

# The Millennium Development Goals for Water: Crucial Objectives, Inadequate Commitments

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*We recognize that, in addition to our separate responsibilities to our individual societies, we have a collective responsibility to uphold the principles of human dignity, equality, and equity at the global level. As leaders we have a duty therefore to all the world's people, especially the most vulnerable and, in particular, the children of the world, to whom the future belongs.*

UN MILLENNIUM DECLARATION

As has been chronicled in earlier volumes of *The World's Water*, the failure to provide safe drinking water and adequate sanitation services to all people is perhaps the greatest development failure of the twentieth century (Gleick 1998, 2000). The most egregious consequence of this failure is the high rate of sickness and mortality among young children from preventable water-related diseases. This chapter discusses recent efforts to address the gap over access to water supply and sanitation by setting targets, explores the likelihood of achieving those targets, and highlights the consequences of success or failure.

In the year 2000, the United Nations and the international water community announced explicit goals—the Millennium Development Goals (MDGs)—for human development over the next several decades. One of these explicitly addressed water by setting the goal of reducing in half the proportion of people unable to reach or afford safe drinking water by 2015. A comparable MDG for sanitation was announced in 2002 at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa. Achieving these goals is a laudable objective, but even if they can be achieved, hundreds of millions of people will still lack basic water services two decades from now. Moreover, given current levels of financial and institutional commitment, there now seems to be little chance that the MDGs will be met. This problem must be considered one of the most serious public health crises facing us, yet it has received little attention and inadequate resources.

## Setting Water and Sanitation Goals

The United Nations, in collaboration with individual nations, regularly monitors access to water and sanitation. The World Health Organization (WHO) published the most recent assessment in 2000, providing information for 89 percent of the world's population (WHO 2000). According to the WHO, 1.1 billion people around the world lacked access to “improved water supply” and more than 2.4 billion, or roughly 40 percent of the world's population lacked access to “improved sanitation” in 2000.<sup>1</sup>

In response, an increasing number of nations, international water conferences, and aid organizations have announced efforts to improve global access to fresh water and water-related services. For example, the recent ministerial statement from the 2nd World Water Forum in 2000 in The Hague (Hague 2000) called for efforts to guarantee:

“that every person has access to enough safe water at an affordable cost to lead a healthy and productive life and that the vulnerable are protected from the risks of water-related hazards...”

In September of the same year, the United Nations General Assembly adopted the Millennium Development Goals (United Nations 2000a), including one for water. A complete list of the MDGs, together with the indicators that are to be used to measure progress toward these goals, is provided in Box 1.1. The MDG objective for water (Goal 7, Target 10) is to:

“Halve by 2015 the proportion of people without sustainable access to safe drinking water” (UNDP 2003).

In August 2002 at the WSSD, the international community added a new goal of halving by the year 2015 the proportion of people without access to basic sanitation.

“The provision of clean drinking water and adequate sanitation is necessary to protect human health and the environment. In this respect, we agree to halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water (as outlined in the Millennium Declaration) and the proportion of people who do not have access to basic sanitation...” (United Nations 2002).

Efforts to meet these targets will lead to a decrease in the total population at risk from water-related diseases.

## Commitments to Achieving the MDGs for Water

Unfortunately, the United Nations water goals and solutions to other water problems are unlikely to be achieved given current levels of financial and political commitments.

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1. Previous assessments were released in 1994, 1990, and during the International Safe Drinking Water Supply and Sanitation Decade of the 1980s. Data from these assessments are available in the 2002–2003 volume of *The World's Water* (Gleick et al. 2002). While each of these assessments offers a picture of the populations without access to water services, different rates of response to surveys, inconsistent and changing definitions of “access” and “adequate,” and poor data availability make it difficult—and ill-advised—to try to draw conclusions about trends over time. In a recent attempt, Lomborg (2001) drew optimistic conclusions from incorrect interpretations and misunderstandings of these data sets (Gleick 2002a). At the same time, despite problems with the data, it is evident that limited resources, misguided priorities, and rapidly growing populations have made it difficult to provide comprehensive and complete water coverage.

