

Tackling the silent killer

The case for sanitation



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Photos: The front cover image shows a site of open defecation in Dhaka, Bangladesh (WaterAid/Kate Eshelby). The image on the back cover shows the state of sanitation facilities in a community in Antananarivo, Madagascar (Brent Stirton).

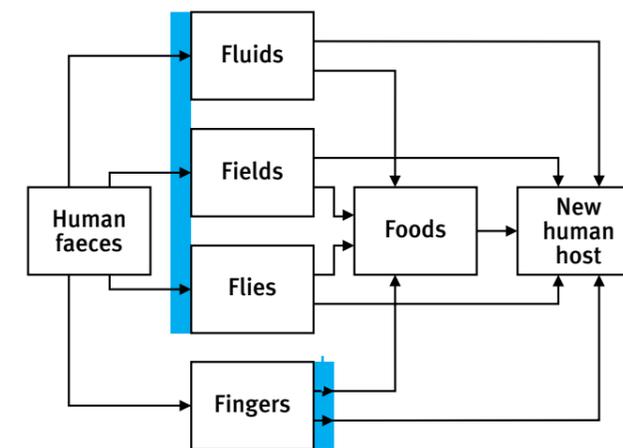
Introduction

This paper does not seek to privilege sanitation at the expense of other sectors. Rather, it seeks to prioritise sanitation, alongside safe water, as part of an integrated approach to development.

What do we mean by sanitation?

In line with the definition of sanitation agreed for the International Year of Sanitation,¹ in this paper ‘sanitation’ includes both safe disposal of excreta and improved hygiene. Both are essential barriers that prevent the transmission of disease by the faecal-oral route, as shown in this diagram:

The effective separation of faeces from human contact through improved disposal of excreta



Good hygienic practices such as hand-washing with soap after going to the toilet

The UN’s Millennium Development Goal (MDG) sanitation target calls for ‘improved sanitation’. The WHO/UNICEF Joint Monitoring Programme (JMP) includes the following as improved sanitation:

- Flush/pour flush to a:
 - piped sewer system
 - septic tank
 - pit latrine
- Ventilated improved pit latrine
- Pit latrine with a slab
- Composting toilet

The first priority is getting onto the ‘sanitation ladder’: a simple pit latrine is preferable to open defecation. And behaviour change is critical. It is when people use a latrine, rather than when one is constructed, that the wider benefits are realised.



An example of poor sanitation in Antananarivo, Madagascar.

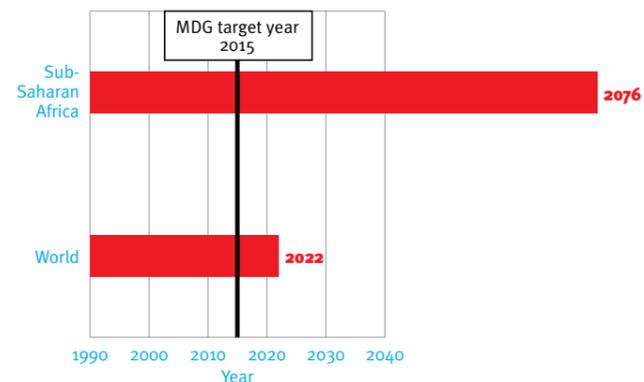
Government failure to address the global sanitation crisis

Inadequate sanitation may be the biggest killer of children under the age of five and yet it remains the most neglected of the Millennium Development Goal (MDG) sectors. Every year, 9.7 million children die before reaching their fifth birthday.² This paper asserts that improved sanitation could bring the single greatest reduction in these deaths. The existing evidence points to poor sanitation being a major factor in approximately 2.4 million child deaths annually.³

The sanitation sector is in crisis with 40% of the world's population lacking access to even basic sanitation. In 2002, an MDG target was set to reduce by half the proportion of people without access to sanitation by 2015. At current rates of progress this global target will not be met and in sub-Saharan Africa it will not be reached until 2076 (see Figure 1).

Fig 1: 60 years too late⁴

When the MDG target for sanitation will be met at current rates of progress.



The agreement of an MDG target for sanitation has failed to mobilise the necessary political will. Political neglect characterises the sanitation sector at the international and national levels. In contrast to other more visible development sectors, sanitation remains largely absent in national development plans and donor aid strategies.⁵ Low political priority plays out in chronic under-investment and weak institutional capacity.

Addressing the sanitation crisis will accelerate progress towards the health, education and economic MDGs and strengthen existing investments in these other sectors. The failure to increase access to sanitation acts as a brake on development and makes the realisation of broader development outcomes both unlikely and unsustainable.

