Open Planning of Sanitation Systems*

Sustainable sanitation

A sanitation system is much more than a technology. It encompasses the collection, transport, treatment and management of the end products of human excreta, solid waste, industrial wastewater and storm water.

Sanitation systems can be regarded as sustainable if they protect and promote human health, do not contribute to environmental degradation or depletion of the resource base, and are technically and institutionally appropriate, economically viable and socially acceptable. It is not always simple to identify the sanitation solution that complies with this definition of sustainability. A strategy for achieving this goal on a project level is proposed below.

Involving the users

In order to achieve a well-functioning system, it is important to involve the users and other relevant stakeholders from the start. The probability of success will increase if the future users are planning participants and are given a sense of ownership of the project.

Open Planning as a tool

There are five steps of the "Open Planning of Sanitation Systems". The basic strategy is to involve the users of the system and to propose several sanitation alternatives that comply to a Terms of Requirements taking into account both primary functions (hygiene/ environment) as well as practical functions (costs/ user friendliness etc.) for them to choose from. Letting the users choose an affordable system that best matches their preferences will increase the likelihood that the system is properly operated and maintained.

This proposed procedure will naturally take more time and can cost more in the beginning. However, it is likely to save time in the implementation phase, and to reduce overall project costs by allowing for stakeholder input.

The five steps

Step 1: Problem identification

Problem identification is an important component of successful project planning. If problems and their causes are not identified, the project is likely to fail. The use of LFA (Logical Framework Approach) or PHAST (Participatory Hygiene and Sanitation Transformation) is recommended. Both strategies contain tools for problem identification and allow stakeholder participation. A workshop can be of great help when run by a facilitator who is familiar with the above methodologies and has knowledge of the links between sanitation and other sectors, e.g. agriculture. It is vital that the facilitator also has a good understanding of the community situation.

Stakeholder identification

In sanitation planning, stakeholders that need to be involved may include:

- residents
- planners and political decision makers
- land owners
- farmers
- contractors

People that are not directly involved but who will be affected by the sanitation system, such as neighbours and people living downstream, also need to be considered.

Step 2: Identification of baseline/boundary conditions

This step assesses the conditions for the project. Subjects to be addressed can include:

- geographic limits

Example of Terms of Requirements for a Low-cost Sanitation System

Primary functions	Practical and economical aspects
Hygiene and disease protection • High hygienic standard within the toilet and the washing areas • Storage/disposal of excreta without the risk of seepage of pathogens into the groundwater • Collection and disposal of waste products in a hygienically safe manner *Water Protection* • Storage/disposal of excreta with no risk of leachate of nutrients into the groundwater • Protection of surface waters from nutrients and organic matter originating from toilets and greywater/wastewater *Natural resources conservation* • Recycling of virtually all nutrients from the sanitary system onto productive land • Collection and recycling of water	*Economics* • Reasonable investment costs. • Operation and maintenance by households *Reliability* • Robust technology, functional during extreme weather conditions *Flexibility* • Technology adaptable to varying household sizes. • System works without electricity *User aspects* • Toilet located inside the house • Easy to use by children, women, and the elderly • Quick and easy maintenance *Responsibility* • Clear responsibilities of households and authorities *Control* • System performance can be evaluated

*Based on Kvarnström, E. and af Petersens, E. 2004. Open Planning of Sanitation Systems. EcoSanRes Publication Series. Report 2004-3. Stockholm Environment Institute; Stockholm, Sweden. Available from ecosanres.org.

- socio-economic patterns
- cultural habits
- system financing
- legal frameworks
- natural environmental conditions
- present infrastructure

The proposed sanitation system needs to be defined with these key questions: where does the system begin and end? Does it include all wastewater fractions of the household?

Step 3: Terms of Requirements

The Terms of Requirements (ToR) should be comprehensive and include all factors needed to ensure sustainable sanitation in the actual context. They are usually set by a facilitator together with stakeholders and the body, often the local government, responsible for sanitation. Function requirements can be organized into two blocks. The first block contains primary functions such as hygiene, environmental protection and resource conservation. The second block is applicable more for the user, and practical functions such as user-friendliness, reliability and affordability are defined. A viable balance between these two blocks needs to be obtained. There are no universal ToR that can describe what is sustainable in all settings. The ToR need to be identified for each setting. Ideas for different categories in the ToR that might be of importance to address for identification of an appropriate and sustainable sanitation system are given below. They encompass both primary functions and practical functions.

Primary Functions:

Hygiene and disease protection

The system should not cause unsanitary conditions or nuisances such as foul odours or insect infestations in any part of the system. The toilet itself should be easy to use and clean. For a dry system, an above-ground collection container for faeces is recommended to minimize risk of groundwater contamination. If recycling of waste products from the sanitary system is considered it must be hygienically safe (see EcoSanRes Factsheet 5). Outgoing wastewater should be treated and discharged to surface water or be reused for irrigation.

Water protection

In order to be environmentally sustainable, surface- and groundwater should as much as possible be protected from nutrients, organic matter and pathogens from the sanitation system. Infiltration, as a treatment method, should be avoided, since groundwater is commonly used as drinking water. Greywater, which includes water from laundry and washing but is not contaminated by excreta, should be treated before discharge (see EcoSanRes Factsheet 8).

Natural resource conservation

Natural resources to be considered for sanitation systems include water, nutrients, land requirement and energy. Recycling the nutrient content in sanitized excreta and wastewater can be done in agriculture or other soil-plant systems. The sanitation system could include reclamation of wastewater or greywater if freshwater is scarce. If it is used for irrigation, the risk of soil salinization needs to be considered in dry areas.

Practical Functions:

Costs

The chosen solution should be economically reasonable, both as an investment and for operation and maintenance in the long run. This varies considerably depending on the community for which the system is intended.

Reliability

Operational problems can be avoided by selecting technologies that are robust and that can cope with extreme weather conditions. Knowledge or expertise on how to run and maintain equipment should be available locally.

User aspects

The sanitary installation should fulfil basic user requirements including comfort, privacy and status. It is also important to ensure realistic expectations through capacity building and information. It is important that the motivation for the project lies within the community. The system should also be able to accommodate existing household habits and routines, rather than making the daily tasks more time-consuming or demanding. Toilets should suit all users, from women and men to disabled, elderly and children.

Operational responsibility and control

It is important to have clear areas of responsibility regarding operations and maintenance. Private and collective responsibilities should be outlined, and management clearly identified.

It must also be possible to evaluate how well the system operates.

Step 4: Analysis of possible solutions

At least three system solutions that fulfil the Terms of Requirements should be presented to the community. A comparison is made with regards to all criteria. The alternatives should be presented in such a way that the community understands why some techniques are feasible and adequate, whereas others have been abandoned.

Step 5: Choice of the most appropriate solution

The final step in the Open Planning of Sanitation Systems is to evaluate and compare the three possible alternatives from step 4. One possible method is by using a scoring system. The final choice of sanitation system should be made by the stakeholders and future users.

Reference

Schönning, C. and Stenström, T.A. 2004. Guidelines for the Safe Use of Urine and Faeces in Ecological Sanitation Systems. EcoSanRes Publication Series. Report 2004-1. Stockholm Environment Institute: Stockholm, Sweden.

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