### Box 1.1 The Millennium Development Goals, Targets, and Indicators

Goals and Targets	Indicators
<p><b>Goal 1</b> Eradicate extreme poverty and hunger</p> <p>Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day</p> <p>Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger</p>	<ul style="list-style-type: none"> <li>• 1a. Proportion of population below \$1 a day<sup>1</sup></li> <li>• 1b. National poverty headcount ratio</li> <li>• 2. Poverty gap ratio at \$1 a day (incidence x depth of poverty)</li> <li>• 3. Share of poorest quintile in national consumption</li> <li>• 4. Prevalence of underweight in children (under five years of age)</li> <li>• 5. Proportion of population below minimum level of dietary energy consumption</li> </ul>
<p><b>Goal 2</b> Achieve universal primary education</p> <p>Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling</p>	<ul style="list-style-type: none"> <li>• 6. Net enrollment ratio in primary education</li> <li>• 7a. Proportion of pupils starting grade 1 who reach grade 5</li> <li>• 7b. Primary completion rate<sup>2</sup></li> <li>• 8. Literacy rate of 15- to 24-year-olds</li> </ul>
<p><b>Goal 3</b> Promote gender equality and empower women</p> <p>Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015</p>	<ul style="list-style-type: none"> <li>• 9. Ratio of girls to boys in primary, secondary, and tertiary education</li> <li>• 10. Ratio of literate females to males among 15- to 24-year-olds</li> <li>• 11. Share of women in wage employment in the nonagricultural sector</li> <li>• 12. Proportion of seats held by women in national parliament</li> </ul>
<p><b>Goal 4</b> Reduce child mortality</p> <p>Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate</p>	<ul style="list-style-type: none"> <li>• 13. Under-five mortality rate</li> <li>• 14. Infant mortality rate</li> <li>• 15. Proportion of one-year-old children immunized against measles</li> </ul>
<p><b>Goal 5</b> Improve maternal health</p> <p>Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio</p>	<ul style="list-style-type: none"> <li>• 16. Maternal mortality ratio</li> <li>• 17. Proportion of births attended by skilled health personnel</li> </ul>
<p><b>Goal 6</b> Combat HIV/AIDS, malaria, and other diseases</p> <p>Target 7: Have halted by 2015 and begun to reverse the spread of HIV/AIDS</p>	<ul style="list-style-type: none"> <li>• 18. HIV prevalence among 15- to 24- year-old pregnant women</li> <li>• 19. Condom use rate of the contraceptive prevalence rate<sup>3,2</sup></li> <li>• 19a. Condom use at last high-risk sex<sup>2</sup></li> <li>• 19b. Percentage of population aged 15-24 with comprehensive correct knowledge of HIV/AIDS<sup>4,2</sup></li> <li>• 19c. Contraceptive prevalence rate<sup>3</sup></li> <li>• 20. Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14</li> </ul>

*continues*

**Box 1.1** *continued*

<b>Goals and Targets</b>	<b>Indicators</b>
<p>Goal 6 <i>continued</i></p> <p>Target 8: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases</p>	<ul style="list-style-type: none"> <li>• 21. Prevalence and death rates associated with malaria</li> <li>• 22. Proportion of population in malaria-risk areas using effective malaria prevention and treatment measures<sup>5</sup></li> <li>• 23. Prevalence and death rates associated with tuberculosis</li> <li>• 24. Proportion of tuberculosis cases detected and cured under directly observed treatment short course</li> </ul>
<p>Goal 7 Ensure environmental sustainability</p> <p>Target 9: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental</p> <p>Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation</p> <p>Target 11: Have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers</p>	<ul style="list-style-type: none"> <li>• 25. Proportion of land area covered by forest</li> <li>• 26. Ratio of area protected to maintain biological diversity to surface area</li> <li>• 27. Energy use per unit of GDP</li> <li>• 28. Carbon dioxide emissions (per capita) and consumption of ozone-depleting chlorofluorocarbons</li> <li>• 29. Proportion of population using solid fuels<sup>2</sup></li> <li>• 30. Proportion of population with sustainable access to an improved water source, urban and rural</li> <li>• 31. Proportion of population with access to improved sanitation</li> <li>• 32. Proportion of households with access to secure tenure</li> </ul>
<p>Goal 8 Develop a global partnership for development</p> <p>Target 12: Develop further an open, rule-based, predictable, nondiscriminatory trading and financial system (includes a commitment to good governance, development, and poverty reduction—both nationally and internationally)</p> <p>Target 13: Address the special needs of the least developed countries (includes tariff-and quota-free access for exports, enhanced program of debt relief for HIPC and cancellation of official bilateral debt, and more generous ODA for countries committed to poverty reduction)</p>	<p>Some of the indicators listed below will be monitored separately for the least developed countries, Africa, landlocked countries, and small island developing states.</p> <p><b>Official development assistance</b></p> <ul style="list-style-type: none"> <li>• 33. Net ODA total and to least developed countries, as a percentage of OECD/DAC donors' gross income</li> <li>• 34. Proportion of bilateral, sector-allocable ODA of OECD/DAC donors for basic social services (basic education, primary health care, nutrition, safe water, and sanitation)</li> <li>• 35. Proportion of bilateral ODA of OECD/DAC donors that is untied</li> <li>• 36. ODA received in landlocked countries as proportion of their GNI</li> <li>• 37. ODA received in small island developing states as proportion of their GNI</li> </ul>