Lack of investment in sanitation reveals a blind spot in development policy: a failure to recognise sanitation's integral role in reducing poverty.

The rationale for sanitation investments is clear and yet is overlooked by governments. While there is strong evidence that it is the single most cost-effective health intervention⁶ most governments, including donors, do not count what they are spending on it. The potential for far-reaching development outcomes is huge and yet the sanitation sector remains largely neglected by the aid system and aid recipient governments.

History demonstrates that sanitation is a powerful catalyst for public health improvements and development gains. In Europe and North America, improvements in sanitation enabled unprecedented reductions in child mortality in the twentieth century. In the UK, in the decade from 1898, sustained investment in sanitation reduced infant mortality from over 160 per 1,000 live births to below 110.⁷ And Figure 2 shows the dramatic impact on child mortality rates in the same period.

Fig 2: Driving down child mortality rates⁸

Dramatic improvements in child mortality⁹ that coincided with a peak in sanitation investments in the UK.



The same historical patterns have been seen in other parts of the world where, in short periods, huge gains in public health have been achieved. In Sri Lanka, where infant mortality fell from 141/1000 in the 1940s to 13/1000 at the beginning of this century, local government action on sanitation was a critical factor.¹⁰ Recent research has revealed the impact of sanitation as a catalyst for reducing child mortality in three East Asian developmental states.¹¹

Access to sanitation is a basic human right and must be urgently re-examined by policy makers as a means of accelerating progress across all the MDGs. It is interlinked and interdependent with other essential sectors, such as health and education, and underpins all development efforts. The neglect of the sanitation sector must end. Addressing the sanitation crisis stands to bring rapid and sustained poverty reduction.

Contrary to the experience in Europe, North America and the East Asian developmental states, policy makers continue to regard lack of sanitation as a symptom of poverty rather than as a major contributing factor.

The neglect of the sanitation crisis raises serious questions over the ability, and indeed willingness, of the international aid system and official donor community to respond to evidence by targeting development resources at the key bottlenecks that hold back human development.

Poor sanitation could be the biggest killer of children

This section considers the evidence that exists today suggesting that poor sanitation is the single biggest killer of children under the age of five in the developing world. To make a definitive claim on this requires more research to be undertaken, but the present indicators are that poor sanitation could be the greatest contributing factor to child mortality in the developing world.

The scale of the sanitation crisis is immense and its impact on child mortality profound. The WHO/UNICEF Joint Monitoring Programme estimates that 2.5 billion people – 40% of the world's population – lack access to sanitation. Poor sanitation, and the resulting contamination of water supplies and transmission of diseases, kills millions of children, yet it stands as the most neglected MDG target.

Estimates on the extent of this impact have traditionally been confined to the resulting deaths caused by diarrhoea. More recent research is now linking poor sanitation to other causes of death, suggesting the burden of child mortality is far greater than previously appreciated.

The true impact of sanitation in the developed world

This emerging evidence that links sanitation to diseases beyond diarrhoea is consistent with an effect identified by two public health engineers at the end of the nineteenth century, known as the *Mills-Reincke Phenomenon*. Mills, an American, and Reincke, an Austrian, independently discovered that the reduction in child mortality brought about by improvements in sanitation (alongside water) exceeded the number of deaths that could be attributed to diarrhoea.

More recent work¹² has estimated that for every diarrhoeal death that was averted in the US at the turn of the century by access to improved sanitation and safe water at least three more were prevented from other diseases.

What is striking is that the most significant health improvements in the developed world came about largely before the advent of widely available patient-centred treatment.

The impact of poor sanitation on child mortality

Every year, 9.7 million children die before reaching their fifth birthday. Attempting to quantify the impact of poor sanitation on child mortality is complicated. It manifests itself across a number of different fatal diseases that are themselves interlinked with different and separable causes. The figures used here are estimates based on the best evidence available that combines both rigorous research and expert opinions.

It is important to note here that establishing an accurate picture is not held back by the lack of available research techniques but rather because sanitation lies outside the priorities of major development and research funding bodies.

