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# The Case for Water and Sanitation

## **Better Water and Sanitation Make Good Fiscal and Economic Sense, and Should be Prominent in PRSPs and Budget Allocations**

How hard does public expenditure 'work' for the water and sanitation sector? Does it bring benefits that outweigh the costs? This note presents a series of arguments for governments to invest in the sector, based on evidence which shows that water supply and sanitation improvements result in quantifiable benefits with substantial direct economic value, and reduce the need for public expenditures in other sectors. The paper also argues that, because of the nature of the benefits they bring, water supply and sanitation are strategic tools in poverty alleviation.

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All sectors compete for allocations in national and local government budgets. A major consideration in the allocations is the extent to which public expenditure 'works' for a particular sector: does it bring benefits that outweigh the costs? If so, by how much? Does it offer good returns on investment? Does it result in single or multiple impacts? Does it contribute significantly to poverty reduction? Essentially, what is the economic, fiscal and political sense of spending public money on the water and sanitation sector?

This paper makes the case that **water supply and sanitation are star performers**. They:

1. result in quantifiable benefits with substantial direct economic value;
2. are cost-effective, with benefits outweighing costs by a factor of more than ten;
3. reduce the need for public expenditures in other sectors, such as curative health services, and make expenditures in others, such as education, more effective;
4. stimulate a chain reaction of economic growth and poverty alleviation; and,
5. are highly valued by the poor.

A review of available literature and country experiences makes the case that improvements to water supply and sanitation provide benefits from:

- ◇ **improving health, and therefore worker productivity**
- ◇ **increasing the number of years people live, and thus the amounts they earn over their lifetimes**
- ◇ **ensuring that children attend school**
- ◇ **facilitating small industry and market gardening**
- ◇ **reducing the amounts people spend to cope with inadequate facilities**
- ◇ **offering dignity, privacy and social status.**

Because of the nature of the benefits they bring, water supply and sanitation are both strategic tools in poverty alleviation, and also reduce the amounts that governments must spend in other sectors. This note presents a series of arguments for investing in this sector, starting with the issue most often associated with water and sanitation – improved health.

### Box 1: WSS a top-ten global priority

Improvements in water supply and sanitation figured prominently in the recent **Copenhagen Consensus** at which a panel of leading economists ranked water and sanitation projects among the top ten most cost-effective ways to advance global welfare.

A panel of eight of the world's most distinguished economists was convened in a project organized by Denmark's Environmental Assessment Institute with the cooperation of *The Economist*. The panel was invited to consider the question: "What would be the best ways of advancing global welfare, and particularly the welfare of developing countries, supposing that an additional US\$50 billion of resources were at governments' disposal?"

The panel was to set priorities among a series of proposals for projects which would confront ten great global challenges (civil conflicts, climate change, communicable diseases, education, financial stability, governance, hunger and malnutrition, migration, trade reform, and water and sanitation). The panel members ranked the projects in terms of economic costs and benefits.

Projects in the sanitation and water sector scored highly, being categorized as 'good' in terms of desirability and impact with respect to costs. Community-managed water and sanitation occupied the seventh position in the ranking (out of thirty projects considered).

*Copenhagen Consensus:*  
The Results from [www.copenhagenconsensus.com](http://www.copenhagenconsensus.com)

## Argument 1

### **Water and sanitation are important for good health, and a healthy population is vital for economic growth**

The benefits of water supply and sanitation improvements are most often thought of in health terms, and it is true that reduction of disease is one of most immediate and direct impacts. Access to clean water in sufficient quantities reduces the risk of a host of diseases, particularly diarrhoeal diseases such as cholera and bacillary dysentery. Better sanitation reduces worm infestations such as hookworm, which causes anaemia and fatigue. Coupling water supply and sanitation with hygiene education further reduces disease. The 1993 World Development Report (WDR) stated: “The lack of water supply and sanitation is the primary reason why diseases transmitted via feces are so common in developing countries”.<sup>1</sup>

The 1993 WDR estimated that the most important of these diseases, **diarrhoea and intestinal worm infections, account for 10 percent of the total burden of disease in developing countries.** This represents an annual loss of 117 million Disability Adjusted Life Years (DALYs).<sup>2</sup> It was further estimated that improved water supply and sanitation services would reduce the diarrhoeal and worm disease burden by 40 percent, or 11.4 DALYs for every 1000 people annually. Since each DALY represents a year in which a worker cannot work due to sickness or premature death, this means that every 1000 people would include 11 additional healthy and productive persons.