*continues*

**Box 1.1** *continued*

<b>Goals and Targets</b>	<b>Indicators</b>
<p>Goal 8 <i>continued</i></p> <p>Target 14: Address the special needs of landlocked countries and small island developing states (through the Program of Action for the Sustainable Development of Small Island Developing States and 22nd General Assembly provisions)</p> <p>Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term</p> <p>Target 16: In cooperation with developing countries, develop and implement strategies for decent and productive work for youth</p> <p>Target 17: In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries</p> <p>Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications</p>	<p><b>Market access</b></p> <ul style="list-style-type: none"> <li>• 38. Proportion of total developed country imports (excluding arms) from developing countries and least developed countries admitted free of duties</li> <li>• 39. Average tariffs imposed by developed countries on agricultural products and clothing from developing countries</li> <li>• 40. Agricultural support estimate for OECD countries as a percentage of their GDP</li> <li>• 41. Proportion of ODA provided to help build trade capacity</li> </ul> <p><b>Debt sustainability</b></p> <ul style="list-style-type: none"> <li>• 42. Total number of countries that have reached their HIPC decision points and completion points (cumulative)</li> <li>• 43. Debt relief committed under HIPC initiative, US\$</li> <li>• 44. Debt service as a percentage of exports of goods and services</li> </ul> <p><b>Other</b></p> <ul style="list-style-type: none"> <li>• 45. Unemployment rate of 15- to 24-year-olds, male and female and total<sup>6</sup></li> <li>• 46. Proportion of population with access to affordable, essential drugs on a sustainable basis<sup>7</sup></li> <li>• 47. Telephone lines and cellular subscribers per 100 population</li> <li>• 48a. Personal computers in use per 100 population</li> <li>• 48b. Internet users per 100 population</li> </ul>

**Notes:**

1. For monitoring country poverty trends, indicators based on national poverty lines should be used, where available.
2. These indicators are proposed as additional MDG indicators, but have not yet been adopted.
3. Amongst contraceptive methods, only condoms are effective in preventing HIV transmission. The contraceptive prevalence rate is also useful in tracking progress in other health, gender and poverty goals. Because the condom use rate is only measured amongst women in union, it is supplemented by an indicator on condom use in high-risk situations (indicator 19a) and an indicator on HIV/AIDS knowledge (indicator 19b).
4. This indicator is defined as the percentage of population aged 15–24 who correctly identify the two major ways of preventing the sexual transmission of HIV (using condoms and limiting sex to one faithful, uninfected partner), who reject the two most common local misconceptions about HIV transmission, and who know that a healthy-looking person can transmit HIV. However, since there are currently not a sufficient number of surveys to be able to calculate the indicator as defined above, UNICEF, in collaboration with UNAIDS and WHO, produced two proxy indicators that represent two components of the actual indicator. They are the following: a) Percentage of women and men 15–24 who know that a person can protect herself from HIV infection by “consistent use of condom”. b) Percentage of women and men 15–24 who know a healthy-looking person can transmit HIV. Data for this year's report are only available on women.
5. Prevention to be measured by the percentage of children under 5 sleeping under insecticide treated bednets; treatment to be measured by percentage of children under 5 who are appropriately treated.
6. An improved measure of the target is under development by ILO for future years.
7. Under development by WHO.

Source: [http://www.developmentgoals.org/About\\_the\\_goals.htm](http://www.developmentgoals.org/About_the_goals.htm)

Despite growing awareness of water issues, international economic support for water projects of all kinds is marginal and declining. Official development assistance (ODA) for water supply and sanitation projects from countries of the Organization for Economic Co-operation and Development (OECD) and the major international financial institutions has actually declined over the past few years (Table 1.1), from approximately \$3.5 billion per year (average from 1996 to 1998) to \$3.1 billion per year (average from 1999 to 2001). Moreover, those most in need receive the smallest amount of aid. Ten countries received around half of all water-related aid, while countries where less than 60 percent of the population has access to an improved water source received only 12 percent of the money (OECD 2002).

