sustainable sanitation alliance

SuSanA - fact sheet

sustainable school sanitation

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Introduction

The major challenge to reach the MDG target for sanitation is not mainly technical or economic; it lies in raising the awareness of the origin of the diseases and changing traditional views and habits on good hygiene[1]. Behaviour is formed in childhood and education on health and hygiene in schools therefore has a very important role to play to improve peoples living conditions in a long term perspective. Another major challenge is overcome taboos on recycling of human excreta[2] as one way to sustainable sanitation solutions and at the same time increase the food security. Sustainable sanitation facilities in schools offer a way to better learning abilities, improved health and higher attendance at school[3].

Education on sustainable sanitation in school is also an effective way to promote sustainable sanitation and hygienic behaviour in a long term perspective. Starting with positive experiences at young age teaches the children skills for life, skills that will be transferred to their own children[9] Children who have adequate water, sanitation and hygiene conditions at school are more able to integrate hygienic behaviour into their daily lives and can thereby be effective agents of change in their families and the wider community[6]. Recent studies in Bolivia shows that the rate of proper use of sustainable sanitation increased significantly in the communities when sustainable facilities were introduced in schools as well[4] and from Nepal many success stories are reported where schools are the agent of change for improves sanitation in the communities via their SLTS-programme (school led total sanitation)[5].

Although sustainable sanitation in schools has many positive effects that reach far beyond the school setting, “acceptable levels of safe water, sanitation and hygiene are not met in many schools world-wide”[6]. At the present as many as 150 children have to share one toilet in some regions. Facilities are often overfilled and stinking which makes them both unattractive and hazardous for the children to use[7]. Many schools in developing countries do not provide appropriate hand washing facilities, and where such are available they may be poorly located, have insufficient hand washing materials or be insufficient for other reasons[8]. There is evidently a great urge for sustainable sanitation solutions in schools, but as sanitation in general it receives very little attention on political levels[9].

The aim of this fact-sheet is to give an overview of specific needs for sustainable school sanitation in terms of planning and implementation and the positive outcomes of sustainable school sanitation when correctly implemented.

Sustainable sanitation in schools

The concept of sustainable sanitation is a way to embrace the whole system of sanitation, to achieve a long lasting, ecological solution suitable for the local conditions[10]. This means that the sustainable sanitation system when designed for a school should consider what technology is suitable for the local conditions, existing structures on the location and take cultural and religious traditions on sanitation into account. Economic capacity and available capacity for operation and maintenance also needs to be considered. This while fulfilling the aims of improved health and hygiene and environmental protection.

The access of safe water throughout the year has to be one of the major determinants when choosing sanitation technologies and hand washing facilities for school settings. The required amounts of water for the number of schoolchildren in the setting have to be covered by the actual supply, and the techniques adjusted to this[6]. Dry, urine diverting systems are water saving, and there are simple water-saving hand-washing devices which use as little as a few decilitres per wash Constraints in available space in relation to number of pupils is often experienced in school settings and further restricts the technical options available.

In its basic principles, sustainable sanitation considers waste a resource, environmental security being one of the core values together with improved health, human dignity and quality of life[11]. Sustainable sanitation solutions therefore encourage reuse of wastewater and human excreta as fertilizer and soil conditioner[11]. Considering reuse of excreta from school settings, all wastes needs to be treated since it is not used within the family[12]. Urine contains almost no pathogens and can be used after only a short storage while faeces and sludge from biogas chambers need secondary treatment, e.g. storage and composting before use as soil conditioner. Systems with urine diversion in a school setting facilitate the waste management where reuse is practiced. Urine and treated faeces/sludge can then be used in school gardens to show the benefits of sustainable solutions to schoolchildren and the community or sold to interested farmers nearby.

Stakeholder participation is emphasized in the process of creating a sustainable sanitation system for it to be accepted and well used in a long term perspective. In schools special considerations has to be made to the children in planning and design of both hardware and software. Without a child-centred approach the installed sanitation system risk to remain unused and old behaviours prevail.