But does reducing disease burden really have an economic impact?

Yes it does, concludes a 2001 report by a World Health Organization Commission<sup>3</sup> tasked with examining the links between macroeconomics and health. The Commission observes that “the economic costs of avoidable disease, when taken together, are staggeringly high”, and that **societies with a heavy burden of disease tend to experience severe impediments to economic progress.** The report points out that the great ‘takeoffs’ in economic history (the Industrial Revolution in Britain and the rapid growth of Japan in the early 20<sup>th</sup> century) were all supported by improved public health, disease control and greater nutritional intake.

But given that diseases caused by poor water supply and sanitation affect mostly children and infants, are the economic impacts still significant?

The WHO Commission established that **reducing infant mortality is key to economic growth,** for a variety of reasons:

- Societies with high rates of infant and child mortality have higher rates of fertility, and large numbers of children reduce the ability of poor families to invest in health and education, resulting in an under-trained, under-productive workforce.
- Lowering infant mortality rates tends to lower, not raise, population growth over the long run, as people adjust to having smaller families. When this happens, the average age of the population rises, and the each worker is supporting fewer dependents. This boosts overall per-capita GNP and economic growth. The rising proportion of the population at working age also raises GNP per capita.

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<sup>1</sup> United Nations, 1993.

<sup>2</sup> DALYs are calculated as a combination of a) discounted and weighted years of life lost as a result of death at a given age and b) disability as a result of sickness, adjusted by severity.

<sup>3</sup> WHO, 2001.

There is evidence of a link between economic growth and infant mortality, and that countries with high infant mortality experience lower economic growth. The WHO Commission examined the growth rates of several dozen countries, with a range of infant mortality rates, between 1965 and 1994. Those which started out with lower infant mortality rates experienced higher economic growth. For instance, among the poorest countries, those with an initial infant mortality rate of between 50 and 100 per live births recorded an average growth rate of 3.7 percent per year, while those with an infant mortality rate greater than 150 recorded an average growth rate of only 0.1 percent per year.<sup>4</sup> Among the countries with the highest infant mortality, many recorded negative growth in GDP.

The WHO Commission Report also identifies other ways in which better health have economic impacts:

**Worker productivity. Healthier workers are more energetic and robust, more productive, and earn higher wages.** Their productivity makes companies more profitable and a healthy workforce is important when attracting foreign investment. A high incidence of disease among the labour force causes high turnover and absenteeism, and firms must often hire and train more than one worker per position, driving their costs up and their returns down.

**Longer lives.** There are important gains in economic well-being from increased longevity, or longer lives. In healthier countries, people live much longer, so their lifetime earnings are therefore much higher. Longer-lived households will also tend to invest a higher proportion of their incomes in education and financial saving, because their longer time horizon allows them more years to reap the benefits of such investments. The WHO Commission report cites the fact that **each 10 percent improvement in life expectancy at birth is associated with a rise in economic growth of at least 0.3 to 0.4 percentage points per year.**

Health status seems to explain an important part of the difference in economic growth rates in Africa: the Commission report cites a recent study which found that more than half of Africa's growth shortfall relative to the high-growth countries of East Asia could be explained by disease burden, demography and geography.<sup>5</sup> The Commission concludes: "because disease weighs so heavily on economic development, investing in health is an important component of an overall development strategy." **The health sector alone cannot produce good health; other sectors too, including the water and sanitation sector, have a vital role to play.**

WHO recently published a report that puts monetary values on some of the health benefits of water and sanitation improvements.<sup>6</sup> As well as quantifying the value of productive days gained by workers and schooldays gained by children who are not ill or dead, the WHO study calculated a monetary value of the patient care costs and health sector treatment costs averted. These calculations were conservatively based on a reduced incidence of diarrhoeal disease only – assuming that this is the primary cause of water and sanitation-related morbidity. Reductions in disease were estimated for different scenarios, from halving the number of people without a basic level of access to water and sanitation (that is, meeting the Millennium Development Goals – MDGs<sup>7</sup>), through providing basic access to all, to installing full piped water supply and sewerage systems for everyone.

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<sup>4</sup> WHO, 2001.

<sup>5</sup> David Bloom and Jeffrey Sachs, 1998.