The 3rd World Water Forum in Japan (described in detail in the “Water Briefs” section of this volume) provided an opportunity for pledges of serious and substantial new commitments of financing and action to meet the MDGs. Such pledges fell far

**TABLE 1.1** Aid to Water Supply and Sanitation by Donor (1996 to 2001)

Country or Organization	US\$ (millions)	
	1996–1998 average	1999–2001 average
Australia	23	40
Austria	34	46
Belgium	12	13
Canada	23	22
Denmark	103	73
Finland	18	12
France	259	148
Germany	435	318
Ireland	6	7
Italy	35	29
Japan	1442	999
Luxembourg	2	8
Netherlands	103	75
New Zealand	1	1
Norway	16	32
Portugal	0	5
Spain	23	60
Sweden	43	35
Switzerland	25	25
United Kingdom	116	165
United States	186	252
<b>Subtotal Countries</b>	<b>2906</b>	<b>2368</b>
African Development Fund	56	64
Asian Development Bank	150	88
European Community		216
International Development Association	323	331
Inter-American Development Bank, Special Operations Fund	46	32
<b>Subtotal Multilateral Organizations</b>	<b>575</b>	<b>730</b>
<b>TOTAL Water Supply/Sanitation Aid</b>	<b>3482</b>	<b>3098</b>

Source: OECD 2002.

short of the level conceivably needed to actually meet the targets. Box 1.2 lists some of the more serious and substantive commitments that came out of the Water Forum. As Box 1.2 shows, together with Table 1.1, commitments to the MDG remain inadequate.

## Consequences: Water-Related Diseases

Although water-related diseases—associated with the lack of access to clean and safe water and sanitation—have largely been eliminated in wealthier nations, they remain a major concern in much of the developing world. While data are incomplete and unreliable, the World Health Organization regularly publishes water- and health-related information in the *Human Development Report* series and the annual *World Health Report* (UNDP 2003, WHO 2003). In the early 1990s there were on the order of 250

### **Box 1.2 MDG Commitments Coming Out of the 3rd World Water Forum, Kyoto, 2003**

UN-HABITAT (the United Nations Human Settlements Program aimed at providing sustainable housing for all) signed a memorandum of understanding with the Asian Development Bank (ADB) to create a program to build the capacity of Asian cities to secure and manage pro-poor investments and to help the region meet the water-related Millennium Development Goals (MDGs). The program will cover \$10 million in grants from ADB and United Nations Habitat for the first two phases and \$500 million in ADB loans for water and sanitation projects in cities across Asia over the next five years. The Government of Netherlands also made additional funding for Water for Asian Cities available to United Nations Habitat.

The United Nations Development Program (UNDP) committed to a Community Water Initiative, aimed at building on the power of the local community to solve water and sanitation challenges. The aim of the initiative is to provide innovative communities with small grants to expand and improve their solutions to the water and sanitation crisis. The Community Water Initiative has an estimated target budget of \$50 million for 2003–2008.

The Netherlands will concentrate its international water aid on Africa and assist 10 countries in the development of their national plans. Further, it is committed to support the African Water Facility.

Australia committed about \$60 million (converted to U.S. dollars) in the current financial year for water activities, primarily in countries in the Asia-Pacific region.

*Source:* Press Release of the World Water Council 2003.  
[http://www.worldwatercouncil.org/download/PR\\_finalday\\_23.03.03.pdf](http://www.worldwatercouncil.org/download/PR_finalday_23.03.03.pdf)

million cases of water-related diseases annually, excluding common diarrheal diseases. In the *2000 World Health Report*, the United Nations reported 4.37 billion cases of diarrhea annually (Annex Table 9 in Murray et al. 2001). The true extent of these diseases is unknown and many cases of water-related illnesses are undiagnosed and unreported.

Water-related diseases can be placed in four classes: waterborne, water-washed, water-based, and water-related insect vectors. The first three are most clearly associated with lack of improved domestic water supply and adequate sanitation. Box 1.3 lists the prevalent diseases associated with each class.

*Waterborne diseases* include those in which transmission occurs by drinking contaminated water, particularly contamination by pathogens transmitted from excreta to water by humans. These include most of the enteric and diarrheal diseases caused by bacteria, parasites, and viruses. Waterborne diseases also include typhoid and over 30 species of parasites that infect the human intestines. Seven of these are distributed globally or cause serious illness: amebiasis, giardiasis, *Taenia solium* taeniasis, ascariasis, hookworm, trichuriasis, and strongyloidiasis. Evidence also suggests that waterborne disease contributes to background rates of disease not detected or reported explicitly as outbreaks.

*Water-washed diseases* occur when there is insufficient water for washing and personal hygiene or when people come in contact with contaminated water. These include trachoma and typhus, and diarrheal diseases that can be passed from person to person.

