

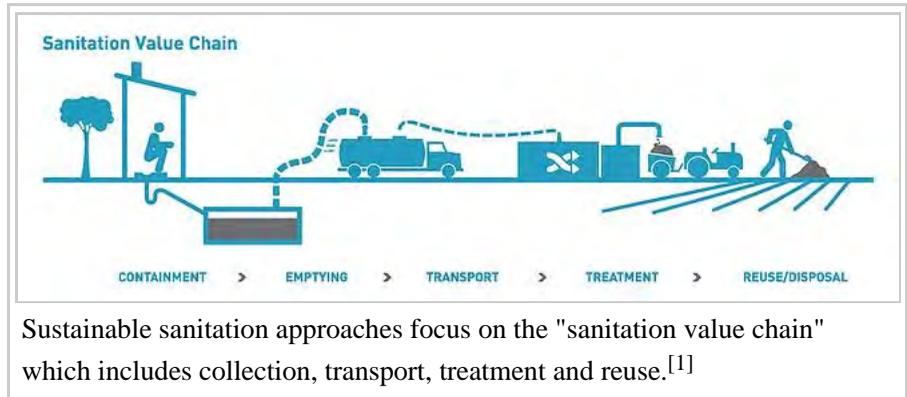
# Sustainable sanitation

From Wikipedia, the free encyclopedia

**Sustainable sanitation** is a type of sanitation system which was first defined by members of the Sustainable Sanitation Alliance. To be sustainable, the sanitation system should meet the following five criteria: it should be economically viable, socially acceptable, technically and institutionally appropriate, and protective of the environment and the natural resources.<sup>[2]</sup> The purpose of

sustainable sanitation, like sanitation in general, is to protect and promote human health by providing a clean environment that reduces disease, particularly by transmission via the fecal-oral route. Sustainable sanitation, defined in this way, may or may not have an emphasis on reuse of excreta.

This approach to sanitation requires a systems thinking approach, rather than only focussing on the toilet itself.<sup>[3]</sup> The experience of the user, waste collection methods, transportation or conveyance of waste, waste treatment, and reuse or disposal all need to be thoroughly assessed.<sup>[3]</sup>



Sustainable sanitation approaches focus on the "sanitation value chain" which includes collection, transport, treatment and reuse.<sup>[1]</sup>

## Contents

- 1 Terminology
  - 1.1 Comparison with "improved sanitation"
  - 1.2 Comparison with ecosan
- 2 Sustainability criteria
  - 2.1 Health
  - 2.2 Environment and natural resources
  - 2.3 Technology and operation
  - 2.4 Finance and economics
  - 2.5 Socio-cultural and institutional aspects
- 3 Planning for sustainable sanitation
- 4 Examples
- 5 See also
- 6 References
- 7 External links

## Terminology

### Comparison with "improved sanitation"

The Joint Monitoring Programme for Water Supply and Sanitation (JMP) of the WHO (World Health Organisation) and UNICEF (United Nations Children's Fund) is responsible for monitoring progress towards the Millennium Development Goal for drinking water and sanitation. For reasons of simplicity — being able to monitor the sanitation situation with household surveys — the JMP had to find a simple differentiation between "improved" sanitation (toilets that count towards the MDG goals) and "unimproved" sanitation (toilets that do not count towards the MDG goals):

Improved sanitation facilities according to the definition of JMP include facilities which are not shared or public and one of the following toilet types: Flush or pour-flush to piped sewer system, septic tank or pit latrine; ventilated improved pit latrine, pit latrine with slab or a composting toilet. Unimproved sanitation facilities according to the JMP include: Flush or pour-flush to elsewhere (excreta are flushed to the street, yard or plot, open sewer, a ditch, a drainage way or other location), pit latrine without slab or open pit, bucket, hanging toilet or hanging latrine, no facilities or bush or field (open defecation).

