

Why Sanitation and Water Supply are Important to Growth and Development in Papua New Guinea

A significant investment increase is required in Papua New Guinea in order to achieve the WSS MDGs.

This briefing note for the Papua New Guinea Ministry of Finance shows that **water supply and sanitation (WSS) need urgent attention**. Failure to finance water and sanitation is costing the country a notable portion of its GDP. Scientific studies show that access to **sanitation and water not only improves quality of life, but also brings tangible health, environmental and economic benefits, and contributes to poverty reduction**. The rate of return of spending on sanitation and water can exceed other public investments such as in infrastructure, transport, health or education. While data are still incomplete, this briefing note demonstrates that even a little spending on water supply and sanitation reaps enormous rewards.

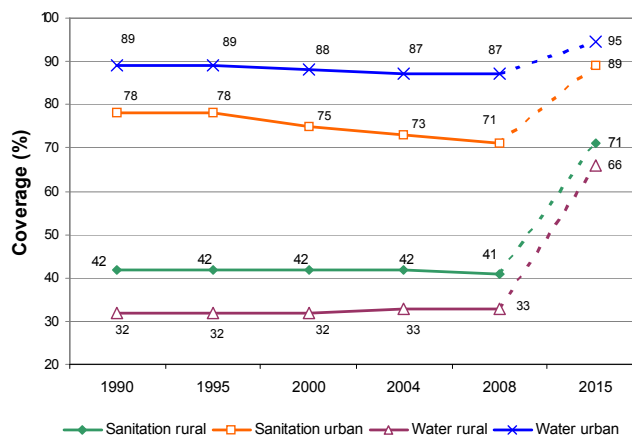
Sanitation and water supply coverage in Papua New Guinea requires attention

According to data compiled by the WHO/UNICEF Joint Monitoring Program (JMP)^a, progress to achieve the WSS MDG targets in Papua New Guinea are seriously off-track. Based on the most recent coverage data in 2008¹, **WSS coverage has been stagnant or declining in Papua New Guinea** over the past two decades. In absolute figures, PNG is most off-track in rural areas^b, where both water and sanitation require gains of at least **30 percentage points to meet the MDG target**. In urban areas, declining sanitation coverage means greater progress is needed to raise coverage from 71% in 2008 to 89% in 2015. Urban water supply requires eight percentage points increase, from 87% to 95%, to meet the MDG target.

The MDG targets are milestones for the next few years, and even if achieved, **29% of the rural population and 11% of the urban population would still be without access to improved sanitation**. Also, rural water supply started from a low baseline of 32% and has made no progress since 1990 – hence requiring redoubled efforts.

As well as investments in new coverage to meet MDG targets, continued investments are needed to maintain and replace existing facilities, and improve the quality of those services.

Papua New Guinea's progress towards the sanitation and water MDGs 1990-2008 and progress required to achieve the MDGs.



Money spent on sanitation and water pays dividends

Based on the average cost of a latrine and water supply, global studies have shown that Papua New Guinea requires a **total expenditure of PGK 772 million (US\$ 294 million) to meet the water and sanitation MDG targets, of which PGK 510 million (US\$ 194 million) is for sanitation²**. This equates with roughly PGK 228 (US\$ 86) per capita over a 5 year period, or PGK 22.8 (US\$ 8.6) per capita annually^c. However, a national costing study is required based on local unit costs to ensure national investment planning is realistic.

^a JMP data are presented as it reflects global monitoring of the MDGs and standardized definitions, while it is recognized that each country has its own targets and data.

^b The rural – urban **target** breakdowns presented here are not official JMP, but are used to indicate what progress is needed in rural and urban areas separately to meet the overall MDG target.

^c This sum will be met from a mixture of sources which include households as well as the government and donor budgets. Also, budgeting has to take into account program costs (program establishment, population sensitization, monitoring, evaluation) which can be significant, but have been excluded here due to lack of data.

Investment needs in Papua New Guinea are sizable, especially compared to current spending. Papua New Guinea will need to significantly increase investments in order to improve water and sanitation. However, **investment in water and sanitation not only provides basic services, but also reaps benefits well beyond the water and sanitation sector.** Investments in water and sanitation in fact are investments in health, education, the environment and poverty reduction.

Failure to invest can be costly in the long-run

Economic research on water supply and sanitation is not commonly done, therefore findings must be borrowed for Papua New Guinea from other countries. For example, a World Bank country environmental analysis conducted in Pakistan has shown that health costs resulting from poor water, sanitation and hygiene cost the country the equivalent of **1.8% of annual Gross Domestic Product (GDP)**. The indirect effects of malnutrition – to which poor water and sanitation contribute 50%, according to WHO - cost even more than the direct effects, taking the total health cost to around **5% of annual GDP in Pakistan**³. An important contributor to this figure is child mortality: in Papua New Guinea WHO estimates close to 3000 deaths of children caused by diarrheal disease in the year 2004. Further, studies demonstrate that poor water and sanitation significantly contribute to malnutrition which leads to lower school productivity and work productivity from impaired cognitive function and learning capacity³. Rates of moderate and severe stunting and underweight are high in children under five in Papua New Guinea, at 43% and 18%, respectively⁴.