Keys for long term success

Important factors for achieving long term success in implementing sustainable school sanitation are to involve the stakeholders in decision making and planning, to have a demand-driven approach and to find a good leader.

Leadership

A visionary, engaged leader committed to the project can inspire the school community in the initial phase and ensure a long term success of the project (provided that she/he remains within the project). It can therefore be worth the effort to find a person, preferably in a decision making position, and initiate him/her in the core values of sustainable sanitation (if *sustainable* sanitation is not already requested by the school itself).

Stakeholder participation

Views of parents, staff, local and religious leaders and health personnel on the adequacy of the sanitation system influence the likelihood of schoolchildren to use the facilities, why all stakeholders need to accept the solution and be part of the planning and decision making process. Sustainable sanitation solutions, especially with reuse of wastes as are often perceived as more complex to operate and maintain than conventional technologies, additionally reuse of human wastes might be sensitive in many cultures. Therefore a participatory approach is of special importance when installing sanitation with reuse to ensure that it is socially acceptable

It is also important to include schoolchildren in the decisions on location and design of facilities since perceptions and views of pupils on what is safe and inviting facilities differ from views of adults. What is a safe and practical location for adults may imply embarrassment to approach for adolescents, a dark toilet or big squatting hole may be frightening to a young child, and the bushes intended to provide privacy may pose a threat of harassment of young girls. Children also many times have innovative solutions to the problem and can contribute greatly to achieve good, user-friendly facilities.

Demand driven process

To achieve success it is also profitable with mainstreaming efforts among the stakeholders, to win the confidence of the local leaders and thereby create a demand for a sanitation system which is sustainable. In this process it is necessary to inform and involve the stakeholders by presenting different options and thereby enable them to make an informed choice. In this process it is crucial to listen to the needs and wishes of the stakeholders and use their knowledge to find the best local solution.

The benefits from sustainable sanitation solutions as low or no odour and fly breeding and economic benefits from sanitation with reuse of human wastes in terms of higher yields and incomes from vending fertilizer can provide the last arguments for sustainable sanitation solutions to appeal to the community, when health benefits alone is not enough. In some regions as West Africa, use of urine as fertilizer is even a driver of sanitation.

Hardware

The first thing to consider in achieving sustainable school sanitation is to have sufficient durable toilets, hand washing facilities and waste treatment at the school.

Toilets

Dimensions

The number of toilets has to be sufficient for present as well as expected number of students to match needs and to avoid long waiting times and overfilled toilets. It has to correlate with the number of children in the school, but also with routines in schools as shown in figure 1. The regulated number of schoolchildren per toilet differs, but a general recommendation is no less than 1 toilet/urinary per 25 schoolchildren / staff. Most planners face overcrowded schools and lack of space and have to adjust the infrastructure to these challenges. The number of toilets, location, choice of technology and design needs to correlate with economic capacity and needs and wishes of the users. It is very important to consider the large volumes of excreta produced in a school[13]. M Samwel estimates that a school of 300 pupils produce approximately 5 m^3 of urine/year. The planned system needs to have the capacity to collect these volumes with reasonable emptying times to ensure function and maintenance. *Overfilled toilets are unusable, no matter how new and fancy.* It also needs to include capacity waste treatment and/or capacity for safe storage and sanitization of the wastes in the case of reuse.

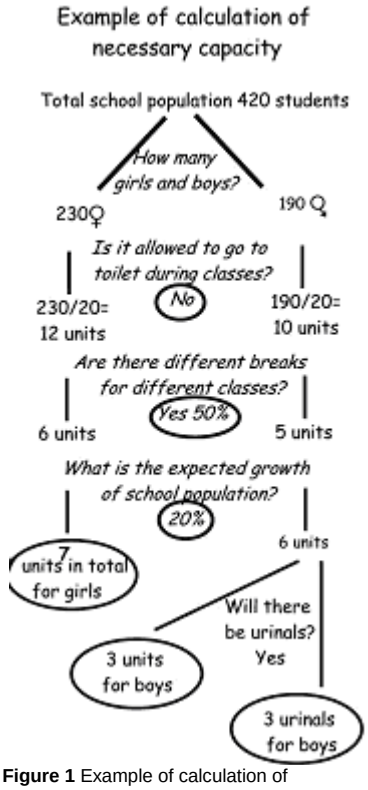

Figure 1 Example of calculation of necessary number of toilets in a school. Source: Zomerplaag and Mooijman, 2005:31

