The school toilet is an essential component of a child's learning environment. It not only enables children to access a basic facility for good health and hygiene but also provides an example of how to manage waste and water resources in a scientific and responsible manner. A school toilet has many users, but they remain the same over several years, which is very different from public toilets. Therefore, there exists a potential for developing a good management system. The quality of school buildings may vary tremendously between urban and rural schools, and from country to country. There are countries where pupils in some schools may prefer to defecate in the open (see picture) or even stay away from school if sanitary conditions are too deplorable.

Many countries have strict regulations and designs for school buildings, including toilets. Protecting pupils' health and providing a clean, friendly, hygienic learning environment is a major concern, and consequently schools and kindergartens are viewed as ideal learning centres for developing and nurturing good practices in hygiene and health. Pupils are said to be able to play an effective role in creating a clean and healthy environment, not only in the school, but also in their homes (WHO, 2009).

In some cases, the reality may be close to these ideals but in others it may be very different – it depends on the standards in the country as a whole and whether the schools are rural or urban, public or private. It is not uncommon for schools, particularly those in rural areas, to lack drinking water and sanitation facilities, or for water and sanitation to be inadequate both in quality and quantity. For instance, the Department of Drinking Water Supply, Ministry of Rural Development in India writes: "*Coverage of school and kindergarten sanitation is abysmally low in rural areas. Sanitation facilities, wherever available, are generally unclean, poorly maintained and often not adapted to the needs of children, in particular girls. School sanitation and hygiene education have been given due importance in the Total Sanitation Campaign, and is now actively focusing on school sanitation in the light of the Government's goal to cover all the schools with toilet facilities by 2005-06. Meeting these goals will be critical for the improvement of health, education and all round development of children*." (Government of India, 2004).

Children spend a fairly large part of an average day in school. Schools with poor water, sanitation and hygiene conditions, and intense levels of person-to-person contact, are high-risk environments for children and staff. For instance, intestinal worms thrive in poor sanitary conditions. They infect close to 90 per cent of children in the developing world, and may cause malnutrition, anaemia and retarded growth (UNICEF, 2006). The need for safety standards is based on the fact that children are particularly susceptible to environmental health hazards. The World Health Organisation has prepared WASH (WAter, Sanitation and Hygiene) standards to address health issues for schools in low-cost settings (WHO, 2009).

Improved nutritional status helps to protect health. Sustainable sanitation contributes to improved nutrition in two ways: the re-use of human-derived nutrients as fertiliser will increase yields in food production (school gardens), and lowering the incidence of diarrhoea will promote healthy digestion.

It is often easier to imitate unquestioningly what others do, rather than to do something new and different. This path-dependency is commonplace in the sanitation sector, just as it is in other fields. An example from South Africa illustrates this. The idea of equity between racial groups, regions etc. was very strong after independence. Rural schools with no water were provided with flush WCs and a borehole to supply the required water for flushing. The problem of how to handle the resulting blackwater was neglected and consequently it was often discharged onto open ground. Only recently have rural councils begun installing DEWATS (decentralised wastewater treatment) or biogas reactors to treat the sewage even though a dry system would seem more appropriate under such conditions.

The widespread reluctance of authorities to do something different is also illustrated by the response to urine-diverting toilets (DUDT). The rules and authorising agencies readily accept conventional flush toilets, irrespective of how poorly they function, but they require perfect functioning under all conditions for any alternative option. Even if only two out of three flush toilets are functioning, the authorities will accept them but may refuse to give a permit to build urine-diverting toilets, a technology which is ecologically sound and outperforms dug latrines and often also WCs. However, authorities can sometimes be both farsighted and courageous. For instance, in the Odessa region in the Ukraine, authorities approved the building of DUDTs in some schools with no water supply. In 2009, after some years of positive experiences of these toilets, they made this technology an accepted one in such schools.

The ability to adapt is strong and human beings seem to accept poor sanitary conditions, unless they have seen better ones. Therefore, seeing good examples may help stimulate interest and demand for better options and ultimately break through the barrier which makes people accept unquestioningly the conditions they are accustomed to. The alternatives shown to individuals or groups need to be within their capacity to construct, and if possible they need to be adapted to the local culture. Otherwise, the idea is likely to be turned down with arguments such as “it is too expensive”, or because it is too different from the familiar, or because people are not convinced that it will work. School authorities and other decision-makers should be exposed to alternatives; they should be motivated and encouraged to consider a range of options and be made aware of what is currently available, what works well and what is liked by the users.