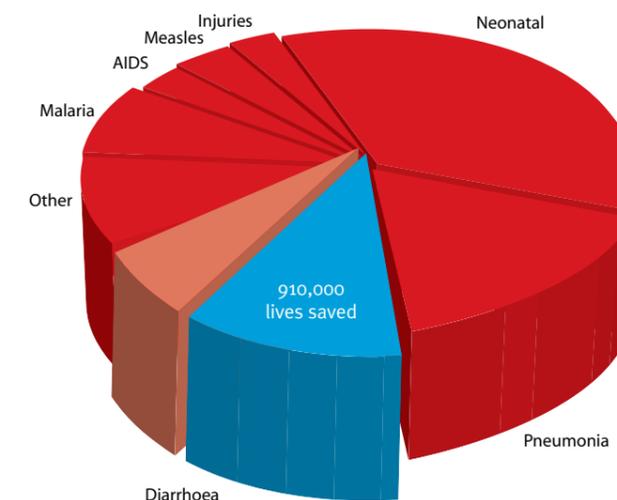
Below, the number of child deaths from diarrhoea, pneumonia and malnutrition that could be prevented with improved sanitation are discussed.

1. Sanitation could reduce the number of children who die from diarrhoea each year by approximately 910,000

Each year 1.6 million children die from diarrhoea, more than malaria, measles and HIV/AIDS combined. The WHO estimates that 88%, or 1.4 million, of these deaths are caused by poor sanitation combined with unsafe drinking water.¹³ Sanitation, as described at the beginning of this paper, encompasses the safe disposal of excreta and associated hygiene, both of which have the potential to considerably reduce child deaths from diarrhoea in the developing world.

Fig 3: How sanitation could prevent approximately 910,000 fatal episodes of diarrhoea

Breakdown of the 9.7 million annual child deaths by cause¹⁴



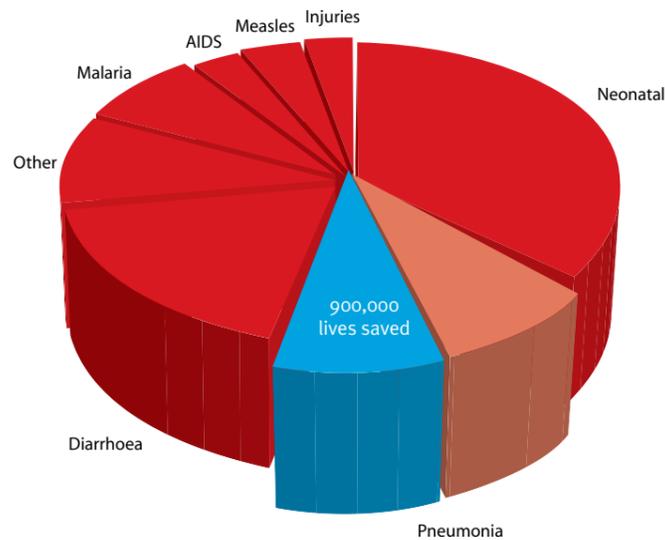
A systematic review estimated that the safe disposal of excreta alone can reduce diarrhoeal disease by 36%¹⁵ and a separate review of the effect of hand-washing with soap on diarrhoea found a 45% reduction.¹⁶ Taken together this suggests that the safe disposal of excreta combined with associated hygiene could reduce the incidence of diarrhoea deaths by 65%.¹⁷ If these 1.4 million deaths that occur each year were reduced by 65%, **910,000 child lives would be saved.**

More recent research in Brazil has shown that the estimates for the effect of safe disposal of excreta may be too low. A comprehensive cohort study has shown that in areas of Brazil with a high level of diarrhoea (comparable to those in poor communities in Africa and South Asia), access to improved excreta disposal alone has reduced the rate of childhood diarrhoea by up to 43% rather than 36% identified in the systematic review cited above.¹⁸

2. Sanitation could reduce the number of children who die from pneumonia each year by approximately 900,000 deaths

Fig 4: How sanitation could prevent approximately 900,000 fatal cases of pneumonia

