**Resources on Resilient Sanitation**

**Note:** All of the following resources are listed in the Ecological Sanitation and Emergency Toilets sections of [www.phlush.org](http://www.phlush.org). All can be downloaded free. As we try to update the page regularly, we appreciate knowing about works you have found especially helpful. Send comments and suggestions to info@phlush.org

**Sanitation for Emergencies**

[***The Application of Ecological Sanitation for Excreta Disposal in Dsaster Relief: Experience, Selection and Design.***](http://www.phlush.org/emergencysan/ecosan-in-disaster-relief-copy/)By Katherine Kinstedt. Institute of Wastewater Management and Water Protection. Technical University of Hamburg. April 2012.  This brief (39p) overview entitled looks at the cases of Japan and New Zealand, reviews key solutions and proposes an additional longer term (relief and rehabilitation) model based on terra preta sanitation. http://www.phlush.org/emergencysan/ecosan-in-disaster-relief-copy/

[**“Low-Cost Sanitation Solutions A report on progress in Post-Earthquake Haiti”**](http://www.susana.org/docs_ccbk/susana_download/2-1716-a63-fsm2-larsen-salt-lake-city-usa.pdf) Andrew Larsen & Fontes Foundation.” FSM 2 Conference Durban, South Africa October 30, 2012. Project funded by a grant from the Bill & Melinda Gates Foundation. http://www.susana.org/docs\_ccbk/susana\_download/2-1716-a63-fsm2-larsen-salt-lake-city-usa.pdf

[**“Haiti recycles human waste in fight against cholera epidemic”**](http://www.guardian.co.uk/world/2013/mar/10/haiti-human-waste-recycle-cholera) By Isabeau Doucet. *The Guardian, March 10 2013*SOIL Haiti processes feces to produce fertiliser, which is sold for crops and new forests, and to eliminate sources of disease. http://www.guardian.co.uk/world/2013/mar/10/haiti-human-waste-recycle-cholera

[**Emergency and Reconstruction Situations Working Group**](http://www.susana.org/lang-en/working-groups/wg08). Sustainable Sanitation Alliance. http://www.susana.org/working-groups/wg08

**Ecological Sanitation Technologies**

[**Compendium of Sanitation Systems and Technologies**](http://www.susana.org/images/documents/07-cap-dev/a-material-topic-wg/wg01/compendium_final.pdf) This concise document by Elizabeth Tilley et al. of [EAWAG](http://www.eawag.ch/index_EN) presents tried and tested technologies in a way that helps communities make informed decisions.  Part 1 describes different system configurations for a variety of contexts. Part 2 consists of 52 illustrated Technology Information Sheets that cover advantages, disadvantages, applications and the appropriateness of the technologies required to build a comprehensive sanitation system. http://www.watersanitationhygiene.org/References/EH\_KEY\_REFERENCES/SANITATION/Latrine%20Design%20and%20Construction/Compendium%20of%20Sanitation%20Systems%20and%20Technologies%20(EAWAG).pdf

[**Sustainable Sanitation Alliance**](http://www.susana.org/)Incorporating the work of more than 190 partners, the extensive SuSanA website has [case studies](http://www.susana.org/lang-en/case-studies), [videos and photos](http://www.susana.org/lang-en/videos-and-photos), [announcements,](http://www.susana.org/lang-en/news) [a discussion forum](http://forum.susana.org/forum), and [working groups](http://www.susana.org/lang-en/working-groups) where practitioners are invited to get involved.. http://www.susana.org

[**SSWM Toolbox**](http://www.sswm.info/category/concept/concept-introduction) The Sustainable Sanitation and Water Management Toolbox combines clarity on the fundamental concepts with a myriad of practical tools for both [planning and process](http://www.sswm.info/category/planning-process-tools/planning-process-tools-introduction) and for [implementation](http://www.sswm.info/category/implementation-tools/implementation-tools-introduction). The interplay between concept and practice is embodied in the brilliant user interface. http://www.sswm.info/category/concept/concept-introduction

[**Sustainable Sanitation for the 21st Century**](http://www.sustainablesanitation.info/)Each of the 25 modules of this free 5 or 6 week course is clearly laid out like [this](http://www.sustainablesanitation.info/m3a.php) and combines illustrated explanatory source materials and links to further reading with a slide presentation. http://www.sustainablesanitation.info

**EcoSanRes** This project of the [Stockholm Environment Institute](http://sei-international.org/) offers online ecosan publications, factsheets, ecosan resources focused on the developing world, EcoSanRes hosts a [discussion group for ecosan professionals](http://tech.groups.yahoo.com/group/ecosanres/).  To join please send an e-mail describing your interest, name and affiliation. http://www.ecosanres.org/index.htm