<sup>6</sup> Guy Hutton and Laurence Haller, 2004.

<sup>7</sup> The Millennium Development Goals commit all the member states of the United Nations to a series of development goals to be achieved by 2015, including halving the number of people without access to safe water and basic sanitation.

The WHO projects that achieving the MDGs in Africa would result in 173 million cases of diarrhoea being avoided every year, and that providing a basic level of access to all would result in 245 million avoided cases. The value of the productive days not lost due to these averted illnesses (using minimum wage as the value of working time) is US\$116 and US\$168 million a year, respectively. The averted costs of health sector treatment were estimated as US\$1.695 billion per year if the MDGs were met, and US\$2.410 billion if everyone had basic access.

These costs were calculated using unit costs from WHO regional databases, and include both outpatient visits and hospital stays, assuming that about 8 percent of cases are hospitalised and the average length of stay is 5 days. Depending on a country's health care system, these treatment costs may be borne by the State, the patient, or the patient's employer. In addition to treatment costs, there are patient care costs (which are almost always borne by the patient's family), including include transport to a health facility, food and drink, and the cost of time spent caring for a sick relative. The value of these avoiding these costs was estimated to be US\$107 million if the MDGs were met, and US\$152 million if everyone had access to water supply and sanitation.

The value to the economy of Africa of avoiding disease, even one as relatively inexpensive to treat as diarrhoea, is thus enormous.

## Argument 2

### **Education is crucial for economic growth, and the impact of water and sanitation on education is critical**

Not only do healthy children attend school more, and get more out of it, but **schools that have water and sanitation facilities attract and retain more students**, particularly girls.

Once again, the contribution of water supply and sanitation to health plays an important role. The WHO estimates that a staggering 99 million schooldays, resulting from fewer incidents of diarrhoea, would be gained annually in Africa if the MDGs are met.<sup>8</sup> This means that African children would spend, overall, an extra 270,000 years in school every year due to fewer incidents of diarrheal disease alone – the equivalent of 270,000 students attending a full year of school instead of being home sick. In addition, health and nutritional status are important predictors of cognitive and educational achievement test results. This appears to be particularly true of intestinal parasites such as hookworm, which impede child development.

Studies have shown that children with intense worm infections perform poorly in learning ability tests, cognitive function and educational achievement, and that heavy infections can result in a six-month delay in development. Some infected children attend school only half as much as their uninfected peers.<sup>9</sup> In schools where students were treated for hookworm, roundworm and schistosomiasis, higher attendance rates were reported, and severe anaemia reduced.<sup>10</sup> Better sanitation can break the transmission routes for hookworm and roundworm, and prevent infections in the first place.

The impact of better water supply and sanitation on education goes beyond health. At the moment, one in four girls does not complete primary school, compared with one in seven boys. There are two ways poor water and sanitation contribute to this. First, girls bear the burden of water collection, which may take

<sup>8</sup> Guy Hutton and Laurence Haller, 2004.

<sup>9</sup> Quoted in *Public health at a Glance: School Deworming* on [www.worldbank.org](http://www.worldbank.org)

<sup>10</sup> WHO, 2001.

them many hours a day, leaving them no time or energy for school. Secondly, **girls, particularly those old enough to menstruate, are reluctant to attend schools without toilets, and their parents are reluctant to send them.**

The lack of girls in school is particularly damaging to the economy of a country. Research shows that for every 10 percent increase in female literacy, a country's economy can grow by 0.3 percent.<sup>11</sup> Educated girls are more likely to raise healthy, well-nourished, educated children, to protect themselves from exploitation and AIDS, and to develop skills to contribute to their societies.<sup>12</sup> **Educating girls is good economics, and you can't do it without improved water and sanitation.**

### Argument 3

#### **Better water supply and sanitation facilitate small industry**

Improved water supply can stimulate small industry, especially at the cottage-industry level; industries too small to be able to construct their own water supply and sanitation facilities if these are lacking. The list of entrepreneurial activities for which clean water is vital is long: for instance: brick making, beer brewing, tea selling, handicrafts, hairdressing, clothes laundering, and pottery.