Breakdown of the 9.7 million annual child deaths by cause

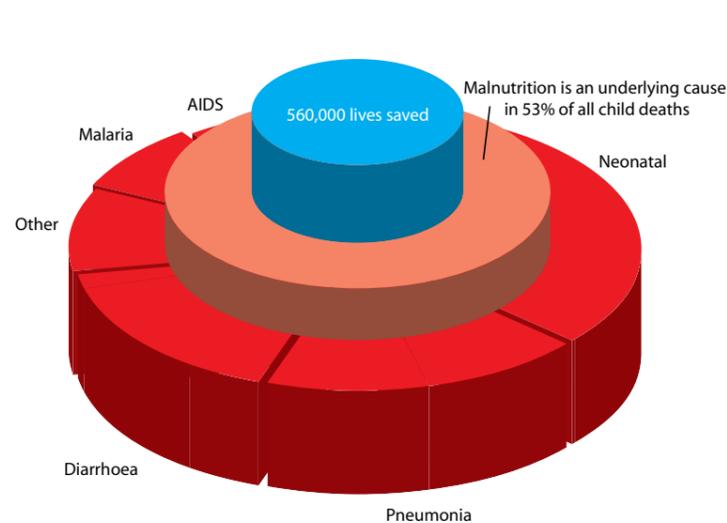


Each year 1.8 million children die from pneumonia,¹⁹ the transmission of which has now also been linked to poor hygiene practices. A systematic review of all studies of the effect of hand-washing with soap on the incidence of respiratory infections has found a mean reduction of 23%.²⁰ Of these studies, however, the only one conducted in a developing country found that hand-washing with soap reduced the incidence of pneumonia by 50%.²¹ There are no rigorous studies on the impact of hand-washing on deaths caused by pneumonia but if the relationship between poor hygiene and the incidence of pneumonia is a guide, then it is possible that around half of the 1.8 million children dying from pneumonia do so because of poor hygiene. In other words, by providing improved sanitation it is possible that every year around **900,000 children's lives could be saved.**

3. Sanitation could reduce the number of children who die from malnutrition each year by at least 560,000

Fig 5: How sanitation could prevent malnutrition deaths by at least 560,000

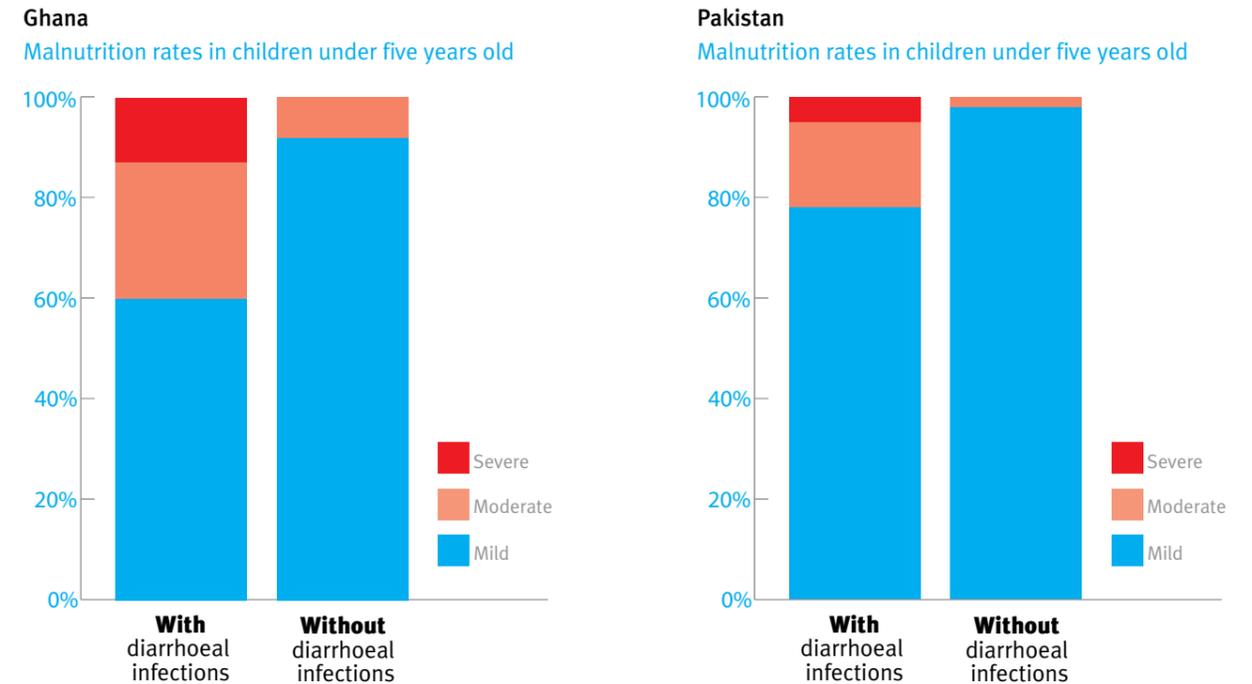
Breakdown of the 9.7 million annual child deaths by cause



Malnutrition is the underlying cause in 53%,²² or five million, of all child deaths globally and increasing attention is being given to this critical area of child mortality. However, efforts to address it have largely focused on increasing food intake and providing vitamin supplements, not on preventing the diarrhoea that leads to malabsorption of nutrients and reduced resistance to infectious diseases.

Figure 6²³ presents evidence gathered from studies in Ghana and Pakistan comparing child malnutrition rates in the presence and absence of diarrhoea. These studies clearly show that in the absence of diarrhoeal infections, malnourished children quickly move up the nutritional status ladder,²⁴ with virtually no severe malnutrition in children without diarrhoea.