When comparing this definition with the definition of sustainable sanitation, it becomes clear that in some circumstances "improved" sanitation facilities can be regarded as not sustainable, whereas in other circumstances "unimproved" sanitation facilities can be regarded as sustainable: This depends on the sanitation system, of which the toilet is only one part. For example, a pit latrine with a slab can become unsustainable sanitation if it is polluting the groundwater or if the faecal sludge that is removed from the pit latrine is dumped into the environment. A bucket toilet can become sustainable if the collection, treatment and reuse or disposal of excreta is taken care of in a safe manner, for example with the urine-diverting dry toilets that SOIL is employing in Haiti.<sup>[4]</sup>

## Comparison with ecosan

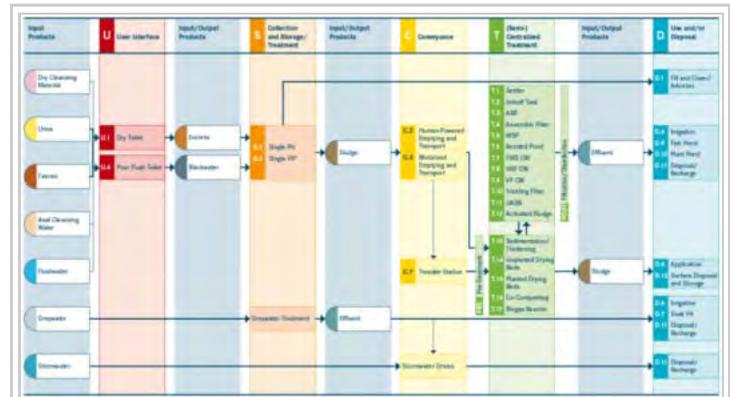
Sustainable sanitation, defined with the five sustainability criteria, may or may not have an emphasis on reuse of excreta, because the criterion of "protecting the natural resources" is only one of several that need to be strived towards. In comparison, ecological sanitation (ecosan) has a strong focus on reuse of excreta.

## Sustainability criteria

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order to be sustainable a sanitation system has to be not only economically viable, socially acceptable and technically and institutionally appropriate, but it should also protect the environment and the natural resources. When improving an existing and/or designing a new sanitation system, sustainability criteria related to the following aspects should be considered, according to the Sustainable Sanitation Alliance.<sup>[2]</sup>

## Health

Health aspects include the risk of exposure to pathogens and hazardous substances that could affect public



Example for the systems approach of sustainable sanitation: Single Pit System (Compendium of Sanitation Systems and Technologies)

health at all points of the sanitation system from the toilet via the collection and treatment system to the point of reuse or disposal. The topic also covers aspects such as hygiene, nutrition and improvement of livelihood achieved by the application of a certain sanitation system, as well as downstream effects.

## **Environment and natural resources**

Environment and natural resources aspects involve the required energy, water and other natural resources for construction, operation and maintenance of the system, as well as the potential emissions to the environment resulting from use. It also includes the degree of recycling and reuse of excreta practiced and the effects of these, for example reusing the wastewater, returning nutrients and organic material to agriculture, and the protecting of other non-renewable resources, for example through the production of renewable energy (e.g. biogas or fuel wood).

## **Technology and operation**

Technology and operation aspects incorporate the functionality and the ease with which the system can be constructed, operated and monitored using the available human resources (e.g. the local community, technical team of the local utility etc.). It also concerns the suitability to achieve an efficient substance flow management from a technical point of view. Furthermore, it evaluates the robustness of the system, its vulnerability towards disasters, and the flexibility and adaptability of its technical elements to the existing infrastructure, to demographic and socio-economic developments and climate change.

## **Finance and economics**

Financial and economic issues relate to the capacity of households and communities to pay for sanitation, including the construction, maintenance and depreciation of the system. Besides the evaluation of investment, operation and maintenance costs, the topic also takes into account the economic benefits that can be obtained in “productive” sanitation systems, including benefits from the production of the recyclables (soil conditioner, fertiliser, energy and reclaimed water), employment creation, increased productivity through improved health and the reduction of environmental and public health costs.

## **Socio-cultural and institutional aspects**

Socio-cultural and institutional aspects take into account the socio-cultural acceptance and appropriateness of the system, convenience, system perceptions, gender issues and impacts on human dignity, the contribution to subsistence economies and food security, and legal and institutional aspects.

Most sanitation systems have been designed with these aspects in mind, but in practice they are failing far too often because some of the criteria are not met. In fact, there is probably no system which is absolutely sustainable. The concept of sustainability is more of a journey rather than a stage to reach. Nevertheless, it is crucial that sanitation systems are evaluated carefully with regard to all dimensions of sustainability. Since there is no one-for-all sanitation solution which fulfills the sustainability criteria under different circumstances to the same extent, this system evaluation will depend on the local framework and has to take into consideration existing environmental, technical, socio-cultural and economic conditions.