With the present international focus on sanitation as part of the Millennium Development Goals (2008 was the Year of Sanitation – remember?) more resources are available for the sector, and this increases our responsibility to use the investments in the best possible ways. We need to start from the fact that the global urban population will double in 40 years, while the rural population will remain constant (UN Statistics, 2008).

Variations in the quality of school toilets

5.3 - 2

Guidelines on sanitation and hygiene in schools are widely available, but standards differ. The four pictures above indicate that the quality of school toilets varies widely. They are from a semi-rural community in Ukraine with no water supply or sewerage. The old school toilet (top left) is still in place but has recently been almost deserted after the new white-coloured one was built (top right).

The old school toilet required minimal management and its main function was to store the excreta away from the pupils in a big pit in the ground. It was sited 50 meters from the classrooms and pupils had to walk there, sometimes through snow during cold winters. The new toilet unit (top right) is attached to the school building and users enter from a school corridor without leaving the school building. The unit is heated in the same way as the classrooms and is warm in the winter.

The inside of the old toilet unit (bottom left) is interesting in that urine is diverted to a groove in the floor next to the user's feet (circled) and eventually flows down into a pit underneath. The toilet was often misused and faecal matter was found on the seat or floor. The next user was forced to defecate a bit to the side and after a short time the whole floor became messy. Some pupils may have been discouraged from misusing the toilet if other users were present. The new toilet room (bottom right) is tiled and easy to clean – even in cases where users have used it carelessly. The squatting pan of hard plastic is waterless and urine-diverting. The urine is collected in plastic containers and used as a fertiliser in the school garden, while the faecal matter and used paper are stored in a chamber below the floor (circled) and either buried or composted together with organic waste and later used as a soil conditioner. The red doors to the chambers for storing faeces and paper are shown in the second picture (top right).

If funds are available, such investments are possible and they improve sanitary conditions tremendously. The pupils can easily visit the toilet. Girls specially appreciate the privacy and school attendance for girls increases. However, the school administration has to enforce a proper management system to maintain high standards of functionality, cleanliness and hygiene. In the case shown here, one school staff member has the responsibility of advising pupils on proper use and carries out regular cleaning of the toilet rooms. Other management options are discussed in connection with slides 17 to 19.

Hygienic conditions for pupils and school staff

5.3 - 3

Incinerator for sanitary pads

Water "tap" for washing hands using 0.1 litre per hand wash

Courtesy of Maria Ines Matiz, Colombia and Subburaman, Scope, India

A toilet is not complete without a hand washing point with soap and adequate drainage. Given that washing hands after defecation is a major barrier against spreading diseases, new toilets must provide facilities for washing hands. Access to water is crucial, and in schools where tap water is not available rainwater can serve the same purpose for at least part of the year. A rainwater tank can also serve as a backup in cases where the tap water is erratic. There are simple ways to reduce the water consumption. A modified plastic vessel (bottom left) uses only 0.1 litres per wash as described in the chapter on public toilets, 5.2-12. In some situations water and soap may not be readily available, but hand washing can instead be done using ash or sand with good results.

