



Thematic week: Water for Life

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Abstract: The extension of water and sanitation systems is recognised as one of the greatest contributions to public health. The historic development of these systems has been achieved through the use of public finance, not through full cost recovery and private providers. In this context, taxation policies are far more important than full cost recovery. Some of the largest developing countries are choosing to pursue similar policies, with effective results. The costs are affordable for countries with the great majority of the population needing connections, with some specific low income countries clearly in need of aid to accelerate their development of systems. The importance of public finance and government policy has been obscured by the insistence of donors on involvement of the private sector. It has also been undermined by poorly-based attacks on corruption as a cultural problem specific to developing countries; by focusing the question of affordability on global aid rather than national public finances; and arguments that water and sewerage systems are northern cultural phenomena which are inappropriate and/or unaffordable in the global south. The donor policy recipe has resulted in delayed and inadequate development of water and sanitation systems, at great cost to people in developing countries, but at no cost to donors themselves. Advocacy of private sector approaches remains in the career interests of officials and politicians in donor countries. Water and sanitation policies need to be driven by national and local policy decisions, not global donor analyses, for the sake of both accountability and economic effectiveness.

Key-words: Public finance; sanitation; accountability; corruption; public choice

1. Introduction ¹

In January 2007, over 11,000 readers of the British Medical Journal (BMJ) chose "the sanitary revolution"— connecting people's homes both to clean piped water and to sewers to dispose of their waste - as the most important medical milestone since 1840. They thought it was more important than antibiotics, vaccination, or the discovery of the structure of DNA. ⁱ

The system was first introduced in London in the 19th century, to reduce the number of people killed by infectious diseases. The system was financed and run by the public sector. This solution included four key features: the technology of a network of sewers throughout the city, flushed by water; public administrative structures to finance build and manage these “expensive works”; a public environmental measure, rather than an attempt to alter individual behaviour; a universal public measure applied to everyone, not selectively targeted. ⁱⁱ

These same principles have been applied in every high income country in the world.. Cities, towns and even villages in these countries have piped water and sewerage connections to all houses. In Europe, every village with a population of 2,000 or more must have a sewer system collecting household waste. ⁱⁱⁱ The extension of systems to the villages of Europe has taken a long time. But in developing countries, many cities and towns are still waiting for the sanitary revolution to reach them. They lack the sewerage systems which protect the northern cities, and the rate of death and disease continues to reflect this.

Through the Millennium Development Goals (MDGs), the countries of the world are committed to improving sanitation in developing countries. But the policies of donors and development banks implementing these goals are at odds with the key principles of the sanitary revolution. They are avoiding commitment to the ‘expensive works’ of building sewers flushed by water; they are failing to support the public sector finance and organisation to introduce these systems, preferring to plan on the basis of ‘cost recovery’ from users; they do not prioritise public environmental measures; and they prefer ‘targeted’ solutions to a universal approach.

2. The Millennium Development Goals for sanitation

Improved sanitation is included in the Millennium Development Goals (MDGs) adopted by the United Nations. Millennium Development Goal (MDG) 7 addresses environmental sustainability, with a target (target 10) to “halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation”.

Although the MDG refers to ‘safe’ drinking water and sanitation, the JMP measures progress according to the percentage of people using ‘improved’ facilities. The JMP lists these as including any of: “Flush or pour-flush to a piped sewer system, septic tank, or pit latrine; ventilated improved pit latrine - pit latrine with slab, or composting toilet”, but only if these facilities “are not shared or are not public”. ^{iv} This means that even urban households can be counted as having ‘improved’ sanitation, even without a sewer connection. The UN task force has also refined the definition of safe sanitation as: “the lowest-cost option for securing sustainable access to safe, hygienic, and convenient facilities and services for excreta and sullage disposal that provide privacy and dignity, while at the same time ensuring a clean and healthful living environment both at home and in the neighbourhood of users.” ^v Sewers are not ruled out, but they are clearly not the ‘lowest cost’ solution.

¹ This paper is based on a longer study on sewerage, which is available from the PSIRU website at www.psiru.org

The following table shows the gap between the MDG definitions and actual sewerage connections for urban populations. In 2004, 73% of the urban population in developing countries had access to improved sanitation, but only 42% had sewerage connections. The gaps were especially wide in sub-Saharan Africa, southern Asia and south-eastern Asia. In developed countries, western Asia (roughly the Middle East) and the former Soviet Union, by contrast, the level of sewerage connections are over 80%.