Better domestic water supply can also make market gardening and small livestock rearing feasible, which, as well as enhancing food security, can be lucrative. For instance, small vegetable gardens as a result of a water project in Zimbabwe were shown to provide produce valued at up to US\$2000 per year,<sup>13</sup> and post healthy financial rates of return of between 11 and 15 percent. In Nicaragua, farm income rose by between 10 and 115 percent after wells were dug and simple rope pumps installed at homesteads.<sup>14</sup>

Both cottage industries and market gardening are often the domain of women, so stimulating them may have significant impact on gender equality, and enhance the status of women.

Better water and sanitation may also have positive impacts on a much larger industry which has a sizable impact on economic growth – tourism. The perception that countries are risky places to visit in health terms hampers tourism. Studies in South Asia estimate that this factor could cost as much as US\$5.7 million of tourist revenues a year in Nepal,<sup>15</sup> and up to US\$283 million in India.<sup>16</sup>

### Argument 4

#### **Poor water supply and sanitation cost people time and money**

In the absence of good and reliable water supply, **many families are forced to incur direct out-of-pocket costs in order to purchase water from vendors**, store water in their houses, or disinfect dirty water by boiling or chemically treating it. These costs, particularly the cost of purchased water, can be considerable. They also tend to be inequitable, as poor people are much more likely to have to pay high prices for water from vendors – often many times the prices paid by the non-poor. For example, it

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<sup>11</sup> Gideon Burrows, Jules Acton and Tamsin Maunder, 2004.

<sup>12</sup> UNICEF, 2004.

<sup>13</sup> Brian Mathew, 2003.

<sup>14</sup> J.H.Alberts and J.J. van der Zee, 2003.

<sup>15</sup> Meera Mehta, 2000.

<sup>16</sup> Carter Brandon and Kirsten Homman, 1995.

estimated that in the informal settlements of Nairobi, users pay US\$0.13 per 20 litre jerry can, or over US\$6.00 per cubic meter, for water during times of shortage – higher than water rates practically anywhere else in the world, and twenty times the amount paid for the same volume of water by those with piped connections.<sup>17</sup> Reducing these payments will without doubt have a positive economic benefit as this money is directed elsewhere, for instance, to finance children's education, or investments in housing.

According to the WHO report, the largest quantifiable benefits from improved water supply and sanitation come from the value of the time saved by having facilities closer to home. These are estimated at between 16 and 35 billion dollars a year in Africa, depending on the number of people served (again, using minimum wage as the value of time).<sup>18</sup> This represents about 70 percent of the total estimated economic benefits. Of the millions of days spent each year in fetching water, it is safe to assume the majority are spent by women. The role of improved water supply and sanitation in freeing women's time and reducing their drudgery is thus important. Aside from the possible economic value of the extra time accrued, **women who spend less of their day carrying water have more time and energy to put into the care of children, their own well-being and education – all of which have a positive impact on economic growth.**

## Argument 5

### **Improved water supply and sanitation are crucial in the fight against AIDS**

Of particular importance to Africa, is the fact that **access to water supply and sanitation prolongs the lives of people living with AIDS.** The epidemic has reached a point in its cycle when those who are HIV positive are starting to fall sick, and are vulnerable to opportunistic infections, including diarrhoeal diseases and skin diseases. In the words of Nkululeko Nxesi, the director of the South African National Association of People Living with AIDS (NAPWA): "In order for HIV-infected people to remain healthy as long as possible and for people with AIDS to reduce their chances of getting diarrhoea and skin diseases, adequate water supply and sanitation are of the utmost importance."<sup>19</sup>

## Argument 6

### **Improved water supply and sanitation are priorities for the poor**

Participatory Poverty Assessments (PPAs) generally show water and sanitation to be a high priority for the poor. In fact, the poor do not view water supply and sanitation merely in terms of their impact on health or education, but rather as intrinsically desirable goods because of the dignity, privacy, convenience and social status they offer. For people living in poverty, improved water supply and sanitation facilities are not merely means to an end, but themselves outcomes in poverty reduction.

The high priority that the poor place on water supply and sanitation has led some countries to use this as a rationale for allocating significant investment funds to them. For instance, when in Uganda the PPA showed safe water to be a major concern of the poor, the government allocated one-third of the debt relief funds the country received under the Heavily Indebted Poor Countries (HIPC) initiative to

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<sup>17</sup> Shagun Mehrotra and Alain Morel, 2004.

<sup>18</sup> Guy Hutton and Laurence Haller, 2004.