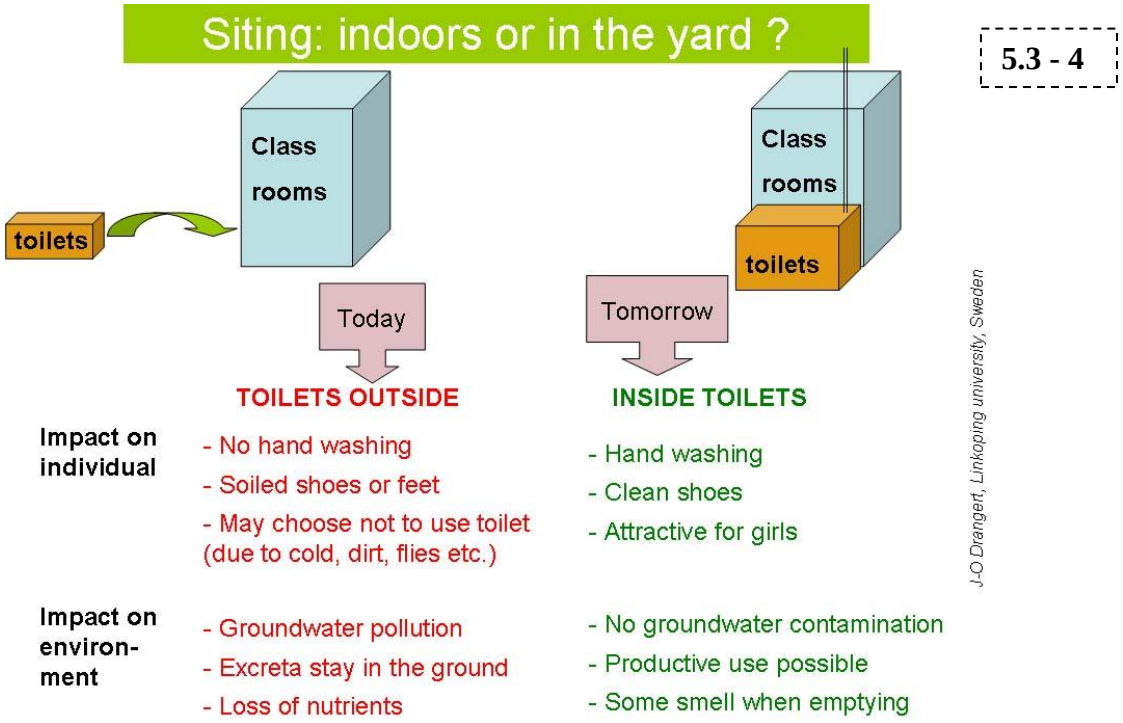
The use of soap in hand washing increases the removal of dirt and microorganisms – if the hands are rubbed together thoroughly. One question is how to make sure there is soap available all the time – and toilet paper whenever the situation demands. We can learn from societies practising anal cleansing with water. People bring water along when they go for defecation. In a similar vein, one could expect pupils to bring soap and toilet paper along to the school toilet. Another approach was used in a boarding school in Ethiopia, where students were given a piece of soap every month and they "paid" for it by not receiving a boiled egg for breakfast one day per month.

Hand washing may become more popular where there is a cold season if the water is lukewarm. This can be achieved by placing a cistern in the attic of the school building in order to bring the water to room temperature. The water flows by gravity to the washbasin. In sunny climates the water can be heated in a simple drum exposed to the sun.

A survey of hand washing in urban schools in Kenya reported: "*Of almost 1000 observed visits to a toilet, less than one-fourth was actually washing their hands afterwards. Access to soap was rare, and observation showed only 5 out of 100 schools had soap available for hand washing. Out of 491 girls observed, 14 used soap to wash their hands and only 7 out of 485 boys after using the toilet"* (Njuguna, 2009). There may be many reasons for the low usage of soap: there may be no soap or towel available, the soap, which is provided for common use may be considered dirty, or it may be swimming in water. Such obstacles could be overcome if pupils brought their own soap! Equally likely reasons are that pupils do not have the habit of washing hands, or they may lack knowledge or not be convinced that soap will improve the effectiveness of washing. Children need to be involved in discussions relating to the benefits of clean hands – the health benefits are the central theme. Such discussions can be associated with more appealing qualities such as "washed hands smell nice" or with the words of some local hero or celebrity who advocates washing of hands because that "protects from disease".

Often, school toilets have no appropriate place where girls can dispose of menstrual cloths and pads. This forces them to throw them in the toilet which in turn may block the WC or pour-flush toilet. A study in Kenya reported that "*The girls ask for permission to go home when menstruating"* (Njuguna, 2009). This response to the problem adversely affects the education of girl pupils. A simple technical solution to overcome this problem is to provide a place for the disposal of menstrual pads and cloths. The above picture (top left) shows an incineration unit attached to the toilet room for girls. They throw the pad down a hole in the wall into a chamber of cement with an iron mesh at the bottom. Lighting a fire underneath incinerates the pads (top left).

A well-functioning, clean school toilet will enable pupils to put into practice the hygiene knowledge that they have learned. Teachers and selected students can be used as role models and practical hygiene can become part of the syllabus. Ideally, pupils will bring these concepts and messages home and encourage their parents to improve the hygiene conditions there. The demonstration effect on visitors is also considerable if the toilets are clean and odourless (see slide 7)??.



Having the toilet indoors rather than in the yard makes a vast difference. In rural schools toilets are often located away from the school buildings, especially if there is no running water. School building regulations may even require the toilet to be at a certain minimum distance, presumably to avoid odour complaints. From a pupil's point of view a yard toilet rarely provides a hand washing facility, and it may lack regular monitoring and cleaning. This encourages careless conduct and neglect of basic discipline, resulting in soiled floors which increase the risk of bringing dirt under one's shoes or feet to the classroom. Also, flies that sit on bits of faecal matter in a dirty toilet may carry microorganisms including pathogens to the classroom, books, play materials and exposed food and surfaces in the school kitchen.