Table 1: Urban population with (a) access to 'improved' sanitation (b) sewer connections 2004

3. Death, sewers and cities

"The obvious benefits to poor people of increased provision of sewerage facilities should serve as the mandate for greater investment by all levels of government and civil society in tackling one of the greatest scourges to communities in developing countries—infectious diarrhoea due to poor sanitation." David Durrheim, writing in the Lancet, 10 November 2007^{vi}

Cholera and diarrhoeal diseases, both transmitted through contaminated food and water, are the major health problems in the absence of sanitation.^{vii} Cholera epidemics no longer affect London and New York, but they continue to be major killers in developing countries. In 2006 the WHO recorded 236,896 cases of cholera, with 6,311 deaths, in 52 countries. This was a 79% increase in cases compared with 2005, a return to the levels of the 1990s.^{viii} According to a global medical review: "The long-term prevention of cholera will require improved water and sanitation facilities, but these improvements are not happening rapidly in most regions where cholera is prevalent."^{ix}

Diarrhoeal diseases, including dysentery, continue to kill around 2 million children a year in low and middle-income countries. The incidence of diarrhoeal diseases has not decreased significantly in recent decades.^{x xi} A recent WHO editorial estimated that over 9% of the global disease burden could be prevented by improved water supply, sanitation and hygiene, with the greatest impact coming from reductions in diarrhoeal disease.^{xii} Simply because of its effectiveness in curbing diarrhoeal diseases, universal water and sanitation provision could save 326,000 infant lives per year. **This is the equivalent of eliminating all infant deaths from AIDS.**^{xiii}

A World Bank study of 92 major cities demonstrated the clear relationship between sewerage connections and child mortality, holding other factors such as income constant.^{xiv} As the household sewerage connection increases, the infant mortality rate drops. If the level of sewerage connection is as low as 15 percent, the average level for most African countries, infant mortality is 95 per 1,000; if sewerage connections rise to 80%, infant mortality falls to 65 per 1000. These massive health gains from sewers in cities have been demonstrated in the city of Salvador, Brazil, where diarrhoeal diseases fell by over 20% as a result of installing sewers (see below, section 4). A lack of sewers not only leads to more infant deaths through higher rates of diarrhoeal disease. Children in homes without sewerage and water connections have more episodes of diarrhoea. This damage to their health stunts them physically: these children are shorter. It stunts them educationally: diarrhoea in childhood is clearly linked to lower scores in non-verbal intelligence tests and worse performance at school even between the ages of 6 and 12.

Table 2: Infant mortality and sewerage connections

It is urban populations who suffer most if these policies do not include commitments to sewerage systems. There are three features which make urban sewerage systems of particular importance. Firstly, urban populations are growing fast; secondly, a significant proportion are in slums, where the health problems of diarrhoeal diseases are most acute and the benefits of sewerage systems are potentially greatest; thirdly, sewerage connections are especially necessary in cities because safe

collection and disposal of human faeces is much harder in densely populated areas without easy access to countryside. In an urban context the benefits of toilets and hygienic practices are much more limited without a sewerage system to ensure safe disposal of excreta.^{xv} Attempting to dispose of human waste without sewers, for example through use of soak-pits or septic tanks, does not remove the waste from the urban environment. These solutions do not provide the same health benefits as sewers: a survey in Pakistan found that infants in households with soak-pits were 60 percent more likely to die than those with toilets connected to sewers.^{xvi} Household toilets without a sewerage connection may actually increase the contamination of the neighbourhood, and thus endanger other households.^{xvii}

Some argue that sewers and wastewater treatment plants are an inappropriate northern technology, at odds with the environment and traditional wisdom. A paper published by the German aid agency GTZ in 2006, for example, argues that end-of-pipe sanitation systems are “expensive to build, operate and maintain, and out of step with traditional wastewater management philosophy”, which was based on the principle of re-use and recycling of human waste.^{xviii} It is important to respect and use local traditions and knowledge in all countries, but this is not a reason for avoiding the development of sewerage systems. In urban environments, sewers *are* the traditional technology – a technology that was first developed in the ancient cities of south Asia 4,000 years. The first urban sewerage systems were built around 2000 B.C. by the inhabitants of the great cities of the Indus Valley civilisation at Mohenjo-Daro (now in Pakistan). They installed universal systems: almost every house was connected. “Wastewater was conveyed in baked clay conduits to covered gutters, then through canals dug under the streets and covered with bricks, and finally to larger collectors. Settling tanks existed in this network to prevent clogging”. The main sewer was 1.5 meters deep.^{xix}