Fig 6: Linking diarrhoea and malnutrition in children under-five in Ghana and Pakistan



Over half of this under-five malnutrition-associated mortality is attributable to diarrhoea and nematode infections caused by poor sanitation.²⁵ As described above effective sanitation interventions can reduce diarrhoea by 65% and therefore could play a critical role in reducing under-nourishment and increasing resistance to infectious diseases.²⁶ The WHO has made estimates for the total number of deaths caused by malnutrition that could be averted with improvements in sanitation, alongside water supply, as approximately 860,000,²⁷ suggesting that **sanitation alone could prevent approximately 560,000 of these deaths.**

In total, lack of access to sanitation may cause approximately 2,370,000 or a quarter of all child deaths in the developing world. Even without considering evidence that is emerging on links between malaria and HIV/AIDS and poor sanitation, these global estimates suggest that poor sanitation is the single biggest contributing factor to child mortality in the developing world. When safe water supply is included alongside sanitation and hygiene, the number of children dying because of inadequate investments in the developing world far outstrips **any** other leading factor.

Any serious attempt to quantify the burden of mortality and to make definitive assertions is bedevilled by the lack of research and evidence on the numbers of children dying from poor sanitation. It is testimony to the sector's marginalisation in international development policy-making circles that the lack of funds available for serious research into this issue is preventing a clear view of possibly the biggest cause of child mortality.

A recent survey conducted by the British Medical Journal identified sanitation as the greatest medical invention in the last 150 years.²⁸

The crisis in perspective

Sanitation-related disease was the major killer of children in nineteenth century Europe and North America. In the twenty-first century, poor sanitation may be a major factor in a quarter of child deaths that occur annually. This presents a startling parallel between the sanitation crisis facing the developing world today and the historical experience of now developed countries.

In the UK unprecedented reductions in infant mortality were brought about by a government-led drive on sanitation. The number of children dying before their fifth birthday fell by almost one third in the decade from 1900 (see Fig 2). To put this in context, if the same was achieved in Nigeria in the decade preceding 2015, 1.65 million child lives would be saved in just 10 years.(see Fig 6).