**Technology Review of Urine Diversion Dehydration Toilets (UDDTs): Design Principles, Urine and Faeces Management**. Christian Rieck, Dr. Elisabeth von Muench. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Eschborn, May 2011. Available at: [www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=874](http://www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=874)

***The SOIL Guide to Ecological Sanitation*** SOIL (Sustainable Organic Integrated Livelihoods) has worked in Haiti before and since the earthquake. Their training manual can be downloaded on line following your request. <http://www.oursoil.org/soils-ecosan-education-resources/>

**Sustainable Sanitation in Cities: A Framework for Action**

Christoph Lüthi, Arne Panesar, Thorsten Schütze, Anna Norström, Jennifer McConville, Jonathan Parkinson, Darren Saywell, Rahul Ingle, 2011. Superb 165 page study explains what’s wrong with contemporary urban systems and what systems that are environmentally and financially more sustainable look like.

http://www.gdrc.org/uem/usan/susana\_sustainable\_sanitation\_in\_cities\_2011.pdf

**Earthquakes and Sewers**

***The Oregon Resilience Plan: Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami.***Report to the 77th Legislative Assembly
from Oregon Seismic Safety Policy Advisory Commission, February 2013

Full plan: http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon\_Resilience\_Plan\_Final.pdf

[Executive Summary](http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon_Resilience_Plan_draft_Executive_Summary.pdf) http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon\_Resilience\_Plan\_Executive\_Summary\_Final.pdf

***The Orphan Tsunami***The story of the January 26,1700 earthquake which struck the Pacific Northwest reads like an adventure story.  Authored by Brian F. Atwater in collaboration with Japanese experts, the beautifully illustrated 144-page book is downloadable free. http://pubs.usgs.gov/pp/pp1707/pp1707.pdf

[**Earthquake and Hazards Program**](http://quake.abag.ca.gov/water/)**of the Association of Bay Area Governments.**  Information specific to water and wastewater treatment plants on liquefaction, landslides, location of active faults and details of infrastructure in hazard areas. http://quake.abag.ca.gov/water/

[**Seismic Assessment and Design of Sewers**](http://www.asce.org/Content.aspx?id=12884903562#More) Webinar on earthquake hazards and their impact on wastewater collection systems by Donald Ballantyne, an engineer who has worked on systems in Vancouver BC, Seattle, Portland and SanFrancisco. http://www.asce.org/Content.aspx?id=12884903562#More

**“**[**Sewers Float and other aspects of Sewer Performance in Earthquakes**](http://www.sewersmart.org/summit08/ABAG%20Sewer%20Ballantyne%2010-09.pdf)**”** has illustrations of damaged sewer lines and wastewater treatment plans in a number of US and Japanese cities. Since water pipes must be able to withstand both pressure and soil loading, they are much stronger than sewer pipes which only need to withstand soil loading.  While water plants are generally built on competent soils, wastewater treatment plans are often built on fill where there is greater risk of liquefaction.

[**“Calif. quake model looks for ‘big one’ in NW”**](http://www.kgw.com/news/Computer-model-gives-insight-into-when-the-Big-One-will-hit-186243722.html)  Keely Chalmers January 10, 2013  Short (2:20) video. Good for training awareness.

[**The Earthquake Engineering Research Institute**](https://www.eeri.org/seismic-safety-policy-advocates/).  A place to follow the latest research. https://www.eeri.org/seismic-safety-policy-advocates/

**“**[**Billions needed to upgrade America’s leaky water infrastructure**](http://www.washingtonpost.com/local/billions-needed-to-upgrade-americas-leaky-water-infrastructure/2011/12/22/gIQAdsE0WP_print.html)**.”** *Washington Post.*January 2, 2012.  In the United States, sewer infrastructure is already vulnerable and problems are exacerbated by customer ignorance. http://www.washingtonpost.com/local/billions-needed-to-upgrade-americas-leaky-water-infrastructure/2011/12/22/gIQAdsE0WP\_print.html

[**“Saving U.S. Water and Sewer Systems Would Be Costly”**](http://www.nytimes.com/2010/03/15/us/15water.html?pagewanted=all)  By Charles Duhigg *New York Times*: March 14, 2010 http://www.nytimes.com/2010/03/15/us/15water.html?pagewanted=all&\_r=1&

**Urine Reuse**

**Practical Guidance on the Use of Urine in Crop Production**. Anna Richert, Robert Gensch, Håkan Jönsson, Thor-Axel Stenström and Linus Dagerskog. Stockholm Environment Institute, EcoSanRes Series, 2010-1.  Available at: [www.ecosanres.org/pdf\_files/ESR2010-1-PracticalGuidanceOnTheUseOfUrineInCropProduction.pdf](http://www.ecosanres.org/pdf_files/ESR2010-1-PracticalGuidanceOnTheUseOfUrineInCropProduction.pdf)