A large part of urban population in developing countries lives in informal settlements in slum areas. The need for sewerage systems in slums is even greater than elsewhere: the health benefits of sewerage may be twice as high in slum areas as in other urban settlements, because of the combination of living conditions and poverty.^{xx} The Orangi pilot project (OPP), in Karachi, Pakistan, was created by community organisation planning and developing a sewerage network throughout the area, constructed by paving the lanes over sewers built using local labour and micro finance, following natural drainage channels. The municipal authority built large mains sewers in the settlements to support the development. The same principles have been applied in other towns and cities in Pakistan, with investments financed by government and development banks. The project has successfully campaigned for the principles of this approach to be adopted by the Karachi Water and Sewerage Board as the basis for developing sewers throughout the city, including the slums, based on public finance: “OPP's proposal for sewage disposal for Karachi is now the KWSB's [Karachi Water and Sewerage Board] plan for the city costing Rs.8.85 billion (about US\$ 121 million). The plan has been approved by the provincial and federal government for its financing”.^{xxi}

The MDGs should therefore be revised so that the target for urban sanitation, at least, is specifically for household sewerage connections – not merely ‘improved’ sanitation. It would then read: “**To halve by 2015 the proportion of the urban population without household connections to a sewerage system**”. The following table sets out estimates for the numbers of people in cities in developing countries needing household connections to sewers in order to halve the urban population without a household sewerage connection by 2015. The target would require the levels of urban household sewerage connections in these regions to rise from an average of 41% in 2004 to an average of 71% in 2015. On the basis of the World Bank estimates of the relation between sewerage connections and infant mortality (see above), this could be expected to reduce infant mortality in relevant urban areas from about 84 per thousand to about 70 per thousand. The target is also quite feasible. For all regions, including south-eastern Asia which requires the greatest leap, it is less demanding than the achievement in Salvador, Brazil, which moved from 26% to 80% in 8 years.

Table 3: Millions needing connections to halve proportion of urban population without sewerage connection by 2015

Moreover, the needs are highly concentrated in relatively few countries. The next table shows that **half of all the new sewerage connections needed to meet this target are in just four countries: India, China, Indonesia, and Brazil.** Three-quarters of all the connections needed are in just 20 countries. This concentration helps make the discussions of needs and affordability concrete, instead of an abstract debate about billions of people in unspecified places, and the billions of dollars involved. Some of the countries at the top of the list are there because of their size and rapid growth and urbanisation (China, India), some mainly because of an existing large urban population (e.g. Brazil), some mainly because of a very low level of sewerage connection (e.g. Indonesia and the Philippines), some because of very high levels of forecast urban population growth coupled with low levels of sewerage connection (e.g. Nigeria, Bangladesh).

Table 4: The 20 countries needing most urban sewerage connections

4. The need for public finance

The main policy advice of donors and development banks emphasises three key policy positions: the insistence on the need to finance developments through cost recovery from users; the preference for a central role for the private sector; the assumption that sewer systems are too expensive and so unaffordable. But this emphasis on the private sector and cost recovery is contrary to the experience of high income countries, all of which have developed sewerage systems using public finance; ignores the failure of privatisation in the south to deliver any significant investment; and ignores the fact that successful extensions of sewerage systems in the south also use public finance. Such policy advice is in itself an obstacle to the development of sewerage and sanitation in the south, because it directs aid and government efforts into developing schemes which will not deliver the investment needed for sanitation.

Insisting on full cost recovery means that sanitation programmes are only worth doing if people are willing and able to pay the full cost themselves. There are two great flaws in this approach. Firstly, the benefits of sewerage connections are public. The improvements in health and the environment are benefits to the community as a whole, not just the households connected, and so should be financed collectively. The UN task force report notes that many households are reluctant to pay for the health benefits of sanitation: “among the reasons that people invest in improved [sanitation] services, health does not figure particularly prominently”. But, as they also note, this was exactly the same in the countries of the north in the 19th century: the citizens of Boston, Massachusetts, in 1850 were also: “unable or unwilling to take on personal responsibility to conduct their lives in accord with recommended sanitary principles”.^{xxii} The second problem with user charges is affordability. The poorest, who usually are in greatest need of connections, will be least likely to afford them. An insistence on cost recovery from users of the system thus becomes an obstacle to achieving improvements in sanitation: “If international donors wish to pursue a policy of universal access, they should acknowledge that the costs of improved services are far beyond the reach of many households.”^{xxiii} Even low levels of connection charges act as deterrents for poor households, who suffer most from the disease consequences of poor sanitation, because of unequal resources. The death rate within the same city varies according to the income of residents: a study found that infant mortality rates in seven different areas of Karachi varied from 33 to 209 per 1000 live births.^{xxiv}