Figure 2 Urine tank in the basement of school, Armenia. Source: AWHHE in Samwel et al, 2007

Location

The location of toilets is important for them to be safely and easily accessible; facilities are recommended to be within 30 m

from all users in the school setting. However, environmental and health aspects has to be taken in account for facilities to be sustainable and functional in a long term perspective, for example position in relation to drinking water sources and health hazards such as garbage dumps and prevailing wind directions to avoid odours. Locations for treatment of wastewater and excreta shall also be taken into account.

The perception of safety, privacy and dignity, especially of small children and girls, are important to observe when choosing the location. If the location, the entrance or the pathway to the facilities is considered frightening, unsafe or is embarrassing, the facilities might not be used. Schoolchildren's perceptions on cleanness and safety may differ from the adult view and it is therefore important to involve schoolchildren in the process of deciding location and designing the sustainable sanitation system to achieve high use-rate of the facilities.

Design

The design of the facilities needs to be child-friendly and accessible for all children, also disabled children. This means that urinals, squatting plates or pedestal toilets etc. are adjusted in size and shape to fit children and to be safe for children to use (see Zomerplaag and Mooijman, 2005 for dimensions and suggestions of design). Separate toilets for smaller children is recommended in big schools, but small adjustments and provisional aids can make full size facilities and entrances accessible and safe for small children.

Disabled children may require additional adjustments, as ramps instead of stairs to elevated toilets.

Figure 3 Urinals in different height for boys Source: AWHHE in Samwel et al, 2007.

Robustness of the buildings is important since there will be a high user pressure on school sanitation facilities. Plastic, porcelain or concrete slabs are recommended even when other parts of the building are constructed with local materials, to facilitate cleaning and hygiene in the toilets.

Gender and privacy

It is important to have separate toilets (and showers in boarding schools) for male and female teachers as well as for boys and girls separated by solid walls with separate entrances Separate facilities for teachers provide a better opportunity for teachers to be good role models in using the toilets and hand washing devices, and can also be a factor in attracting teachers to school located in rural areas.

Separate facilities for girls and boys increase the sense of privacy and allow for different designs with girls'/boys' urinals if a urine diverting system is used. Doors have been shown to break or fall off in many schools due to vandalism and other causes[14] Therefore other model solutions that provide privacy has been developed in school settings, e.g. a spiral structure as shown in figure 4[15].

Figure 4 Toilet building with spiral structure to provide privacy, Zimbabwe. Source: Morgan, P. and Shangwa, A.

Special attention needs to be paid to girls in adolescence, for which culturally appropriate menstrual hygiene facilities needs be taken care of, such as disposal of sanitary pads, washing possibilities etc.. The perception of locations being safe, having sufficient privacy and sufficient hygienic standards are important to increase attendance during menstruation and to reduce drop-outs of adolescent girls.

When using urine diversion systems menstrual blood in the urine may rise as a concern. Recommendations on treatments are made from tests including urine from menstruating women and do not pose any sanitary risks. Discussions in the EcoSanRes discussion group[16] show that blood in the urine bowl can be an embarrassment for girls, why they can be informed to flush with a small amount of water to avoid traces of blood.

Cleaning and maintenance routines

Even if toilets are available in large numbers and have a child friendly design, the toilets will be less frequently used and even be a health hazard if not properly maintained and cleaned. Toilets should be cleaned every day, and if needed also during the day to stay attractive. If the toilets are dirty there is a risk that they are not used, and that children go back to open defecation and might even avoid hand washing. The cleaning can be performed by sanitation staff or sanitation staff together with pupil as a part of their sanitation and hygiene education, but is not to be a punishment for pupil. There are many innovative solutions present on economic solutions to allow for sanitation and cleaning staff, including payment in fertiliser from the school's sanitation system[14].

