

The Economic Returns of Sanitation Interventions in Lao People's Democratic Republic

June 2013

INTRODUCTION

The Economics of Sanitation Initiative (ESI) is a multi-country study launched in 2007 as a response by the World Bank's Water and Sanitation Program to address major gaps in evidence among developing countries on the economic aspects of sanitation. The study covers Bangladesh, Cambodia, Chinaⁱ, India, Indonesia, Lao PDR, Nicaragua, Pakistan, the Philippines, Vietnam and over twenty countries in Africa. Its objective is to provide economic evidence to increase the volumes and efficiency of public and private spending on sanitation. This research brief summarizes key findings of Study Phase II - cost-benefit analysis of alternative sanitation options - from Lao People's Democratic Republic (PDR).ⁱⁱ

PROBLEM STATEMENT

Despite significant progress in recent years, **access to improved sanitation is a major concern for Lao PDR.** Access to improved sanitation facilities rose from 17% of the population

in 1995 to 63% in 2010.ⁱⁱⁱ Nonetheless, almost three out of ten persons in Lao PDR still practiced open defecation in 2010. Sanitation conditions are also worse in rural areas, where 8% of the population only had access to unimproved facilities and about 41% of the population still practiced open defecation. Furthermore, coverage figures do not reflect the other dimensions associated with the proper management of human excreta, like properly designed septic tanks and connections to sewers with wastewater management, which also have implications for health risks and the pollution to water resources.

The lack of access to improved sanitation facilities imposes a heavy burden on society. **Phase I of the ESI** estimated the overall economic costs of poor sanitation in Lao PDR to be US\$193 million per year, in 2006 prices. Translating to about US\$34 per person per year, these costs are equivalent to about 5.6% of gross domestic product (GDP).^{iv}

Key Messages

- Sanitation interventions have very favorable socio-economic returns to households and society, contributing to improved health, clean environment, dignity and quality of life, among many other benefits. Economic returns are potentially high—in excess of US\$2 return per dollar invested in urban areas and at least US\$4 return per dollar invested in rural areas.
- Economic efficiency of improved sanitation can be optimized by improving program performance, which leads to sustained behavior change. Future projects should carefully plan and implement activities cost-effectively, and closely monitor project costs and impacts, to ensure that the project resources are being appropriately utilized.
- Sanitation solutions in urban areas that involve wastewater management are potentially cost-beneficial, despite not all benefits having been included. While difficult to quantify in economic terms, the associated environmental benefits of wastewater management are highly valued by households, tourists and businesses.
- Improved hygiene and sanitation conditions in institutions, public places and tourist sites are important to attract more businesses and tourists to Lao PDR.

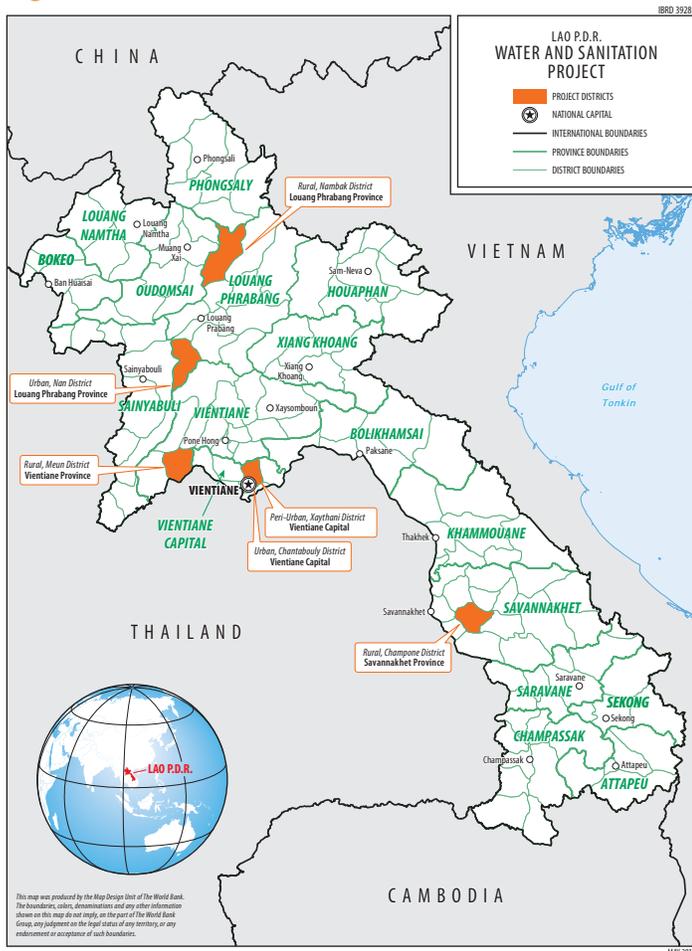
Economic analysis measures the broader welfare benefits of products and services on populations, such as value of life, time use, environmental and social benefits, as opposed to **financial analysis**, which measures the financial gains only (e.g. changes in income or cash situation).