The cost of WSS investment is off-set by the benefits that accrue in other sectors.

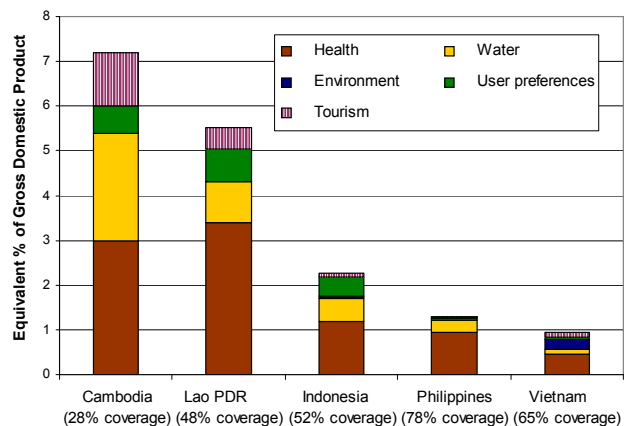
As well as valuing health-related productivity and loss of life associated with inadequate WSS, other economic impacts have been valued for countries other than Papua New Guinea. These costs include treatment seeking for illness; time to access unimproved drinking water and sanitation; and water pollution.

The latter includes the cost of water treatment to ensure the safety of hauled and piped water, or access to safer but more distant water sources. **In neighboring Indonesia, the economic cost of poor sanitation was estimated at PKG 70 (US\$ 26.8) per capita.**

Studies from other Southeast Asian countries show the non-health costs of poor sanitation are comparable with the health costs, contributing 47% of the total annual per capita losses in Indonesia and 63% in Cambodia. **The results are indeed alarming: the total economic losses associated with poor sanitation are equivalent to 7.2% of annual GDP in Cambodia, 5.4% of annual GDP in Lao PDR, and 2.3% in Indonesia.**⁵

The graphic shows the equivalent cost, as a proportion of annual GDP, of not investing in improved sanitation in 5 countries of Southeast Asia. (in brackets, sanitation coverage in 2006)

Source: World Bank



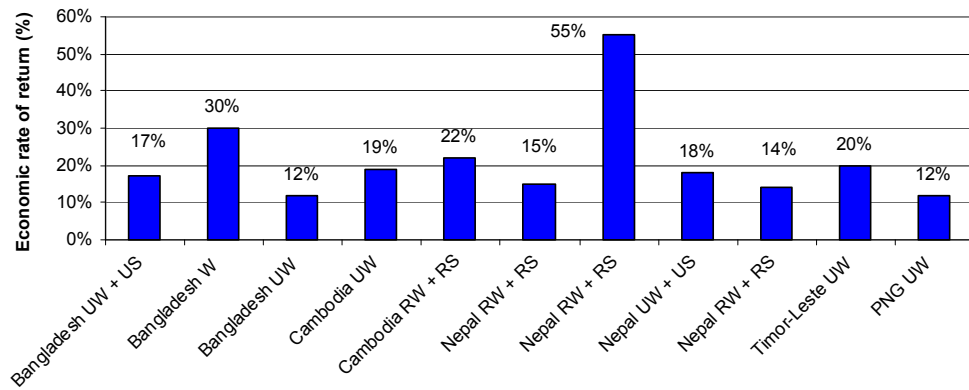
As well as the direct household effects of poor sanitation, poor water and sanitation can also have larger scale effects. First, it can impact on **foreign tourists** choosing Papua New Guinea as their holiday destination. Second, it can affect business and play an influential role in where **foreign businesses** invest their money. Emerging evidence from Asia suggests that a country's reputation of poor environment, polluted water and an unhealthy workforce can affect the earning power of foreign currencies, and hence hinder economic growth⁵. Furthermore, as the effects of **climate change** are felt – with increased predictions of extremes such as flooding and droughts – it will become even more important to invest in resilient WSS systems to ensure the availability and safety of the water supply, as well appropriate sanitation options that do not further stress water supplies nor pollute dwindling water resources.

WSS services can yield a major return on investment

Economic returns on water and sanitation projects are highly favorable. A project completion report of the 3rd Urban Water Supply project in Papua New Guinea showed an **economic rate of return** of 12%⁶. WSS project appraisals from other countries is also informative. For example, an urban water project in Dili, Timor-Leste, receiving support from the Asian Development Bank in 2007 was estimated to have an **economic rate of return** of 20%⁷. In Cambodia, a rural water supply and sanitation project showed a rate of return of 22% in 2005⁸. Other WSS programs supported by development banks in selected Asian countries have an estimated economic return of 12-55% per annum (see Figure).