These were the core reasons why, in all developed countries, the idea of financing sanitation through cost recovery from users was abandoned. The sewerage systems in Europe, the USA and Japan were not developed through full cost recovery from users – they were paid for by distributing the costs amongst the public, using taxation and cross-subsidy. Connection was not a matter of

individual choice, but required as a matter of public policy: “public financing of sanitation infrastructure was seen as the only option for ensuring investment adequate to protect public health.”^{xxv} In Toronto, for example, little progress was made in extending sewerage connections in the 19th century by waiting for private demand from individual householders. But in the 1880s, despite an economic recession, the city council not only municipalised the water service, it authorised the city engineer to install new sewers for public health reasons, whether householders asked for it or not, financed by the municipality. The benefits were immense: “This unprecedented power...led to tremendous sewer development in the 1880’s....The effects of the typhoid fever epidemic were greatly reduced by the presence of a complete, clean sewage system. At the beginning of the 20th century, most of the streets in the city had been serviced and the operational costs were met through direct taxation.”^{xxvi} European countries used the same system: in France: “Connection to a main sewer was compulsory for households, and therefore it was covered by local taxes (as in Germany).... after 1945....investment in sewage treatment led to the creation of the Agences de l’Eau...levying water pollution and abstraction charges from water bills at river basin level, through a mutualisation of investment needs”^{xxvii}. Japan expanded sewerage coverage from 8% in 1965 to 69% in 2006 (and projected to reach 72% in 2007), using public finance, public operations and domestic public-public partnerships (PUPs), mainly technical and financial assistance provided by a central governmental agency to local authorities.^{xxviii} The same principle of cross-subsidy through public finance continues to be applied in Europe at a transnational level. The EU raises taxes across all the countries of Europe to support the cost of water and sanitation improvements in the poorer countries, the equivalent of €20 per person per year.^{xxix}

5. The illusion of private sector investment

The idea that the private sector can or will invest significant money in developing sanitation or sewerage systems is equally misleading. In developed countries, as described above, the private sector played almost no role in financing the sanitation systems. In developing countries, despite all the encouragement and support from donors and development banks, the private sector has contributed only a trivial amount to investment in urban infrastructure in the last 20 years. A key problem has been that the private sector has to make profits that cover the cost of its capital and the associated risks. It is therefore selective about the countries it chooses to operate in – only one-third of developing countries have received any kind of private investment in water and sanitation; it has therefore frequently relied on governments to revise contracts and provide guarantees, and so has created fiscal risks for governments in the shape of unexpected liabilities; it has been unable to get the necessary rate of return, due at least in part to public resistance to paying the prices required to deliver this rate of return; and had therefore retreated even from those areas where it has invested. Even in middle income countries where the private sector presence has been greater, the private sector investment is very small in comparison to investment by the state. In some countries such as Senegal or Indonesia, the water privatisation was not extended to sanitation because the private sector was not interested; in others, such as Malaysia, Argentina, and Bolivia the privatisation failed to deliver and was renationalised. A World Bank research paper in 2006, reviewing actual private investment in a 22 year period from 1983 to 2004, concluded bluntly that: “PPI [private participation in infrastructure] has disappointed - playing a far less significant role in financing infrastructure in cities than was hoped for, and which might be expected given the attention it has received and continues to receive in strategies to mobilize financing for infrastructure...PPI is inherently limited in scope for financing urban infrastructure for the wide array of non-commercial infrastructure services cities need. Even for commercial services like water supply, subsidies are prevalent all over the world...Local governments need good sources of public finance to fund those services, and some form of government borrowing is needed for major investments in these areas to avoid inter-generational inequities.”^{xxx}

The constant donor advice to involve the private sector is thus contrary to all the experience of successful development of sanitation and sewerage.