*Water-based diseases* come from hosts that live in water or require water for part of their life cycle. These diseases are passed to humans when they are ingested or come into contact with skin. The most widespread examples in this category are schistosomiasis and dracunculiasis. Schistosomiasis currently infects 200 million people in 70 countries. Safe drinking water systems will eliminate exposure to these hosts.

### **Box 1.3 Water-Related Diseases**

Waterborne diseases: caused by the ingestion of water contaminated by human or animal feces or urine containing pathogenic bacteria or viruses; include cholera, typhoid, amoebic and bacillary dysentery, and other diarrheal diseases.

Water-washed diseases: caused by poor personal hygiene and skin or eye contact with contaminated water; include scabies, trachoma, and flea-, lice- and tick-borne diseases.

Water-based diseases: caused by parasites found in intermediate organisms living in water; include dracunculiasis, schistosomiasis, and other helminths.

Water-related insect vector diseases: caused by insects that breed in water; include dengue, filariasis, malaria, onchocerciasis, trypanosomiasis, and yellow fever.

The final category—*water-related insect vectors*—includes those diseases spread by insects that breed or feed near contaminated water, such as malaria, onchocerciasis, and dengue fever. These diseases are not typically associated with lack of access to clean drinking water or sanitation services, and they are not included here in estimates of water-related deaths. It must be noted, however, that their spread may be facilitated by the construction of large-scale water systems that create conditions favorable to their hosts.

## Measures of Illness from Water-Related Diseases

As tragic and unnecessary as are water-related deaths, there are other significant health consequences of failing to provide adequate water services. These consequences include morbidity, lost workdays, missed educational opportunities, official and unofficial health care costs, and draining of family resources. These are poorly understood and even more poorly measured and assessed. Nonetheless, there are a variety of ways of reporting on the prevalence and severity of illnesses that result from water-related diseases. The most common ways have been morbidity (number of reported incidents of sickness) and mortality (deaths). These measures, however, have some important limitations. There is a significant difference (in both perception and economic impact) of a death of a child, who may lose decades of productive life, and the premature death of an older person, who may lose a few months or years to a late-developing disease. Illnesses that cause blindness or other incapacitating effects should be considered—and measured—differently than illnesses that are only temporarily or mildly debilitating.

In 1993 the Harvard School of Public Health in collaboration with the World Health Organization and the World Bank began a new assessment of the “global burden of disease” (GBD). This effort introduced a new indicator—the “disability adjusted life year” (DALY)—to quantify the burden of disease. The DALY is a measure of population health that combines in a single indicator years of life lost from premature death and years of life lived with disabilities. One DALY can be thought of as one lost year of “healthy” life. International policy interest in such indicators is increasing, and the WHO *World Health Reports* now use this as a basic measure of well-being and health (Mathers et al. 2003).

Table 1.2 lists deaths and DALYs from selected water-related diseases, as reported by the World Health Organization for 2000. This table excludes diseases associated with insects (water-related insect vectors) such as malaria and dengue. As Table 1.2 shows, total estimated DALYs associated with water-related diseases exceed 75 million annually. The vast majority of these are the result of diarrheal diseases. We do not discuss the broader health consequences of these diseases except to note their importance and to urge that better data be collected on the true economic and social costs of the failure to provide adequate water of appropriate quality.

## Mortality from Water-Related Diseases

Deaths from water-related diseases are inadequately monitored and reported. A wide range of estimates is available in the public literature, ranging from 2 million to 12 million deaths per year (see Table 1.3). Current best estimates appear to fall between 2

**TABLE 1.2** Annual Deaths and DALYs from Selected Water-Related Diseases

	<b>Deaths</b>	<b>DALYs</b>
Diarrheal diseases	2,019,585	63,345,722
Childhood cluster diseases		
Poliomyelitis	1,136	188,543
Diphtheria	5,527	187,838
Tropical-cluster diseases		
Trypanosomiasis	49,129	1,570,242
Schistosomiasis	15,335	1,711,522
Trachoma	72	3,892,326
Intestinal nematode infections		
Ascariasis	4,929	1,204,384
Trichuriasis	2,393	1,661,689
Hookworm disease	3,477	1,785,539
Other Intestinal Infections	1,692	53,222
<b>TOTAL</b>	<b>2,103,274</b>	<b>75,601,028</b>

Notes: DALYs: The DALY is a measure of population health that combines in a single indicator years of life lost from premature death and years of life lived with disabilities. One DALY can be thought of as one lost year of “healthy” life. This table excludes mortality and DALYs associated with water-related insect vectors, such as malaria, onchocerciasis, and dengue fever. Trachoma: While few deaths from trachoma are reported, approximately 5.9 million cases or 3.9 million DALYs of blindness or severe complications occur annually.