Fig 6: The potential to save children's lives in Nigeria

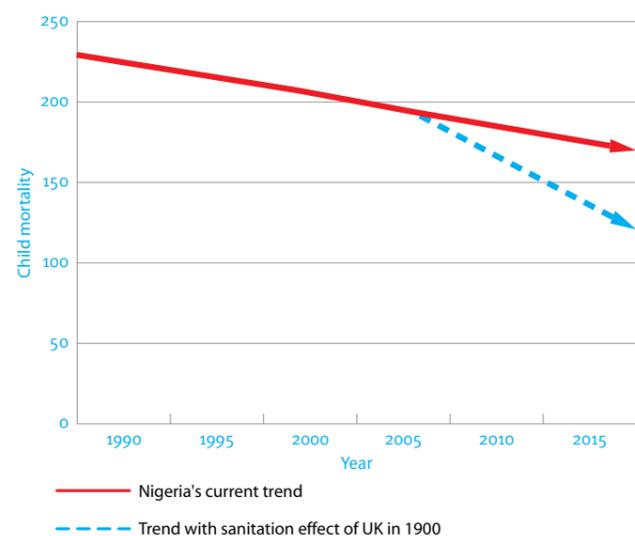


Fig 7: The cost-effectiveness of child survival interventions ²⁹

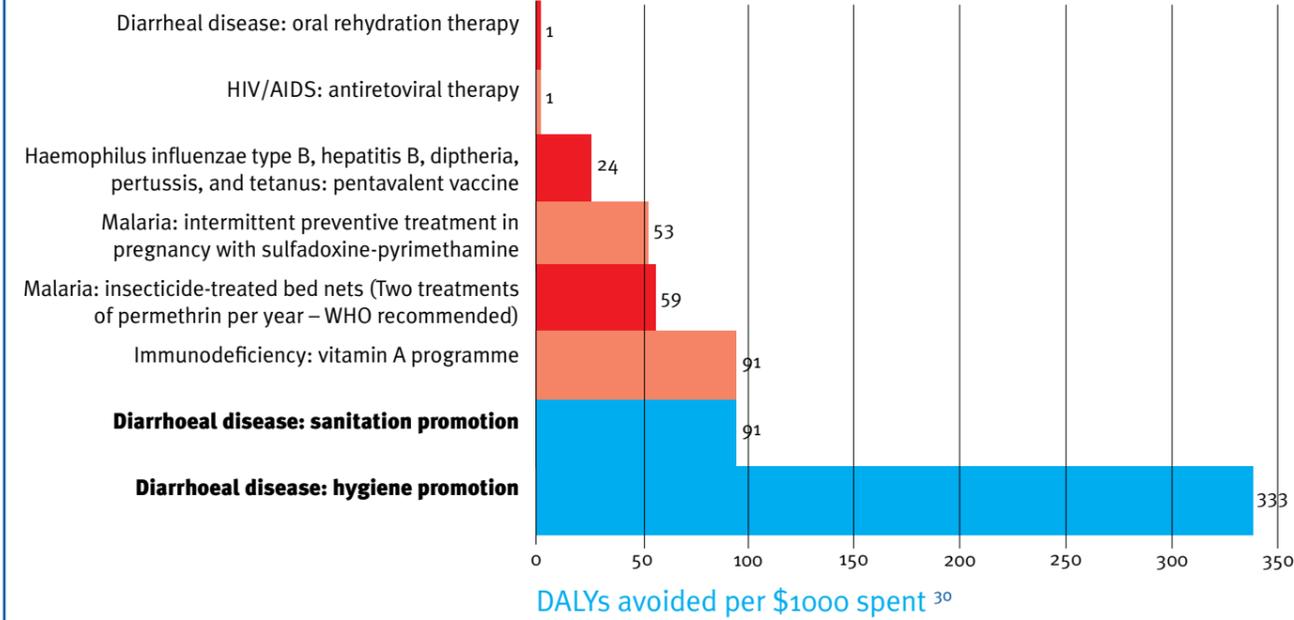


Figure 7 shows the relative cost-effectiveness of various interventions recommended for tackling child mortality. It is clear that hygiene and sanitation, at \$3 and \$11 per DALY, are the most cost-effective alongside the administration of vitamin A. Oral rehydration therapy, traditionally recommended as a means for treating diarrhoea, sits as the least cost-effective.

To conclude this section we must ask why, when so many deaths are caused by a lack of sanitation, and when the cost-effectiveness is so clear, is sanitation not prioritised by donor and aid recipient governments?

This paper argues that, globally, sanitation alone has the potential to save around 2.4 million children – almost a quarter of the 9.7 million annual child deaths.

That sanitation continues to be overlooked by national governments and donor agencies alike suggests that policies are defined by attitudes rather than evidence-based analyses. The failure is patently clear: in sub-Saharan African under-five mortality has fallen from 185/1,000 in 1990 to 166/1,000 in 2005, just over 10% in 15 years.³¹

Urgent research and attention is now needed to strengthen the international aid system's capacity for rational and evidence-based policy-making. Unless the evidence linking poor sanitation to millions of preventable child deaths is urgently acted upon, MDG 4 – to reduce child mortality by two-thirds – will not be met.

Sanitation: a failing sector

Sanitation is the single most neglected MDG sector – afforded low priority by donor and recipient governments alike. It is clear that without an extraordinary effort at all levels the MDG target for sanitation will be missed by 700 million people. In sub-Saharan Africa, progress has been so slow that at current rates of progress the target will not be met until 2076.

The decision taken by the international community in Johannesburg in 2002 to set an international target for sanitation under the MDG framework has failed to mobilise the requisite political will among international or national level actors. Sanitation has low political priority. Governments do not prioritise sanitation within national development plans or development assistance strategies.

Ironically, the continuing neglect of sanitation in public policy perpetuates its low priority, leaving a dearth of reliable data with which to make accurate assessments of the depth of this neglect. The tendency of most governments to aggregate sanitation with water has in many cases resulted in a lack of transparency on sector spending, hampering overall progress. Put simply, both donor and recipient governments do not know how much is being spent on sanitation.

Neglect at the international level

Where data has been collected, it is clear that financing for sanitation is low in comparison to water and risible in comparison to other development sectors such as health and education. The WHO/UNICEF Joint Monitoring Programme estimates that investments in sanitation in Africa between 1990 and 2000 made up just 12% of the total water supply and sanitation sector investments.

This figure belies the true extent of the under-investment in basic sanitation. The greatest returns on investments are made in basic household sanitation but finance is dominated by large-scale sewerage systems and wastewater plants, the benefits of which are usually unaffordable to the poor. This trend for increased investments in large-scale infrastructure has become more marked in recent years as bilateral donors channel more financing for the sector through international financial institutions.