6. Country policies and affordability

The continuing importance of public finance for the development of sanitation can be seen in the actual policies being pursued by the four countries which are of the greatest importance for connecting urban populations: Brazil, China, India and Indonesia. Three of these – Brazil, China, and India - are investing in sanitation, including sewerage connections, using public finance. As a result, Brazil and China are investing enough to achieve the MDGs in full and 80% urban sewerage connections by 2015; India may need further investment, but is actively increasing its tax revenues, which will permit this. The fourth country, Indonesia, has no national programme of investment in sewers using public finance, despite having very healthy government finances, with growing tax revenues. It is being advised by the World Bank to focus on increasing user charges. If it does so, Indonesia will fail to improve its urban sewerage connections to anywhere near the proposed target level. The urban sewerage connection rate in China rose from 30% in 1990, to 50% in 2002.^{xxxix} Public spending on infrastructure has not only kept pace with the growth of the Chinese economy, it has increased twice as fast: “Since 1995, China’s GNI has almost tripled while overall annual municipal infrastructure spending, including roads, has increased six-fold.”^{xxxix} The total length of urban sewerage networks increased by nearly 225% between 1991 and 1998, but less than 4% of all the investment in water and sanitation was financed through the private sector.^{xxxix} China’s approach has been favourably compared to that of the World Bank by economist Jeffrey Sachs: “Unlike the Chinese, the Bank has too often forgotten the most basic lessons of development, preferring to lecture the poor and force them to privatize basic infrastructure, rather than to help the poor to invest in infrastructure and other crucial sectors.The Bank can regain its relevance only if it becomes practical once again, by returning its focus to financing public investments in priority sectors, just as the Chinese leadership is prepared to do.”^{xxxix}

A combination of economic growth and more active public investment policies can raise taxes enough to make a difference. In China, economic growth is producing a growth in personal incomes, which means that income tax can start to grow; China may be able to collect 4.5% of GNI in income tax by 2010, with total taxes worth over 18% of GNI. This would reflect a similar process in northern countries in the first half of the 20th century, the same period when much of the investment in sewerage systems was made. In those countries : “moving from an elite income tax raising less than 1% of GNI to a mass income tax raising around 4-5% of GNI is exactly the kind of process through which Western countries went during the 1914-1950 period.”^{xxxv}

The results of cost-benefit analyses of spending on water and sanitation have been invariably positive. A detailed cost-benefit analysis published by the WHO in 2004^{xxxvi} concluded that in all regions studied, and for all levels of investment - including the most expensive form, which includes sewerage connections, the cost-benefit ratio (CBR) is positive.^{xxxvii} A Wateraid study estimates the economic value of the health benefits alone to be of the order of \$ 9 for every \$ 1 spent, with higher returns for universal coverage.^{xxxviii} A recent WHO editorial quotes benefits falling between \$3 to \$34 dollars per dollar invested.^{xxxix} Another economic benefit of a systematic development of sewerage systems, not included in the above calculations, would be the creation of large-scale employment in developing countries for the necessary construction, maintenance and operations.^{xi}

National affordability, in terms of economic resources, is the next key issue. In practice, the great majority of the resources for extending water and sanitation come from national resources. Especially in the larger countries, such as India and China, aid can only offer a small proportion of needs. Private sector investment contributes little, and so government revenues are the key source for financing developments. There is a political reason for this too. The countries concerned are all sovereign states, and so decisions are – or should be – taken by governments of those states. The key decisions are taken in Beijing, Delhi, Brasilia, Jakarta and other capital cities, not in Washington, London or Paris.

The table below estimates the costs facing countries. It sets out estimates of the annual costs for the 20 countries needing the greatest number of urban sewerage extensions, as estimated above in table 6 (these countries between them cover nearly 90% of the need for urban sewerage connection). It then expresses these costs as a percentage of each country's economy (Gross National Income – GNI), and calculates the amount needed in excess of 1% of GNI, as an indicator of how much international aid might be needed. The urban sewerage targets are calculated by reference to the connections needed in each country, as calculated in table 6, and a global average cost for new connections derived from the WHO estimates. The table shows that 14 out of these 20 countries can achieve the urban sewerage target, and the full MDGs for sanitation and water, rural and urban, with full household connections, for less than 1% of GNI per year. For many of the middle income countries the cost is less than half of one per cent of GNI per annum. China, Brazil and India are already planning to spend as much on development of water and sanitation as these estimates suggest is needed for the MDGs with household connections and the urban sewerage target (see above).

It is not credible to dismiss this level of commitment as 'unaffordable'. When a number of developing countries have clearly decided that they are prepared to invest on this scale, it is inappropriate for international financial institutions to declare that they 'cannot' afford it. These levels of spending are affordable elements of public investment in relation to the size of economies, especially in view of recent growth rates. Most of these countries have experienced sustained economic growth in recent years. Between 2001 and 2006 China averaged growth of 9.7% per annum, India 7.6%; but other much poorer countries have also grown, including Mozambique (average annual growth rate of 8.6% between 2001 and 2006), Vietnam (7.6%), Tanzania (6.4%), Bangladesh, Iran, Nigeria (5.6%), Ghana, Pakistan (5.2%), Indonesia (4.9%), Philippines (4.6%), DR Congo (4.2%), and Brazil (2.9%).^{xli} Spending an extra 1% of GNI on investment in water and sanitation is thus allocating part of this growth, not a claim on other uses of existing income.