Source: World Health Organization 2001.

and 5 million deaths per year. Of these deaths, the vast majority is of small children struck by virulent but preventable diarrheal diseases.

The current best estimate of water-related deaths from diarrheal diseases is around 2 million per year (as shown in Table 1.3), but this estimate must be qualified. First, huge numbers of cases of diarrheal diseases are not reported at all, suggesting that some—perhaps many—deaths may be misreported as well. Second, deaths are categorized by the primary diseases, but it is well known that diarrhea is a contributing cause of death in many circumstances (Box 1.4). Third, other deaths from water-related diseases are also poorly monitored in some places and for some diseases.

## Scenarios of Future Deaths from Water-Related Diseases

The number of deaths anticipated from water-related diseases over the next two decades depends on many factors, including total global population, the relative rates of mortality from various diseases, the incidence of those diseases, interventions on the part of the health community, and future efforts to change these factors.

Current projections of population growth worldwide are available from several sources, including the United Nations and the United States (U.S.) Bureau of the Census. In addition, each of these sources provides a range of estimates to account for uncertainty and changes in birth and death rates in the future.

According to the U.S. Bureau of the Census international data group and United Nations population estimates, the global population between 2000 and 2020 will grow from just over 6 billion to as much as 7.5 billion, with most of the increase in developing countries of Africa and Asia (United Nations 2000b, U.S. Census Bureau 2002). Pro-

**TABLE 1.3** Estimates of Water-Related Mortality

Source	Deaths per Year (millions)
World Health Report WHO 2001	2.1 (diarrheal and other water-related deaths)
World Health Organization 2000	2.2 (diarrheal diseases only)
World Health Organization 1999	2.3
WaterDome 2002	more than 3
World Health Organization 1992	4
World Health Organization 1996	more than 5
Hunter et al. 2000	more than 5
UNDP 2002	more than 5
Johannesburg Summit 2002	more than 5
Hinrichsen et al. 1997	12

## Notes:

- WHO 2001. The “version 2” update of the *World Health Report* notes 2 million diarrheal deaths and another 100,000 deaths from intestinal nematodes, childhood “cluster” diseases, and tropical diseases associated with unsafe water.
- WHO 1996. “Every year more than five million human beings die from illnesses linked to unsafe drinking water, unclean domestic environments and improper excreta disposal.”
- Johannesburg Summit 2002. “More than 5 million people die each year from diseases caused by unsafe drinking water, lack of sanitation, and insufficient water for hygiene. In fact, over 2 million deaths occur each year from water-related diarrhea alone. At any given time, almost half of the people in developing countries suffer from water-related diseases.”
- WHO World Health Report 1999. Statistical Annex. Totals of 2.3 million excluding several diseases.
- WaterDome 2002. “More than 3 million die from diseases caused by unsafe water... . Currently, about 20 percent of the world’s population lacks access to safe drinking water, and more than 5 million people die annually from illnesses associated with unsafe drinking water or inadequate sanitation. If everyone had safe drinking water and adequate sanitation services, there would be 200 million fewer cases of diarrhea and 2.1 million fewer deaths caused by diarrheal illness each year.”
- Hunter et al. 2000. “Excluding deaths from malaria and other diseases carried by water-related insect vectors, the best international estimates of total water-related disease mortality range from 2.2 to 5 million annually. We use this range in our calculations of future mortality to represent the uncertainty in projections. No “best estimate” is provided.”
- UNDP 2002. “We know it is the poor who are most affected, with 800 million people undernourished and 5 million dying each year because of polluted water, lack of sanitation, and waterborne diseases alone...”
- WHO. 1992. “Lack of sanitary conditions contributes to about two billion human infections of diarrhea with about 4 million deaths per year, mostly among infants and young children.”
- Hinrichsen, D., Robey, B., and Upadhyay, U.D., 1997. “Water-borne diseases are “dirty-water” diseases—those caused by water that has been contaminated by human, animal, or chemical wastes. Worldwide, the lack of sanitary waste disposal and of clean water for drinking, cooking, and washing is to blame for over 12 million deaths a year.” This estimate seems high and may mistakenly include deaths from malaria and other diseases not associated with inadequate and unsafe drinking water and sanitation.