STUDY AIMS & METHODS

The purpose of Phase II of the ESI is to provide sanitation decision makers with improved evidence on the costs and benefits of alternative sanitation options in different contexts in Lao PDR. The study focuses on human excreta management, covering six selected field sites as well as national surveys.

Surveys were conducted in four rural and two urban sites that have recently been the focus of intensified sanitation programs and projects and/or have a relatively wide range of sanitation interventions that can be evaluated (see Figure 1). Primary data collection involved household surveys (1,200 observations), focus group discussions, physical investigations, and water quality assessments. Interviews of business owners/managers and foreign visitors were also conducted in

Figure 1. ESI Field Sites in Lao PDR



order to get a sense of the impacts of sanitation on business-related activities and tourism. Primary data were supplemented with information from other national and local surveys, and published documents.

Sanitation interventions evaluated varied by rural and urban location, comparing open defecation with the range of sanitation facilities currently used by the Lao population. These facilities are dry pit latrines, wet pit latrines (private and shared), and toilets with septic tanks (private and shared). While these are currently not in use, the study also explored the economic efficiency of toilets that have access to treated sewers in Vientiane Capital.

Conventional techniques of economic analysis were utilized to generate outputs such as benefit-cost ratio, cost-effectiveness ratio, net present value, internal rate of return, and payback period of sanitation options.

Economic benefits quantified include impacts on health, drinking water, and sanitation access time. Environmental and social impacts of poor sanitation were not fully captured in the monetary estimates of benefit. Qualitative analysis was conducted on selected social and broader economic benefits. Full investment and recurrent costs were measured for each sanitation option.

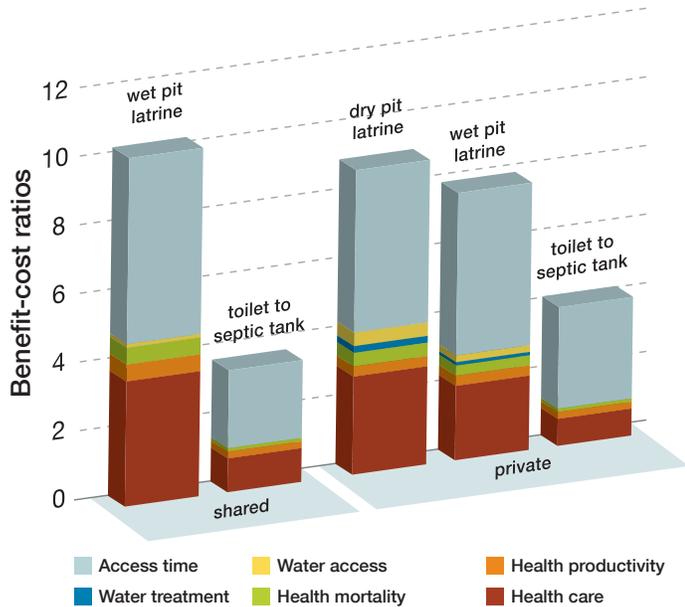
STUDY RESULTS

Rural Areas: Highly Favorable Economic Returns on Pit Latrines - When Used

Benefit-cost ratios (economic return per currency unit invested) are compiled for the four rural sites in Figure 2. Among the various sanitation options, the most favorable economic performance was found for shared wet pits, followed by private dry pits. These interventions had benefit-cost ratios of at least 9 and annual economic rates of return in excess of 100%. It also requires less than one year to recover the economic value of the initial investment costs for these facilities.

Shared and private toilets that flush to septic tanks did not perform as well as pit latrines. However, with benefit-cost ratios greater than one, the study finds that these options are still economically viable in rural areas.