Table 5: National affordability: costs as percentage of national income

One way of addressing the global affordability question is whether the world economy as a whole has capacity for this level of spending. Tested against the capacity of the global economy, achieving the MDG targets plus urban sewerage connections costs 0.08% per annum of global GNI. So the figures show what would be needed to cover the costs of sewerage and the MDGs in excess of 1 per cent, 0.75 per cent, or 0.5 per cent of GNI. On any such rule, aid should be concentrated on a few countries. Under the 1% threshold, the aid required would be heavily concentrated in two countries – Nigeria and DR Congo – followed by Ethiopia and Bangladesh. These four countries account for half of all the aid required at this level. A number of African countries, including Sudan, Ghana, Tanzania, Mozambique, Madagascar, together with Haiti, would also require significant aid at this level (see Annex for details on other countries). . At the 0.75% level, Nigeria, DR Congo, Ethiopia, Bangladesh, Philippines, Sudan, and Pakistan account for over half of all the aid required. Middle income countries only start receiving significant aid if it covers costs above 0.5% of GNI. Indonesia and the Philippines both require significant aid, because the current level of sewerage connections is so poor. India and Pakistan would also receive large amounts of aid at this level.

Table 6: Global affordability: the need for aid

The total amount of aid required to support spending on the combined targets over 0.5% of GNI is \$7.9 billion. This compares with actual aid for water and sanitation of \$5.9 billion in 2005 - \$4.5bn. from donors and \$1.4bn. from development banks.^{xliii} This implies an increase, but a feasible increase: aid for water and sanitation increased by \$0.9bn per year from 2002 to 2005, and a continuation of this upward trend is a possibility. So even this high level of aid is a realistic target. A redistribution of existing aid would be appropriate, however. Ten per cent of aid for water and

sanitation in 2001-2005 was spending by the USA in Iraq; out of the 10 countries which appear to need most aid on our estimates, only two – India and Vietnam – were amongst the top ten recipients of water and sanitation aid. Instead, five of the top ten recipients were north African countries, and the largest was China – a pattern of spending which reflects the target markets of the multinational companies very well, but not the pattern of needs.^{xliii}

Finally, the cost is affordable when compared with other elements of global expenditure.

- The support from the UK government for the failed bank Northern rock has now been consolidated in a nationalisation which is estimated to cost £100billion (\$200billion). This amount would be sufficient to finance more than half the entire costs of the MDGs and the urban sewerage target in every city on earth.
- Recent calculations of the costs of the war in Iraq and Afghanistan show that the monthly expenditure by the USA on these wars is around \$16billion, an annual total of £192billion dollars. One-fifth of this amount would be sufficient to finance the total annual cost of achieving the MDGs, plus the urban sewerage connections target, for every city in the world.

7. Conclusion

The health benefits of household sewerage connections are so certain and so great that they should be incorporated as central to the MDGs, not dismissed as an expensive ‘extra’. The need for sewerage in cities, in particular, is so fundamental that it should be incorporated as a new target in the MDGs:

“To halve by 2015 the proportion of the urban population without household connections to a sewerage system”.

The costs of the programmes are affordable for the national economies with the majority of people needing connections. They should be treated as an investment which is justified on the health and economic benefits achievable. The additional benefits in terms of employment and stimulus to the global economy are important additional benefits of a programme of sewer extensions. The aid required is also affordable for donor countries, and is modest when compared with other items of expenditure by high income countries.

Developing countries should continue to plan for development of household water and sewerage connections. The important financial issue is to ensure that sufficient taxes are raised to finance the programme. Attempts to finance it through user charges recovering costs, or attempts to involve the private sector in investment, are likely to be expensive irrelevances that will slow down achievements. Countries such as Indonesia and Philippines need to develop major public spending programmes to develop urban sewer systems.

Donors should stop encouraging countries to try and finance development of sewerage systems through cost recovery from users, and stop encouraging countries to believe that the private sector will make any significant contribution to investment in sanitation. They should instead encourage countries to build the taxation capacity needed to finance this investment, and provide capacity-building support and training through public-public partnerships, following the model of Japan.