Global **benefit-cost studies** on water supply and sanitation for Asia, including the value of health improvements and time savings, estimated the benefit per currency unit invested was estimated at a return of at least 6 currency units per unit investment^{9,10}. While the results of these studies demonstrate a strong case for increased investment in water and sanitation, in fact, **these studies actually underestimate economic benefit as they include diarrheal disease only, thus excluding other positive health effects of improved water and sanitation.**

The graphic shows a high Economic Rate of Return on sanitation and drinking water projects.



Key: W – Water; S – Sanitation; R – Rural; U - Urban

Source: Development banks

Sanitation and water projects in Papua New Guinea have a 12% or higher economic rate of return.

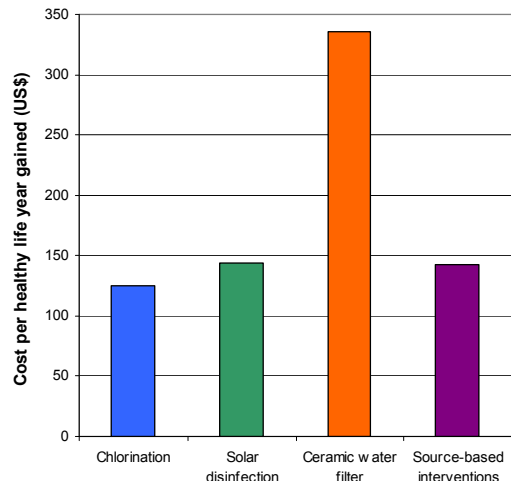
Investing in sanitation and water can help Papua New Guinea tackle its basic economic challenges as well as improve health.

The health returns on investment in WSS are considerable

If health impacts are valued in units of Healthy Life Years (HLY) – defined as ‘a year of life lived in full health’ – they can be compared with other health interventions¹¹. In Asia, the cost of basic water was estimated at US\$ 94 per HLY gained and sanitation estimated at US\$ 270 per HLY gained¹². When a cost per Healthy Life Year is below the GDP per capita of a country, **the intervention is deemed a cost-effective use of health budgets. In Papua New Guinea, where GDP per capita is around PGK 3,150 (US\$ 1,200), the cost per Healthy Life Year of PGK 246 (US\$ 94) or PGK 707 (US\$ 270) is a strong argument for investing in basic water and sanitation interventions, respectively.**

In another global study¹³ (see graphic) rates of health return on different interventions to improve water quality were measured. Cost per HLY ranges from PGK 328 (US\$ 125) to PGK 880 (US\$ 336). These rates of health return are similar to other preventive health interventions such as for malaria and HIV/AIDS.

Therefore, taking into account that WSS interventions – in addition to gain in health – also have health productivity and non-health benefits, it is rational to invest in WSS services.



An important role of government is to catalyze household investment.

Households are willing to pay for services when they see a benefit

Economic research indicates that households, even poor ones, are willing to pay for reliable and quality WSS services. World Bank studies in Ghana¹⁴ in the early 1990s estimated the average willingness to pay per month per household was roughly PGK 4 (US\$1.50) for water as well as PGK 4 (US\$1.50) for sanitation services, which equates to a combined **annual willingness to pay of PGK 183 (US\$ 70)**¹⁵ in today's values. Furthermore, willingness to pay is enhanced when water supply has benefits beyond general household uses, in revenue-generating activities such as a small-scale household business or agriculture (irrigation)¹⁶. **Evidence from willingness-to-pay studies demonstrate that government investments in ensuring services are available leverage household investments. When reliable services are available, households are willing to invest themselves.**

Intangible aspects of water and sanitation are crucial in household decision making

Other benefits of improved water and sanitation rarely captured in economic studies are 'intangible' impacts, so-called because they are difficult to measure. These aspects may include dignity, comfort, privacy, security, and social acceptance. An undeniable basic need is to have a near-by, safe and private place to defecate, and this is especially true for women, the elderly, the sick and also children. As well as facilities at home, water and sanitation at schools can improve school enrolment, attendance and completion, and at the workplace can increase female participation in the urban workforce. **Hence water and sanitation promote social equality and economic growth.**

Conclusions and recommendations

Spending on water and sanitation is not only politically popular and socially beneficial, but it **makes good economic sense**. Economic evidence supports that meeting and going beyond MDG targets to achieve universal water and sanitation coverage not only improves quality of life, but also bring tangible health, environmental and economic benefits. Investing in sanitation and water can help the Government of Papua New Guinea lay down the foundations for sustainable growth and poverty reduction as well as improving health outcomes. Improving access to sanitation and water **contribute importantly to the achievement of other MDG targets.**