Figure 2. Benefit-Cost Ratio in Rural Sites (economic return per unit of currency spent)

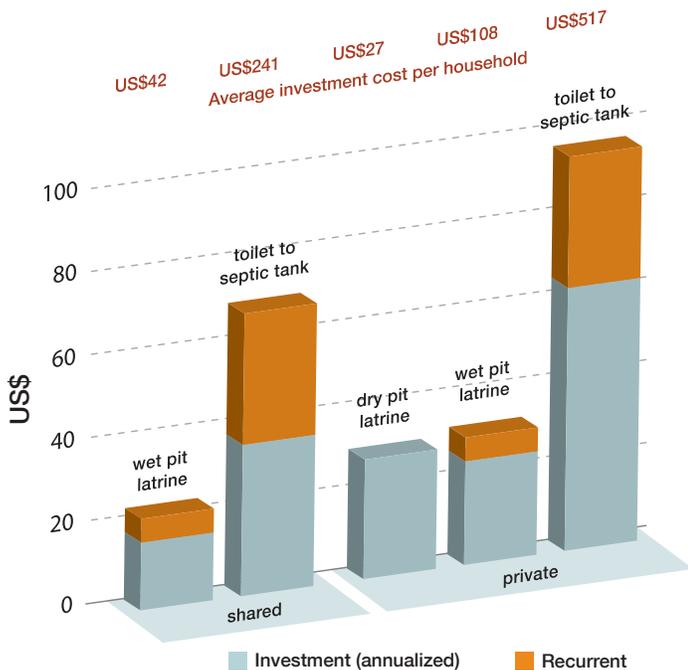


Access time savings, which represent the monetized value of time that was spent searching for a private place to defecate or waiting in a line in the case of shared toilets, was the largest source of gains. For the options presented in Figure 2, these represent at least 53% of the net benefits from improved sanitation. Avoided health care costs were estimated to have the second largest contribution to net benefits.

Private toilets with access to septic tanks were the most expensive option examined for rural areas. Average investment costs for these facilities were estimated to be more than 10 times larger than the least expensive option (shared wet pit latrines) evaluated in the study (see Figure 3).

The findings suggest that low-cost technologies, particularly wet and dry pit latrines, are worth pursuing especially for low-income groups. Although wet pit latrines have a higher initial investment cost, a longer expected life leads to comparable annualized costs as dry pits. The most important benefits for all options are access time savings and avoided health care costs. In the cases of wet pits (shared or private) and private dry pits, the annual values from either health or access time exceed the annual costs of the facilities themselves.

Figure 3. Annualized Costs in Rural Sites (2010 prices, using average exchange rate with US\$)



Urban Areas: Favorable Economic Returns on Full Excreta Management Options

Benefit-cost ratios are compiled for the two urban sites in Figure 4. As with rural areas, the most favorable economic performance was found for wet pit latrines (shared and private) — with benefit-cost ratios of about 6 and annual rates of return of more than 100%. For these facilities, it also requires less than one year to recover the economic value of the initial investment cost. With returns of at least US\$2 for every dollar invested, toilets with access to septic tanks or sewers had lower returns relative to wet pits, but were still economically viable.

As in rural areas, the largest sources of benefits are access time savings and avoided health care costs. For all facilities examined, access time savings exceed the annual costs of the facilities.

Figure 5 shows the costs associated with the different facilities evaluated. It clearly shows the extent to

which toilets with access to septic tanks and toilets that flush to sewers are more expensive than wet pit latrines. Comparing Figure 5 with Figure 4, it also suggests the extent to which costs influence the benefit-cost ratios of the different options.

The findings suggest that low-cost technologies, particularly improved wet pit latrines, are economically viable for urban areas. Septic tanks with septage treatment and sewerage with treatment are economically attractive options but to a lesser degree. However, the environmental benefits of improved sanitation, which were not fully captured in monetary terms in this study, are likely to raise the net benefits of facilities with treatment options.