<sup>19</sup> Eva Kamminga and Madeleen Wegelin-Schuringa, 2003.

improving water supply and sanitation.<sup>20</sup> In some countries, the importance of water and sanitation to the poor is a major electoral issue.

### Box 2 “No Water, No Vote!”

In Teshie, an old fishing village that is now a suburb of the Ghanaian capital Accra, residents buy water by the bucket from private vendors because their taps have been dry for five years. They are fed up with the situation and have threatened not to vote in parliamentary and presidential elections due in December unless the government does something to resolve the crisis.

“This water crisis has affected the whole economy of my area. Food prices have shot up. Some petty traders have stopped selling food because of high water prices. Truancy among school kids is on the increase.” says Samuel Ayi Tettey, a local assembly representative in Teshie. Now posters and banners have begun appearing all over town with the slogan: “No Water, No Vote.”

“That is the voice of the people!” Tettey declared. “Most of the residents say they will not vote if the water situation remains the same. It shows public disappointment in politicians who come and go but do nothing about our plight”.

*Quoted on www.irinnews.org, July 4 2004. UN Office for the Coordination of Humanitarian Affairs*

## Summary

### Investing in water supply and sanitation brings substantial economic returns, and reduces costs in other sectors

The WHO report quantifying the benefits of water and sanitation improvements in monetary terms showed clearly that the values are enormous – in the order of US\$44 billion in Africa if everyone had basic access to water supply and sanitation, and US\$22 billion if the MDGs for water and sanitation were met. Furthermore, the analysis compared the benefits with costs and found that **investments in water and sanitation have a high rate of return: the benefit cost ratio is always greater than one, and in Africa it is greater than 10.**<sup>21</sup>

Table 1 summarized the economic cost benefit analysis performed by the WHO. In both cases, that of meeting the MDGs, or providing access to basic water and sanitation for all, the ratio of economic benefits to the costs is approximately 11.

The benefit cost ratio of 11 means that **for every US\$1 invested in the sector, US\$11 of benefits are realised.**<sup>22</sup>

This analysis does not take into account a number of important benefits that are difficult to quantify, meaning that the benefit cost ratio is probably even higher.<sup>23</sup> These benefits include:

- the health impact of water and sanitation related diseases other than diarrhoea (worm infestations, skin diseases, etc.);
- the cost of household water treatment avoided (boiling, for instance);
- the costs avoided due to reduced reliance on commercial water sources (bottled water, or water sold at high prices by kiosks and vendors, for instance);

<sup>20</sup> Meera Mehta, 2002.

<sup>22</sup> Ideally, it would be possible to compare this ratio to the impact of an investment in another sector, for instance roads or electricity. However, little research exists to support such comparisons. This is an area for further investigation.

<sup>23</sup> However, this would be somewhat balanced by the fact that the use of the minimum wage to value time saved could be argued to be an overestimate.



- the availability of water for small industry or gardening;
- capacity building at local level which occurs when communities come together to install and manage better water supply facilities; and,
- providing people with dignity, privacy, convenience and a sense of social status.

**Table 1: Summary of the Benefits and Costs of Improved Access to Water Supply and Sanitation in Africa<sup>24</sup>**

	<b>Meeting MDGS</b>	<b>Providing access to basic water and sanitation for all</b>
<b>Impact of Improved Access to Water Supply and Sanitation</b>		
Case of diarrhoea avoided annually	173 million cases	245 million cases
Productive days gained annually	456 million days	647 million days
Value of productive days gained annually	US\$116 million	US\$168 million
Health sector treatment costs averted annually	US\$1,695 million	US\$2,410 million
Value of time saved	US\$15,877 million	US\$33,972 million
Schooldays gained annually	99 million schooldays	140 million schooldays
<b>Economic Benefit Cost Analysis</b>		
Cost of interventions per year	US\$2,020 million	US\$4,040 million
Total Economic Benefits per year <sup>25</sup>	US\$22,910 million	US\$44,040 million
Benefit Cost Ratio	11	11

*Dollar values as at 2000*

The positive economic benefits of water supply and sanitation are also apparent in the analyses carried out recently for World Bank-financed projects in Africa. In Ghana, Nigeria and Ethiopia, a calculation of the expected Internal Rate of Return (IRR)<sup>26</sup> of planned projects was between 16 and 25 percent, well above the IRR required for a viable project. The benefits that were quantified to calculate the rates of return included welfare benefits as well as the value of time saved and increased water sales.<sup>27</sup>