Fig 8: All but one sub-Saharan African country is off-track to meet the MDG target for sanitation³²



■ On-track
■ Insufficient or no data
■ Off-track

Neglect at the national level

At the national level, sanitation is afforded low investment priority by governments. In Madagascar, for example, where only 34% of the population have access to a hygienic latrine, sanitation represents only 0.3% of the total allocation for water and sanitation, which itself is only 3% of the national budget.³³ And national investments in sanitation are predominantly financed by aid rather than national revenue. In Malawi, for instance, only 11% of spending on the sector was from the Malawian Government's own revenues, with the rest coming from donor sources.³⁴

At the sub-national level, even the collective allocation for water and sanitation is small in comparison with often more prominent development sectors. In Mali, at the local level, recent research has shown that healthcare attracts twice the budget of water and sanitation combined and education four times this.³⁵

The sector's crisis and chronic decay can be put down to critical failures in leadership and accountability. Institutional fragmentation and poor coordination between the various mandated bodies make effective action difficult. This plays out in weak policy formulation and an institutional failure to bid for adequate budget allocations. In short, strong champions for sanitation are absent at every level.

Across the developing world, the capability of states to meet their duty to ensure effective delivery of this most essential of services is weak. In many developing countries responsibility for delivering sanitation has been decentralised to local government without the necessary financing or requisite investments in local capacity.³⁶ This is compounded by financing for the sector being largely project-based as well as often being off-budget.

The sector is mired in a vicious cycle that thwarts progress. Donor and recipient governments alike seem unable, indeed seem unwilling, to diagnose and respond effectively to a crisis that has such clear and profound consequences for the lives of millions of children.

To address the sanitation crisis, these critical sector failings must be addressed through strategic investments to build institutional capacity at the national and sub-national level.

Accelerating development: sanitation as a catalyst

The impact of the sanitation crisis reaches far beyond child mortality and health, seriously constraining progress against the poverty, health and education MDGs.

Governments are now coalescing around the need to critically review progress on the MDGs and mobilise the necessary resources to get the initiative back on track by targeting the most off-track MDG targets.³⁷ Significantly, lack of progress on sanitation, itself desperately off-track, acts as a further constraint on other seriously off-track sectors:

- MDG 1 to eradicate extreme poverty and hunger
- MDG 3 to eliminate gender disparity in education
- MDG 4 to reduce child mortality

Access to sanitation underpins all of these sectors and its absence therefore undermines development efforts. Governments must realise that investment in sanitation presents an essential strategic intervention in reducing poverty.

For every \$1 invested in sanitation, \$9 are returned to national economies in increased productivity and a reduced burden of healthcare.³⁸

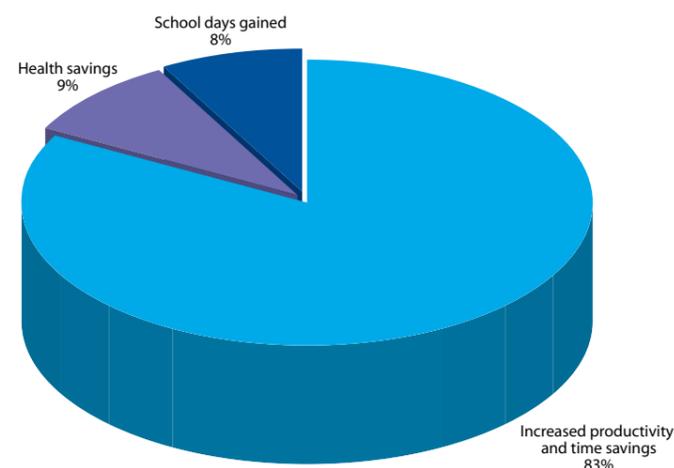
Sanitation yields huge national economic benefits

Lack of sanitation limits economic growth and cripples developing world economies. Workers are less healthy and therefore less productive, live shorter lives, save and invest less and their children are less likely to attend school.³⁹

Meeting the sanitation MDG target would yield economic benefits in the region of \$63 billion each year (rising to \$225 billion if universal access to sanitation was achieved).⁴⁰ Figure 9 below shows how these economic benefits are shared across the health and education sectors and across the economy as a whole.

Fig 9: Calculating the cost of poor sanitation

Breakdown of the \$63 billion in economic benefits



Lack of access to adequate sanitation, alongside safe drinking water, is estimated to cost sub-Saharan Africa 5% of its GDP each year⁴¹ and a forthcoming World Bank publication on environmental health risk factors cites research in Pakistan and Ghana which estimates this burden at 8-9% of GDP.⁴² This is a doubling of previous estimates which did not include sanitation-associated malnutrition.