One important factor is to plan for maintenance and cleaning already when choosing the sanitation system, and involve all stakeholders in the process for them to be aware of the efforts

in maintenance and operation when making the technical choice. The system has to be chosen so that maintenance can be affordable, available and conducted locally.

Anal cleansing
Cultural appropriate anal cleansing material should be sufficiently planned and supplied. Depending on what sustainable system is chosen integrated or separate treatment of anal cleansing material (solids or water) needs to be accounted for. Separate collection and treatment of cleansing material reduces the volumes of excreta and keeps faeces dry when anal washing is practiced, and may therefore be considered. Safe, hygienic collection, handling and treatment are then necessary to avoid a nuisance or health hazard.

Hand Washing
Hand washing facilities has to be provided in ample numbers (general recommendation is one tap per 50 schoolchildren) and with access to safe water in large enough volumes. The hand washing devices has to be designed in a way to avoid contamination and to use as little water as possible.

Figure 5 Girl using simple hand washing device which she constructed. Source: Morgan and Shangwa, unpublished.

The design also needs to be easy for children to access, reach and use, with special considerations of small or disabled children. Hand washing facilities should be located to encourage the use and form a “hygiene barrier” To be able to monitor the hand-washing of especially young children, hand-washing facilities sometimes is preferred close to the classroom.

Soap or other washing material needs to be supplied for hand washing. In some schools stealing of soaps have been a problem, why solutions with e.g.”soap on a rope” or location of hand washing facilities where supervision is possible may be solutions. Constant supply of washing material is of most importance for hygiene and to promote hygienic behaviour.

Wastewater from hand washing and other grey water sources has to be treated, infiltrated or recycled in a safe manner to avoid spreading of pathogens and turning the wash place into a muddy spot, attracting mosquitoes and being unattractive to use.

Reuse of nutrients
One of the advantages with choosing sustainable sanitation is that human waste can be used for biogas production and/or fertilizer and soil conditioner after sanitization. Human wastes can preferably be used for nutrient recycling in school gardens /school fields, but these agricultural areas might not be large enough for the volumes of excreta accumulated at the school or not be an accepted/allowed solution. Each setting needs to have a plan for how to handle this excess material why planning needs to be done in collaboration with school staff and adjacent farmers to investigate possibilities for transport and use of urine and treated faecal wastes or transport for other types of treatment.

Since the school is most likely to be dependent on the surrounding community for complete recycling of the large volumes of excreta, it is important to find forms of reuse which are accepted in the community, and that there is an existing demand for the products. This underlines the importance of a participatory planning approach involving the community.

Vending urine has been practiced with public toilets in Rwanda[17] and also successfully in a pre-school in Kenya. To sell excess urine and compost from a school could give the school a small income, covering for example provision of soap and anal cleansing material. The small income is in Kenya used for benefit of the school.

Software

Children with access to good sanitation facilities are more able to integrate a good behaviour into their daily lives. Infrastructure is a prerequisite for behavioural change, but does in no way guarantee it, why education and participation is very important. Education and knowledge is a step closer, but it does not automatically lead to behavioural change. Factors that trigger behavioural change differ between ages, gender and cultural and religious values and norms, and education needs to be developed to fit these differences. Therefore the methods used in education on sustainable sanitation needs to involve the children in participatory and practical work to develop an education adjusted to each specific situation. That way it is possible to cultivate a demand for a new behaviour which truly leads to long term behavioural change[18]. It is important to underline the influence and participation of the surrounding community in this process as mentioned earlier.

To raise the awareness of the value of reuse and health it is important to include sanitation into the school curricula and to give attention to educating the school staff, both teachers, management and other staff on sustainable sanitation, both for them to understand the importance of good cleaning routines, to be able to become good role models and to get required background knowledge to teach the children. Curriculum development and inclusion of sustainable sanitation in the national teacher training programmes is of vital interest at national level, where involvement of the political leaders is a key to success.