**Box 1.4** A Comment on Fatalities from Diarrheal Diseases

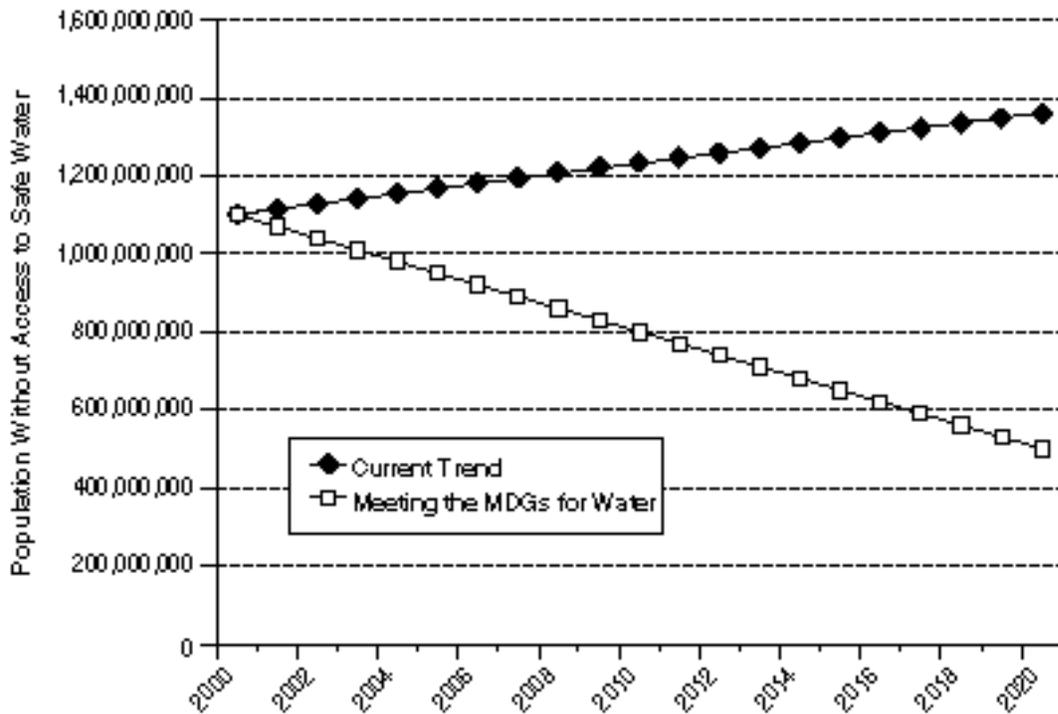
A very large (but uncertain) number of deaths result every year from diarrheal diseases that occur in conjunction with non-water-related diseases, such as measles and AIDS. When this occurs, deaths are categorized by the primary disease. Thus, many cases of early death that may be caused by lack of access to clean water and proper sanitation are not included in the estimate of approximately 2 million diarrheal deaths each year.

jections of future water-related deaths will depend on these future population estimates as well as a wide range of other factors.

Two scenarios are presented below as simple ways to think about the consequences of these factors, including meeting the United Nations Millennium Development Goals for water. Unfortunately, there is no consensus on the best way forward toward these goals. Traditional thinking says that large financial commitments for centralized infrastructure will be required (Camdessus 2003). Yet there is a growing realization that the funds for such investments are not being made available, that past infrastructure investments have not satisfied the objectives of universal coverage, and that alternative approaches may be more effective, faster, and less expensive. The more expensive estimates assume a cost of around \$500 per person—typical of the costs of centralized water systems in developed countries—while field experience suggests that safe and reliable water supply and sanitation services can be provided in urban areas for \$35 to \$50 per person and in rural areas for less than that when local communities build appropriate-scale technology (WSSCC2000). The lack of agreement about how best to proceed, however, makes it increasingly unlikely that the goals will be met.

### Scenario A: No Action: Proportional Deaths

A relatively simple estimate of future deaths from water-related diseases comes from assuming that the current proportion of deaths to the population without access to safe water services today will remain constant and that the population without access to water services will grow in proportion to global population growth. Currently, approximately 18 percent of the world's population lacks access to safe drinking water



**FIGURE 1.1** Future populations without access to safe water, with and without the MDGs.

(1.1 billion people out of a total of 6 billion in the year 2000). As total population grows between 2000 and 2020 to around 7.5 billion, the total population without access to safe drinking water can be expected, without action on the part of the water community, to grow to over 1.3 billion. While this assumes no actions are taken to provide new access, it is also not the worst case because it ignores the fact that the populations without access to water may be growing at a faster rate than the world average.

If the total annual death toll from water-related diseases remains proportional to the population without access to clean water (around 0.19 percent of the population without access to safe water dies annually: 2.1 million deaths per year out of 1.1 billion people), the annual death toll will reach almost 2.6 million per year in 2020, and a total of nearly 50 million people will die from these diseases between 2000 and 2020 (Figures 1.1 and 1.2).

