Making sustainable choices – the development and use of sustainability oriented criteria in sanitary decision making

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INTRODUCTION

The global sanitation crisis has been recognised by the international community with the setting of a concrete target in the Millennium Development Goals (MDGs) to halve the number of people without access to adequate sanitation by 2015 (UN 2002). However, the Joint Monitoring Programme has found that if the current rate of provision does not improve dramatically, the sanitation target will be missed by over a half billion people, and 2.4 billion people world-wide will still be without access in 2015 (WHO/UNICEF JMP 2004).

With this pressing need for action to meet the MDG sanitation target there is a huge risk that the focus will fall simply on the provision of latrines/toilets, overlooking what is needed for sanitation systems and the related services to be sustainable from a broader perspective. However providing unsustainable sanitation systems will only be a short-term solution that will inevitably lead to long-term problems. Current legislation and decision-making procedures for choosing sanitation systems are determined by the norms, standards, and practices of conventional, end of pipe sanitary thinking, based to a large degree on the initial investment and operation and maintenance cost of the system. However, for sustainability, a more holistic decision making process for sanitary provision is needed, geared towards finding sustainable systems. Sanitation decisions therefore need to be made considering a much broader range of criteria than at present (Werner *et al*. 2004).

Drawing up criteria – the need to speak the same language

Most usually references to sustainable sanitation are given without any accompanying definition of what the phrase means. However to be able to assess in any way whether the system actually is sustainable it is essential to have an agreed definition of what the sanitation system comprises and what sustainability actually means in the given context. For the criteria list presented in this paper the working group agreed that a sanitation system should be considered as comprising the users of all parts of the system, along with the collection, transport, and treatment of human excreta, grey water, solid waste, industrial wastewater, and storm water, and the management of the resulting end products.

This definition explicitly recognises sanitation as being multi-facetted, and explicitly includes the social aspect of sanitation, the economic and logistical side, and the idea of resource management. It sets the boundary conditions of the system wide to enough to ensure that all effects of the system are contained within its limits, and are thus considered as part of any system assessment (Bracken *et al*. 2005).

Taking this definition and combining it with an understanding of the Brundtland definition (UN 1987) of sustainable development, as development that meets the needs of current generations without compromising the ability of future generations to meet their own needs, an agreed understanding was reached that: a sanitation system that is sustainable protects and promotes human health, does not contribute to environmental degradation or depletion of the resource base, is technically and institutionally appropriate, economically viable and socially acceptable.

Suggestion of a general criteria list for the sustainability assessment of sanitation systems

In developing the criteria presented here (see Table 1) the working group was aware that one cannot prepare a general list of sustainability criteria that will be universally applicable. The requirements of sustainability are dictated by context, and can change with time. The list is therefore not definitive but intended to encourage sanitation planners to integrate the concept of sustainability criteria into their work using these criteria as a base, and to define, with the relevant stakeholders, what other criteria a planned sanitation system should fulfil in order to be sustainable in that context. It aims to provide certain "core" considerations of sustainability, which should be the minimum considered in any basic list to assess a sanitation system. The criteria list could also serve as a base upon which a technical working group could begin drawing up new standards.

As can be seen, the criteria are divided into five main categories; health, environment, economy, socio-culture, and technical function, with each category containing a range of indicators. This represents an expansion of the broadly accepted triple bottom line of economy, society and environment, which we believe was needed to reflect adequately the particularities of sanitation. A separate category for health was made to emphasise the fact that the protection and promotion of human health is the main aim of sanitation. The technical function of the system was also considered an important criterion for sustainable functioning of the system, which could not be satisfactorily addressed under the other criteria categories. The categories are further described below. Where possible, an attempt has been made to give a clear method of quantification in the descriptions (and correspondingly in the table) to highlight how these criteria vary from existing standards.