Donors should focus aid on the countries in greatest need of assistance to meet the costs of urban sanitation, in particular low income African countries, led by Nigeria and the Democratic Republic of Congo. The need for aid should be assessed in relation to national needs and affordability, not by reference to the total global cost of developing water and sanitation systems, most of which will be met by national resources.

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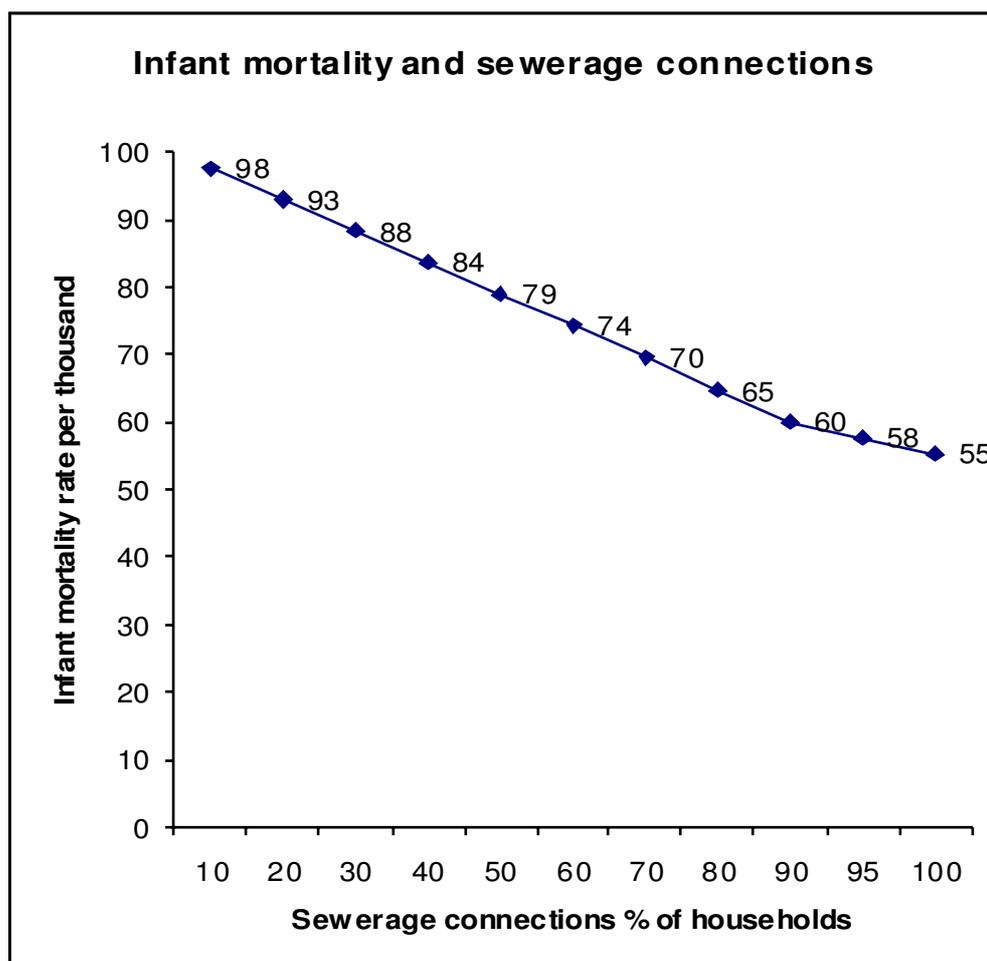
9. Figures and tables

Table 1. Urban population with (a) access to 'improved' sanitation (b) sewer connections 2004

Region	Urban Population billions	% with improved sanitation	%with sewer connection
Sub-Saharan Africa	0.27	53	19
Eastern Asia	0.58	69	50
Southern Asia	0.46	63	24
South-eastern Asia	0.24	81	9
Latin America and Caribbean	0.43	86	62
Oceania	0.02	81	32
Northern Africa	0.08	91	73
Western Asia	0.13	96	83
CIS (former Soviet Union)	0.18	92	82
Developed countries	0.76	100	93
World total	3.11	80	56

Source: JMP online data (see Annex)

Table 2. Infant mortality and sewerage connections



Source: Shi 2000 Table 4. ^{xliv}

Table 3. Millions needing connections to halve proportion of urban population without sewerage connection by 2015