Sanitation Links to Tourism and Economic Development

A survey of 235 foreign visitors found that the general sanitation conditions can still stand some improvement, particularly in the tourist site of Vang Vieng (Vientiane Province).^v Toilet availability in public places also appears to be a serious concern. Close to half (46%) of the respondents said that, when outside the hotel, they could not find a toilet at a time of need. About a fifth (19%) of the respondents admitted to having experienced gastrointestinal problems during their stay. On average, affected visitors were incapacitated for about half a day but felt the symptoms for slightly more than two days. This is a cost to tourism. The amount that visitors could have spent during those days of illness represents foregone earnings for the tourism industry.

Seventeen business owners/managers operating in Vientiane Capital were asked to rate different aspects of sanitation in their areas of operation. On a scale of 1 (best) to 5 (worst), the most favorable average ratings were given to the water quality of rivers (2.4), air quality from human excreta in public spaces (2.6) and household coverage with private toilets (2.6). In contrast, the least favorable ratings were given to the presence of toilets in public places (4.2). While sanitation did not appear to be a serious consideration in the location of the firms surveyed, the study found evidence that it has an effect on business operations. All respondents cited that poor water quality could have a serious impact on their business, suggesting an important link between sanitation and business operations.

Figure 4. Benefit-Cost Ratio in Urban Sites (economic return per unit of currency spent)

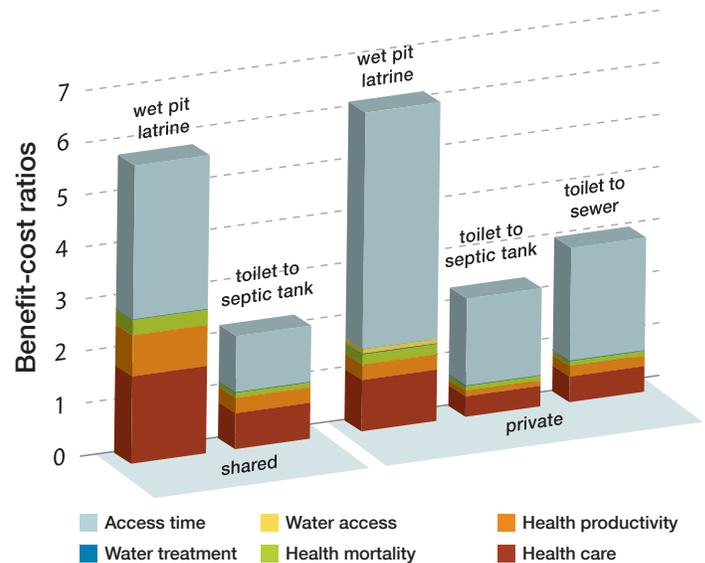
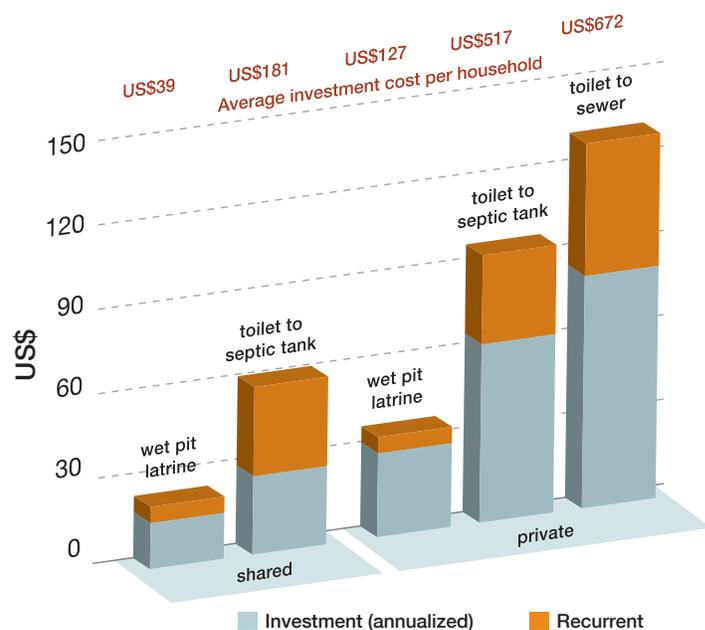


Figure 5. Annualized Costs in Urban Sites (2010 prices, using average exchange rate with US\$)



KEY FINDINGS AND RECOMMENDATIONS

This study finds that all sanitation interventions examined have benefits that exceed costs, when compared with “no sanitation facility.” The high net benefits from low-cost sanitation options, such as wet pit latrines in urban areas and all types of pit latrines in rural areas, suggest that these technologies should be at the center of national plans for sanitation improvements, especially where funds are scarce. However, treatment facilities should not be overlooked especially in urban areas. For one, these options also had positive net benefits, albeit lower than pit latrines. Moreover, the appropriate treatment and/or isolation of waste are essential to the future sustainable development of Lao PDR.