In other words, even on conservative estimates, adequate investments in sanitation could provide the estimated additional 3% economic growth in sub-Saharan Africa needed to achieve MDG 1 – to halve the proportion of people living on less than a dollar a day.

Sanitation is a powerful force for pro-poor economic development

In sub-Saharan Africa, since 1990, the proportion of people living on less than a dollar a day has fallen by just 6% against an MDG target of 50% by 2015.⁴³ Treatment of sanitation-related diseases is a significant drain on scarce financial resources among this section of society. Money spent on medicine and healthcare will be at the expense of food, education and other essentials. A recent study by WaterAid in Bangladesh has shown that access to sanitation improved the economic status of the poorest households even in a context of broader economic decline.⁴⁴

Sanitation reduces the burden on failing health systems

At any one time, half the hospital beds in Africa are filled with people suffering from diarrhoeal diseases. Endemic diarrhoea in the developing world diverts much-needed government resources. In sub-Saharan Africa this cost equates to at least 12% of the total health budget. These additional resources would be a powerful source of financing for the three health MDGs currently identified as a development priority under various international initiatives.⁴⁵

Over half of those who lack access to sanitation live on less than \$2 a day.

Sanitation improves the educational prospects of the poor and increases girls' attendance

Investments in education are undermined by inadequate sanitation at home and at school. Significant progress has been made in extending primary education but sick children do not attend school. The WHO estimates that meeting the MDG sanitation and water target would result in a gain of 272 million school days in the developing world.⁴⁶ Sanitation-associated helminth infections, or parasitic worms, have been shown to impede learning and inhibit child development.⁴⁷

Inadequate sanitation in schools reduces girls' attendance and is a significant barrier to the achievement of the MDG target to remove gender disparity in primary education. The Education for All (EFA) Report for 2008 highlights the disproportionate effect that poor sanitation has on girl students' enrolment and attendance and calls on national governments to address gender disparities by building schools with proper sanitation.⁴⁸ A failure to address sanitation in schools, including facilities for menstrual hygiene management, widens the gulf between the opportunities afforded to girls and boys through education.

The sanitation crisis is acting as a brake on poverty reduction and this effect is most acute in the MDG sectors that are most off-track. Getting the sanitation target back on track has the potential to accelerate progress in these critical areas.

Child mortality, gender disparities in primary education, and a failure to reduce the number of people living on less than a dollar a day are **all** linked to inadequate sanitation. Sanitation, as a single intervention, has the potential to accelerate progress towards the most off-track MDG targets and protect existing investments in these sectors.

Paving the way to progress

The scale of this crisis is clear and the detrimental impact on development is immense. Improving access to sanitation has the greatest potential to get the MDG target for child mortality back on track and yet remains the most neglected MDG sector. At a time when governments are declaring a “development emergency”⁴⁹ and issuing a call to action around the most off-track MDGs, policy makers must urgently recognise and act upon the following:

Sanitation is the single most cost-effective major public health intervention to reduce child mortality⁵⁰ and will accelerate progress and strengthen investments in other MDG sectors. In the health sector improved access to sanitation would significantly reduce the burden on weak and failing health systems.

The potential for pro-poor economic growth is significant with the greatest benefits accruing in the poorest countries of the world and among the poorest people within these countries. Recent research has shown that the economic benefits of sanitation investments accrue even against a backdrop of broader economic decline.⁵¹

There is a critical failure in the international aid system to respond to challenges with cost-effective and far-reaching policy interventions. This is made clear in the lack of progress towards meeting the targets agreed under the Millennium Development Goals initiative,⁵² this failure being most evident in the sanitation sector.

The sanitation crisis lies at the heart of the failure of the Millennium Development Goals initiative to secure real progress under the key health, education and economic goals. The imperative is clear and the need is immediate. Governments must urgently mobilise the necessary extraordinary effort and undertake to:

At the international level:

1. A global action plan for sanitation and water with political endorsement at the highest level that recognises the integral role of sanitation in achieving the economic, health and education MDGs
2. A global taskforce mandated at the highest level to plan, implement and monitor the extraordinary effort that is needed on sanitation and water
3. A commitment that no credible national plan that is consistent with achieving the sanitation and water MDGs targets should fail for lack of finance

At the national level:

1. One coordinating national body, one national plan, and one transparent monitoring framework for sanitation
2. Increased levels of investment delivered through a specific and transparent budget line open to public scrutiny
3. Broad participation by a wide range of sector stakeholders in the planning and monitoring of sanitation service delivery at the national and sub-national levels

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Notes



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 **WaterAid**

WaterAid's mission is to overcome poverty by enabling the world's poorest people to gain access to safe water, sanitation and hygiene education.