Table 1. Suggested list of criteria to assess the sustainability of sanitation systems (Bracken *et al.* 2005)

CRITERIA	INDICATOR
HEALTH	
Risk of infection of complete use of system	Risk assessment or qualitative
Risk of exposure to hazardous substances: heavy metals, medical residues, organic compounds	Risk assessment or qualitative
ENVIRONMENT	
Use of natural resources, construction and O&M	
Land (investment, constr. and O&M)	m2/pe
Energy (constr. and O&M)	MJ/pe
Construction material (constr.)	Type and volume
Chemicals (constr. and O&M)	Type and volume
Fresh water (O&M)	
Discharge to water bodies	
BOD/COD	g/pe/yr
Impact on eutrophication	g/pe/yr of N and P
Hazardous substances: heavy metals, persistent organic compounds, antibiotics/medical residues, hormones	mg/pe/yr
Air emissions	
Contribution to global warming	kg of CO2 equivalent/yr
Odour	Qualitative
Resources recovered	
Nutrients	% of incoming to the system
Energy	% of the consumption within the system
Organic material	% of incoming to the system
Water	% of incoming to the system
Quality of recycled product (released to soil)	
Hazardous substances: heavy metals, persistent organic compounds, antibiotics/medical residues, hormones	mg/unit
ECONOMY	
Annual costs, including capital and maintenance costs	Cost/pe/yr
Capacity to pay – user (% of available income)	Disposable income/pe
Local development	Qualitative

Table 1 ***continued***. Suggested list of criteria to assess the sustainability of sanitation systems (Bracken *et al.* 2005)

CRITERIA	INDICATOR
SOCIO-CULTURAL (Institutional and User)	
Willingness to pay (% of available income)	Reasonable % of income – defined by users
Convenience (comfort, personal security, smell, noise, attractiveness, adaptability to different age, gender, and income groups)	Qualitative
Institutional requirements	Qualitative
Responsibility distribution	Definition of level of organisation
Current legal acceptability	Qualitative
Appropriateness to current local cultural context (acceptable to use and maintain)	Qualitative
System perception (complexity, compatibility, observability – including aspects of reuse)	Qualitative
Ability to address awareness and information needs	Qualitative
TECHNICAL FUNCTION	
System robustness: risk of failure, effect of failure, structural stability, robustness against extreme conditions	Qualitative
Robustness of use of system: shock loads, abuse of system	Qualitative
Possibility to use local competence for construction and O&M	Qualitative
Ease of system monitoring	Qualitative
Durability / Lifetime	Qualitative
Complexity of construction and O&M	Qualitative
Compatibility with existing systems	Qualitative
Flexibility / adaptability (to user needs and existing environmental conditions – high groundwater level, geology etc.)	Qualitative

CONCLUSIONS AND RECOMMENDATIONS

The list of criteria presented in this submission is seen as a contribution to advancing the discussion regarding the use of criteria in sanitation decision-making. It is based on the different criteria / functions / indicators already used by those working in this field, which have been discussed and adapted during the course of two international workshops. The criteria in the list have been deliberately drawn up in a general fashion in recognition of the fact that such criteria need to be developed “in situ” for them to be of real relevance in decision making. Where possible an indication of how to quantify the sustainability indicators has been given. The general list provided here could be used as a basis for decision making and adapted to suit the needs of the situation with the participation of all stakeholders. The list of criteria can be used to narrow down and focus discussions among decision-makers and also inspire to the development of context-specific sustainability criteria in the actual planning situation.

Sustainability criteria however can serve several other purposes. They can be a very useful tool in participatory processes, can provide a sound basis for the development of new

technical and treatment standards, and can be a useful tool to employ in the evaluation of existing sanitation systems.

This paper strongly recommends the use of sustainability criteria in any strategic sanitation planning and decision making process whether on a macro or micro project level. However criteria for sustainable sanitation systems alone will not suffice to allow for planning and implementation of sustainable sanitation systems and services. The use of sustainability criteria, without a process-oriented approach, will be a tool of only academic use. Sustainability criteria should therefore be integrated into current, commonly used decision-making processes as well as into more recently introduced approaches to sanitation, such as the guidelines for implementing the Bellagio Principles in urban environmental sanitation services (Eawag 2005). On the macro level, international financing and donor organisations must be encouraged to make sanitation decisions on the basis of sustainability considerations.

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