The net benefits of sanitation interventions also vary considerably from one site to the next. This suggests a careful consideration of site conditions before interventions are implemented.

While not directly drawn from the study, it is important to emphasize that there is still an urgent need to increase access

to improved sanitation in Lao PDR. This can be seen clearly from the WHO/UNICEF Joint Monitoring Programme (JMP) statistics for 2010, which indicate that about 4 in 10 people (37%) in the country did not have access to improved sanitation facilities. This is further supported by evidence that the economic costs of poor sanitation are large.

Recommendations:

1. Increase access to improved sanitation in rural areas. Data from the JMP show that access to improved sanitation is substantially lower in these areas. The stronger emphasis on investment in rural areas is also supported by the finding that the net returns to sanitation investments, at least from the perspective of the benefit-cost ratios, are higher in these areas compared to urban areas. This recommendation does not suggest abandoning efforts to increase access to improved sanitation in urban areas. For one, 11% of the urban population in 2010 did not have access to improved sanitation. However, investment in urban areas may have to go beyond latrines and more into off-site treatment facilities.



2. Focus on least expensive solutions with highest benefits. Achieving economic benefits from increased access to improved sanitation does not require expensive toilet facilities. This study found that the highest net returns were for wet and dry pit latrines in rural areas, and wet pit latrines in urban areas. While the study found that shared toilets have comparable benefit-cost ratios to private toilets, these facilities should not be disregarded altogether. For one, shared toilets were still found to be economically feasible (their economic benefits exceed investment and recurrent costs) despite the fact that users of these options still incur time losses and are less likely to realize the health benefits, especially when facilities are not maintained very well. Where space and funds are seriously constrained, these facilities may continue to offer a practical option until private facilities can be made available to households. However, some consideration must be given to the demand of the community for such facilities.

3. Promote equitable access to improved sanitation. The Government, donor agencies and other institutions will continue to have an integral role in increasing equitable access

to improved sanitation. Information from the World Bank shows that one third of the Lao population lives on less than 1.25 International Dollars per day, and two-thirds live on less than 2 International Dollars per day. The households with no access to improved sanitation facilities are predominantly belonging to this segment of the population. This argument is further supported by the focus group discussion findings, where respondents cited economic factors (e.g. cost is too high), for not having a toilet. However, some care must be exercised in the manner in which institutions participate in providing access to improved sanitation. The field research conducted in this study found that respondents in all sites cited "never offered a toilet" as a reason for not having one. This response creates the impression that households seem to be waiting for an intervention rather than trying to address sanitation problems on their own. Along with the finding that only half of the respondents in the survey claimed to have washed their hands after defecating, this underscores the need for evidence-based behavior change approaches that emphasize the potential benefits of improved sanitation and hygiene.

Acknowledgments

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About us

The Water and Sanitation Program (WSP) is a multi-donor partnership created in 1978 and administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services. WSP provides technical assistance, facilitates knowledge exchange, and promotes evidence-based advancements in sector dialogue. WSP has offices in 24 countries across Africa, East Asia and the Pacific, Latin America and the Caribbean, South Asia, and in Washington, DC. WSP's donors include Australia, Austria, Canada, Denmark, Finland, France, the Bill and Melinda Gates Foundation, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States, and the World Bank.

Contact us

For more information please visit www.wsp.org or email wspeap@worldbank.org

¹ Yunnan Province of China

² Economic assessment of sanitation interventions in Lao PDR. Rodriguez U, Hutton G and Boatman A. Water and Sanitation Program. World Bank. 2013.

³ The figures are from the WHO/UNICEF Joint Monitoring Programme.

⁴ Economic Impacts of Sanitation in Lao PDR. Hutton G, Larsen B, Leebouapao B and Voladet S. World Bank, Water and Sanitation Program. 2009.

⁵ A small town located between Vientiane and Luang Prabang. Vang Vieng is popular among backpackers and low-budget travelers. It is currently being developed to target visitors from higher-end markets.

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