Improvements to water supply and sanitation also bring fiscal benefits, as investments in this sector reduce costs in other sectors. The most obvious of these is the curative health sector. The WHO estimates that meeting the MDGs would save almost US\$1.7 billion annually in Africa in treatment costs for diarrhoea alone, or more than US\$1.60 per capita.<sup>28</sup> (These savings alone are 84 percent of the investment costs of meeting the MDGs.) Some of these treatment costs are, of course, borne by private individuals, but much of the bill is paid by governments through the health system. With African health systems straining – particularly to meet the needs of AIDS sufferers – eliminating the cost of treating avoidable diarrhoea makes sense.

The other major impact on government spending is the increased effectiveness of education for children who are healthy, and the increased attendance at schools with water and sanitation facilities. African governments cannot afford the burden of paying for children to repeat grades in school because they have

<sup>24</sup> Guy Hutton and Laurence Haller, 2004.

<sup>25</sup> Includes health sector benefit, patent expenses avoided, deaths avoided, time savings, productive days gained, school attendance gained, child days gained.

<sup>26</sup> The interest rate that is equivalent to the returns (quantified in monetary terms) expected from the project

<sup>27</sup> Project Appraisal Documents of World Bank-financed projects

<sup>28</sup> Guy Hutton and Laurence Haller, 2004.

had trouble learning, nor can they afford to finance schools which do not reach their full attendance capacity. A third fiscal impact is on spending on small enterprise development – this is wasted if those enterprises cannot flourish without water supply.

## Conclusion

### **Water supply and sanitation should be given prominence in Poverty Reduction Strategy Papers (PRSPs) and budget allocations**

The evidence is overwhelming that water supply and sanitation are investments which more than pay for themselves over time while reducing poverty and ensuring a better quality of life. But how to make sure that water supply and sanitation take their rightful place in a country's development strategy, and how to secure financing?

**Giving water supply and sanitation a prominent position in the PRSPs is an effective way to state the intention to place them on the development agenda, to set goals for their improvement, and to indicate the investments that are required.<sup>29</sup>**

As the PRSP secures national spending on priority sectors and provides a link to the budget cycle through a medium-term expenditure framework, it provides the opportunity to turn broad plans for the sector reform and investment into implementation strategies and time-bound, costed action plans. The PRSP process also enables countries to move from a series of fragmented projects to a country and sector-wide approach under government leadership with a clear poverty focus, pooled funding and sectoral budget support

Improvements to water supply and sanitation should take their place as essential components of a poverty reduction strategy, but a great deal of thought must be given to developing strategies to invest in them. The investment needed is huge, and resources will always be short – so it is important to use available funds as efficiently as possible. Relying on expensive urban technology (full piped water and sewerage) is likely to burn up resources without achieving large increases in coverage, and thus without realising the full extent of the benefits described in this paper. It is thus necessary to 'think outside the box' in terms of innovative ways to make funds go as far as possible, and to leverage other resources.

Governments must use low-cost and innovative technology and take advantage of the impact of inexpensive interventions such as hygiene education. Governments and aid agencies must also be willing to use innovative financing mechanisms and stimulate household investments in water and sanitation. With commitment and imagination, the enormous potential of water supply and sanitation to improve the lives of millions can be realised.

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<sup>29</sup> Mehta, Meera and Thomas Fugelsnes, 2004.

## List of Useful Websites

### World Health Organization

Macroeconomics and Health

<http://www.who.int/macrohealth/en/>

### Water Supply and Sanitation Program

<http://www.wsp.org>

“Meeting the Financing Challenge for Water Supply and Sanitation”

<http://www.wsp.org/publications/FINANCE%20REVIEW%20PRESS.pdf>

Financing Sanitation

[www.wsp.org/publications/af\\_finsan\\_mdg.pdf](http://www.wsp.org/publications/af_finsan_mdg.pdf)

“Water Supply And Sanitation In PRSP Initiatives: A Desk Review of Emerging Experience in Sub-Saharan Africa”

[http://www.wsp.org/pdfs/af\\_prsp.pdf](http://www.wsp.org/pdfs/af_prsp.pdf)

### World Health Organization

“Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level”

[http://www.who.int/water\\_sanitation\\_health/wsh0404/en/](http://www.who.int/water_sanitation_health/wsh0404/en/)

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