This corresponds to 61 million disability-adjusted life-years lost

(DALYs), taking into account burden of disease due to both morbidity and mortality. While there has been considerable investment in water and sanitation in developing countries since the 1980s, in 2004 an estimated 1.1 billion people were without access to safe water sources and 2.6 billion people lacked access to basic sanitation (WHO & UNICEF 2006). Nearly 80% of the people using water from unimproved sources are concentrated in three