### Scenario B: Meeting the United Nations Millennium Goals

It is reasonable to hope and assume that the MDGs will cause additional actions to be taken in the next few years to accelerate the rate at which access to safe water is provided, although as noted, the actions taken so far suggest that we will fail to meet the MDGs. Nevertheless, assuming that the Millennium Goals are met, the proportion of the population without access to safe water will drop in half by 2015. Thus, the current proportion—18 percent of the world’s population—will drop to 9 percent. In 2015, 9 percent of the world’s population will still be 650 million people without access to safe water. Extending this trend through 2020 shows that the global population will exceed 7.5 billion and that 6.6 percent will still lack basic water services—a total of approximately 500 million people.

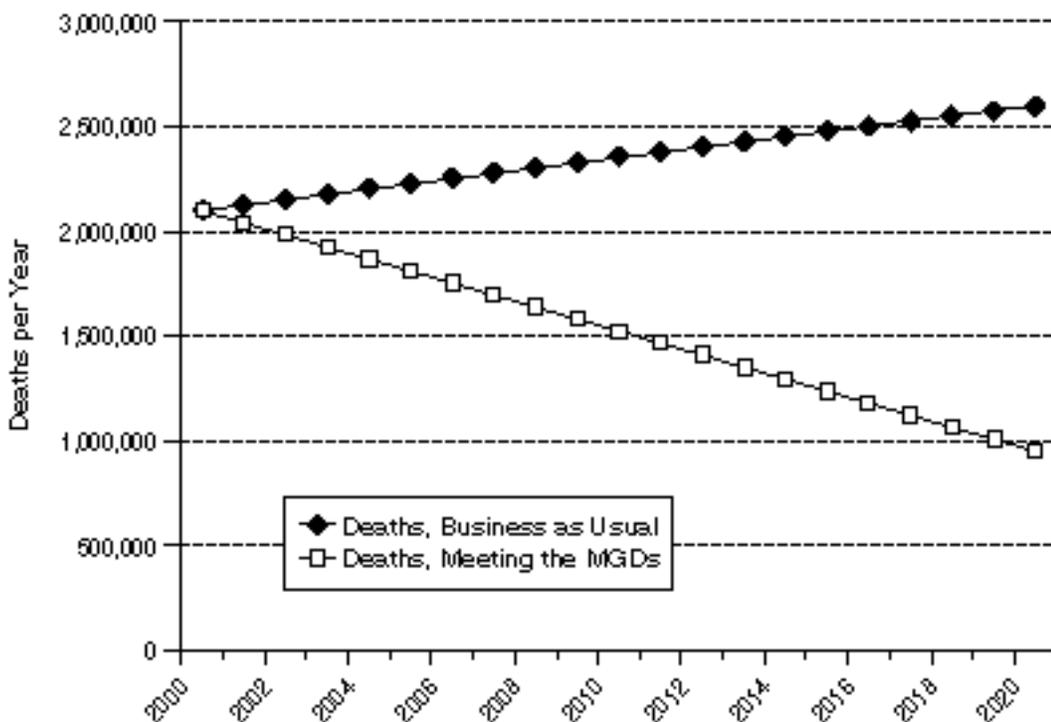


FIGURE 1.2 Annual deaths from water-related diseases, with and without the MDGs.

Figure 1.1 shows the downward curve of population without access to safe water associated with meeting the MDGs compared to the population without access to safe water associated with Scenario A. If the ratio of deaths to the population without access to safe water remains the same, at around 0.19 percent annually, the total number of deaths from water-related diseases will drop to around 1 million per year. Summing the number of deaths between 2000 and 2020 gives a total of 32 million deaths (Figure 1.2). While this scenario represents 18 million fewer cumulative deaths than Scenario A, it still represents a tragedy of an extreme order.

## Conclusions

The failure to meet basic human needs for water is widely acknowledged to be a major development failure of the twentieth century. In recognition of this failure, the United Nations and the world community adopted a set of ambitious development goals to try to address unmet issues of poverty and human development, including two goals to provide safe and reliable access to water and sanitation services. Despite this laudable goal, and fine rhetorical efforts, practical actions and commitments to provide universal coverage for water and sanitation continue to be inadequate. The price for this will be paid by the poorest populations of the world in sickness, lost educational and employment opportunities, and for a staggeringly large number of people, early death. Even if the official Millennium Goals set for water are met—which is unlikely given the current level of commitments by national governments and international aid agencies—as many as 32 million people, and perhaps many more, will die by 2020 from preventable water-related diseases. This is morally unacceptable in a world that values equity and decency. At present, it appears unavoidable.

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