	Millions	2004 % urban household sewerage connection	2015 % urban household sewerage connection after achieving target
Northern Africa	46	73	87
Sub-Saharan Africa	179	19	60
Latin America and Caribbean	146	62	81
Eastern Asia	273	50	75
Southern Asia	277	24	62
South-eastern Asia	157	9	55
Western Asia	50	83	92
Oceania	1	32	66
Total above	1,141	41	71

Source: calculated from JMP data and UN ESA population data ^{xlv} (see Annex for more details)

Table 4. The 20 countries needing most urban sewerage connections

	Millions	2004 % urban household sewerage connection	2015 % urban household sewerage connection after achieving target
China	251	50	75
India	184	25	63
Indonesia	73	2	51
Brazil	60	53	77
Nigeria	43	23	62
Philippines	34	7	54
Pakistan	32	40	70
Bangladesh	27	7	54
Iran	25	19	60
Congo DR	15	4	52
Viet Nam	14	14	57
Argentina	13	48	74
Thailand	12	0	50
Sudan	11	1	51
Egypt	11	68	84
Venezuela	10	61	81
Ethiopia	10	2	51
Malaysia	10	41	71
Myanmar	9	10	55
Korea Rep	9	65	83

Total of top 4 (China, India, Indonesia, Brazil)	568
Total of 20 countries with greatest needs	851
Total connections needed in all developing countries (from table 5)	1,141

Source: calculated from JMP data and UN ESA population data^{xlvi} (see Annex for more details)

Table 5. National affordability: costs as percentage of national income

	National income group	GNI 2006 \$billion.	Urban sewer target m.	Annual cost of urban sewer target \$m.	%GNI	Annual cost of MDG HC + urban sewer target \$m.	%GNI
China	ML	2641.6	251	6275	0.24	7878	0.30
India	L	906.5	184	4591	0.51	5764	0.64
Indonesia	ML	315.8	73	1825	0.58	2291	0.73
Brazil	ML	892.8	60	1498	0.17	1881	0.21
Nigeria	L	92.4	43	1086	1.18	1364	1.48
Philippines	ML	120.2	34	852	0.71	1069	0.89
Pakistan	L	122.3	32	797	0.65	1000	0.82
Bangladesh	L	69.9	27	681	0.97	855	1.22
Iran	ML	207.6	25	630	0.30	790	0.38
Congo DR	L	7.7	15	386	5.01	485	6.29
Viet Nam	L	58.1	14	358	0.62	450	0.77
Argentina	MU	201.4	13	321	0.16	403	0.20
Thailand	ML	193.7	12	302	0.16	379	0.20
Sudan	L	29.9	11	281	0.94	352	1.18
Egypt	ML	101.7	11	270	0.27	340	0.33
Venezuela	MU	164.0	10	247	0.15	310	0.19
Ethiopia	L	12.9	10	243	1.89	306	2.37
Malaysia	MU	141.4	10	238	0.17	299	0.21
Myanmar	L		9	230		288	
Korea Rep	H	856.6	9	214	0.03	269	0.03
Total of above				21,325		26,773	
Total for all developing countries				27,800		34,900	

Source: PSIRU calculations from World Bank, JMP, UN ESA and WHO data (see Annex)

Income groups: L=low income; ML=lower middle; MU=upper middle; H=high.

Table 6. Global affordability: the need for aid

	Income group	Annual cost of MDG HC + urban sewers %GNI	Aid needed to cover spending >1% of GNI (\$m.)	Aid needed to cover spending >0.75% of GNI (\$m.)	Aid needed to cover spending >0.5% of GNI (\$m.)
China	ML	0.30			
India	L	0.64			1232
Indonesia	ML	0.73			712
Brazil	ML	0.21			
Nigeria	L	1.48	440	671	902
Philippines	ML	0.89		168	468

Pakistan	L	0.82		83	389
Bangladesh	L	1.22	156	331	505
Iran	ML	0.38			
Congo DR	L	6.29	408	427	446
Viet Nam	L	0.77		14	159
Argentina	MU	0.20			
Thailand	ML	0.20			
Sudan	L	1.18	53	128	203
Egypt	ML	0.33			
Venezuela	MU	0.19			
Ethiopia	L	2.37	177	209	241
Malaysia	MU	0.21			
Myanmar	L n/a				
Korea Rep	H	0.03			
TOTAL for all developing countries			2236	3603	7919

Source: PSIRU calculations from World Bank, JMP, UN ESA and WHO data (see Annex)
Income groups: L=low income; ML=lower middle; MU=upper middle; H=high.

10. Notes

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