## **Planning for sustainable sanitation**

Some basic principles should be observed when planning and implementing a sustainable sanitation system.

These were endorsed by the members of the Water Supply and Sanitation Collaborative Council as the “Bellagio Principles for Sustainable Sanitation” during its 5th Global Forum in November 2000:

1. Human dignity, quality of life and environmental security at household level should be at the centre of any sanitation approach.
2. In line with good governance principles, decision making should involve participation of all stakeholders, especially the consumers and providers of services.
3. Waste should be considered a resource, and its management should be holistic and form a part of integrated water resources, nutrient flow and waste management processes.
4. The domain in which environmental sanitation problems are resolved should be kept to the minimum practicable size (household, community, town, district, catchment, city).

These planning guidelines have been revised further and are now used in various training courses for urban planners.<sup>[5][6]</sup>

## Examples

Some examples for improving present sanitation practices in the short-term, purely from a *technology perspective*:

- Pit latrines could be modified to be soil-composting latrines (Arborloos), thus requiring some wall reinforcement, made shallow (max 1-1.5 m) and maintained using daily soil additions; the pits would be periodically closed and covered with soil in order to allow for sanitization and composting prior to emptying and reuse in agriculture.
- Simple urinals with separate collector systems could be installed instead of using toilets and pit latrines for urination
- Flush toilets could be modified to use less water or reuse greywater.<sup>[7]</sup>
- Greywater could be source-separated from the blackwater from toilets thus simplifying its treatment and providing opportunities for reuse.
- Blackwater from toilets could be held in conservancy tanks instead of open septic tanks and cess pits and then emptied and transported to biogas reactors; alternatively the toilets could be connected to biogas reactors.
- Cess (or drainage) pits e.g. from pour-flush toilets could be equipped with a safety zone of additional filter material to prevent contamination of ground water.
- Above ground dry toilets with urine diversion could be installed in dry areas lacking water, rocky areas where pits are expensive to dig and areas with high water tables and flooding.

With respect to the other sustainability factors, key areas of attention need to be creation of an enabling environment, market development and capacity development.

## See also

- Bill and Melinda Gates Foundation - active in the area of sustainable sanitation research and implementation

## References

1. BMGF (2015). Building demand for sanitation - a 2015 portfolio update and overview (<http://www.susana.org/en/resources/library/details/2317>) - Water, sanitation, and hygiene strategy, June 2015. Bill & Melinda Gates Foundation, Seattle, Washington, USA
2. SuSanA (2008). Towards more sustainable sanitation solutions - SuSanA Vision Document (<http://www.susana.org/en/resources/library/details/267>). Sustainable Sanitation Alliance (SuSanA)
3. Tilley, E., Ulrich, L., Lüthi, C., Reymond, Ph. and Zurbrügg, C. (2014). Compendium of Sanitation Systems and Technologies. 2nd Revised Edition (<http://www.sandec.ch/compendium>). Swiss Federal Institute of Aquatic Science and Technology (Eawag), Duebendorf, Switzerland
4. Russel, K. (2013). Mobile sanitation services for dense urban slums (<http://www.susana.org/en/resources/library/details/1753>) - Various documents on results from research grant. Stanford University, USA
5. IWA (2005). Sanitation 21 - Simple approaches to complex sanitation (<http://www.susana.org/en/resources/library/details/1336>). International Water Association (IWA), London, UK
6. Lüthi, C., Panesar, A., Schütze, T., Norström, A., McConville, J., Parkinson, J., Saywell, D., Ingle, R. (2011). Sustainable sanitation in cities: a framework for action (<http://www.susana.org/en/resources/library/details/1019>). Sustainable Sanitation Alliance (SuSanA), International Forum on Urbanism (IFoU), Papiroz Publishing House, ISBN 978-90-814088-4-4
7. Duttle, Marsha (January 1990). "NM State greywater advice". New Mexico State University. Retrieved 23 January 2010.

## External links

- Sustainable Sanitation Alliance website

Retrieved from "[https://en.wikipedia.org/w/index.php?title=Sustainable\\_sanitation&oldid=748558385](https://en.wikipedia.org/w/index.php?title=Sustainable_sanitation&oldid=748558385)"

Categories: Hygiene | Sanitation | Sustainability by subject

- 
- This page was last modified on 8 November 2016, at 21:25.
  - Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the Terms of Use and Privacy Policy. Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a non-profit organization.