When introducing programmes for sustainable sanitation it is shown to be effective to build on existing structures in the communities and schools, for example Health clubs or other existing clubs, which could be replicated or expanded into “agro-clubs” as well. Clubs offer a way to reach beyond the school setting[19] and may offer an opportunity for teachers to use a freer approach to the subjects, to be handled gentle to

create a positive and open learning environment where children feel free to raise their concerns. It is beneficial and sometimes necessary to have separate boys' and girls' learning groups to approach sanitation issues, and teaching material also needs to be adjusted to the conceptions of children. E.g. technical sketches can be very difficult for children to understand why using a model or simpler drawing is usually better for the understanding. Material to promote hygienic behaviour can also be developed and produced by the children themselves, including and engaging the children in participatory work.

Schoolchildren can enforce positive behaviour in participation in producing tools and materials for promotion of safe sanitation and reuse. Ideally, schoolchildren take part already in the planning and design phase together with the other stakeholders, which provides a good learning opportunity and increased chance of adoption of good practices.

Promote proper use of hardware

Theoretical lectures on hygiene, health, safe treatment and reuse is important for understanding of the value of hygiene, reuse and plant growth but theory is not enough. Participatory, hands-on education is important for the children to practice what they learn and can in that way support behavioural change. A participatory learning situation also gives the children better opportunities to speak freely than a strict classroom situation.

Sustainable sanitation systems are in general more reliant on proper use to function well and produce wastes that are easy to sanitize, especially if a urine diverting system is used. As the hardware is installed, demonstration and trial-practice of toilets and hand-washing devices for the schoolchildren is needed for them to feel comfortable using their new facilities. Inspection of toilets after use and supervision of hand-washing is one key to promote a hygienic behaviour continuously and keep the toilets inviting, this is not least important in an introductory phase and when new classes start.

Figure 6 User training for urine diverting toilets, Kalungu, Uganda. Source: Ecosan Club

Schoolchildren can also take part in building, cleaning, operation and maintenance of toilets and hand-washing devices as part of their practical education[20].

When having sanitation with reuse in schools, participation in operation is more motivated since hands-on education on safe handling, emptying, storage and treatment of human wastes is important for the schoolchildren to acquire knowledge that enable them to collect all benefits of sustainable sanitation and use it outside school, in their homes.

Box 1 Maintenance arrangements in Rwanda

Hygiene and Sanitation in Schools Programme, HAMS (Hygiene et Assainissement en Milieur Scolaire) in Rwanda involves pupils, teachers and community in planning, implementation and monitoring daily hygiene and sanitation in schools. Pupils arrange themselves the cleaning of toilets and each school has HAMS committee, involving pupils, teachers, representative of surrounding community and parents. To ensure the sustainability of sanitation infrastructure and availability of soap and toilet paper all the time, some schools initiated a hygiene fund and parents supported the innovative idea of pupils by contributing to the hygiene fund whenever needed. The idea of Hygiene Fund has been initiated by school committees where they work properly[1].

Reuse of nutrients

In addition to health and hygiene issues related to sanitation, schools with reuse of human wastes needs to provide schoolchildren with possibilities to learn how to handle, sanitize and reuse it in a safe manner. This is a welcome extra effort that means promotion of something positive (improved food security) instead of avoidance of something negative (diseases).

Education on reuse needs to include practical demonstrations and hands-on education where schoolchildren participate in the safe handling and reuse and investigate the benefits in school gardens. This may include trials on using urine as fertilizer, testing how composted faeces can improve the water holding capacity and thereby the production, or simply by using compost and urine to grow vegetables in the school garden. Lush school gardens which provide schoolchildren with vegetables for their lunches also serve as a showcase for families and surrounding farmers. In cases where use of human wastes is not accepted urine and /or faecal compost can be used in nurseries, for flower production or trees instead.

Figure 7 Garden trials in Zimbabwe with untreated and urine treated plants. In each case for rape, spinach and maize the effect is very noticeable. Source: Morgan and Shangwa, unpublished

Different forms of sustainable sanitation solutions which is simple to construct, both toilets and hand washing devices, can also be built in school, for use at the school and moreover for

the children to bring the knowledge home and be able to construct sustainable sanitation facilities in the home.

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