Sanitation and water interventions deliver economic returns of at least 5 times on investment, commonly with an annual rate of return of 20% or more. Furthermore, **WSS services are basic services that are demanded by the population, with often strong willingness to pay for these services -- when services are reliable.** As decisions are made to increase investments, an efficiency comparison of alternative water and sanitation policies, programs and technologies can assist the government to respond better to the needs of its population. Going forward, policy makers are recommended to address:

- **POLICY:** Implement **policies that lead to increased public and private spending** on water and sanitation services, especially sanitation, where progress is slowest. This includes a focus on increased population demand through sensitization and marketing campaigns, which will result in increased household investments.
- **SUSTAINABILITY:** Ensure funds and mechanisms for **adequate operations and maintenance** in order to sustain services and maximize cost-effectiveness of investments.
- **SCALING-UP:** Focus scaling-up efforts on the **most affordable and sustainable services** that are demanded by the population and those that have proven health and environmental benefits.
- **TARGETING:** Provide additional support to increase **access to the poorest and most vulnerable households.**
- **MAXIMIZING EFFICIENCY:** Improve WSS delivery to the population and seek to maximize efficiency gains through **large scale implementation and demand-led outcome-based approaches.**

Endnotes

- ¹ World Health Organization and United Nations Children's Fund Joint Monitoring Programme (JMP) for Water Supply and Sanitation. Coverage estimates for 2008, March 2010 (in print).
- ² "Global costs of attaining the Millennium Development Goal (Target 10) for water supply and sanitation". Hutton G and Bartram J. *Bulletin of the World Health Organization* 86:13-19. 2008.
- ³ "Environmental health and child survival: epidemiology, economics and experience". Acharya A, Paunio M and Ahmed K. World Bank: Washington DC. 2008.
- ⁴ "Tracking progress on child and maternal nutrition. A survival and development priority". UNICEF. 2009.
- ⁵ "Economic impacts of sanitation in Southeast Asia". Hutton G, Rodriguez UE, Napitipulu L, Thang P, Kov P. World Bank, Water and Sanitation Program, 2008. and "Economic impacts of sanitation in Lao PDR". Hutton G, Larsen B, Leebouapao L, Voladet S. World Bank, Water and Sanitation Program, 2009. www.wsp.org
- ⁶ Asian Development Bank. Project Completion Report. Third Urban Water Supply. Papua New Guinea. 2003
- ⁷ Asian Development Bank. Report and recommendation of the President to the Board of Directors on a proposed Asian Development Fund grant - Democratic Republic of Timor-Leste: Dili urban water supply sector project. 2007.
- ⁸ Asian Development Bank. Report and recommendation of the President to the Board of Directors on a proposed grant to the Kingdom of Cambodia for the Tonle Sap rural water supply and sanitation sector project. 2005.
- ⁹ Figures refer to WHO SEAR region, epidemiological sub-stratum D: "Global cost-benefit analysis of water supply and sanitation interventions". Hutton G, Haller L and Bartram J. *Journal of Water and Health* 5:481-502. 2007
- ¹⁰ "Economic and health effects of increasing coverage of low cost household drinking water supply and sanitation interventions to countries off-track to meet MDG target 10". Hutton G, Haller L and Bartram J. WHO/SDE/WSH/07.05. World Health Organization, United Nations Development Programme. 2007.
- ¹¹ While the studies present results in terms of disability-adjusted life-years (DALY) averted, for simplicity of understanding, they are presented here as the equivalent 'healthy life years gained'.
- ¹² "Water supply, sanitation and hygiene promotion, in Disease Control Priorities in Developing Countries". Cairncross S and Valdmanis V. In *Disease Control Priorities in Developing Countries*. Jamison D, Breman J, Measham A, Alleyne G, et al. (editors). 2nd Edition. New York: Oxford University Press. 2006.
- ¹³ "Cost-effectiveness of water quality interventions for preventing diarrhoeal disease in developing countries". Clasen T, Haller L, Walker D, Bartram J and Cairncross S. *Journal of Water and Health* 5:599-608. 2007.
- ¹⁴ "Household sanitation in Kumasi, Ghana: a description of current practices, attitudes and perceptions". Whittington D, Lauria DT, Choe K, Hughes J and Swarna V. *World Development* 21:733-48. 1993. "Household demand for improved sanitation services in Kamasai, Ghana: A contingent valuation study". Whittington D, Lauria DT, Wright AM, Choe K, Hughes JA and Swarna V. *Water Resources Research* 29:1539-60. 1993
- ¹⁵ Using the average GDP deflator of the United States Dollar since 1990.
- ¹⁶ "Multiple uses of water in irrigated areas". Meinzen-Dick R and Van der Hoek W. *Irrigation and Drainage Systems* 15:93-98. 2001.