An improved toilet attached to the school building reduces or avoids all these shortcomings and improves pupils' comfort, health and wellbeing. In addition, in cold climates pupils do not have to walk to the outdoor toilet in rain and snow, or sit in a freezing cubicle.

There is no excuse for waiting until tap water is installed in the school before improving dirty toilets. There are odourless dry toilet options that do not require water for flushing and they can bring about tangible improvements to sanitation in schools (slides 2 and 16).

From an environmental point of view latrine pits have certain disadvantages. Excreta get composted in the pit and fluids disperse into the surrounding soil through the honeycombed brick-wall lining of the pit. In situations where the water table is high, or there is a source of fresh water within a short distance of the latrine pit, the faecal pathogens can leak into the groundwater, unless the soil is impermeable. If the excreta is not emptied in a timely manner, the nutrients in it will be wasted. This represents a big loss of fertiliser. Sustainable toilet units, on the other hand make possible the recovery of urine and composted faecal matter under established safety standards. The nutrients are recycled back to plants to improve productivity in agriculture, horticulture and floriculture. Waterless urinals ease the pressure on pupils of having to queue up to use a small number of toilets. There are both male and female urinals (see slide9). The simplest option is to have two foot rests over a groove in the floor where urine is collected for reuse.

The conclusion is that an indoor toilet has important advantages that can improve health and comfort – and even improve food security by providing fertiliser for a productive school farm (Morgan and Shangwa, 2010).

Guidelines on water, sanitation and hygiene for schools are widely available. Design and building codes and norms give details about building requirements, and codes focus on physical dimensions rather than functions. However, one could say that dimensions are a response to (often hidden) functional criteria. Technical dimensions are often understood to be rigid and may prevent clever local solutions (path dependency). Dimensions are helpful, but it would be more enlightening if explicit functions make up the basis for the regulations which would allow thinking outside the box. Function-based regulations can enable the required outcomes to be achieved in a variety of ways, and schools can choose the combination of measures that is the most appropriate one for their particular circumstances.

For instance, the functional criterion that ***no one should have to wait more than one minute*** outside the toilet could be achieved – at high cost – by installing many toilets. But it could also be achieved with fewer toilets by allowing pupils to visit the toilet during lesson time. This shows that a functional criterion may involve several measures including simple management practices, not only one simplistic physical measure.

A general recommendation from WHO (2009) is to provide one toilet per 25 girls/female staff, and one toilet and one urinal per 50 boys. Girls tend to spend longer in toilets, and therefore introducing girls' urinals may be part of a low-cost solution which does not compromise access or comfort.

The function-based criterion that ***water is always available for washing hands*** after defecation and before eating could be achieved by installing piped water, supplemented by an emergency water tank in case the regular supply fails. The number of taps may limit access to water for washing before eating, so there needs to be a criterion that ***every pupil has enough time for washing hands before eating***.

Places without a reliable piped water supply may require that pupils bring water to school on certain days. This would be possible today, but not ten years ago, as plastic bottles are easy to access. Similarly, pupils could be made to bring along their own soap or ash for effective hand washing. Bringing water and soap are both activities that are easy for the teachers to monitor. This is no different from pupils bringing their school books and pencils. It would be worth investigating if this would make hygiene promotion more effective, since pupils are not likely to throw away water they have carried along to the school.

Good hygiene is not an option – it is a must. This function-based criterion can be achieved at very low cost, but not without strong engagement. It is well known that in places where many people congregate, the risk of spreading infection and disease is high. Schools are no exception. It has been estimated that 88% of diarrhoeal diseases are caused by inadequate sanitation and hygiene and unsafe water (UNICEF, 2006). Helminth infections affect millions of school-age children and can impair their learning ability. The Swedish Institute for Infectious Disease Control initiated a hygiene project in some kindergartens where staff and children wash their hands before eating and after defecation. The staff wash hands and the canvas on the table after changing nappies on toddlers. Sick children are sent home. Such simple measures almost eliminated stomach infections, and the number of sick days was reduced by half. Washing hands in school before eating and after going to the toilet is a must to reduce the spread of pathogens. General cleanliness of toilets is also essential. Only a combination of measures is effective in preventing the spread of disease. The final outcome depends on local conditions and management capacity.

All pupils are entitled to personal security and the key social criterion is that ***no harassment should take place in the school toilet.*** In the previously mentioned Kenyan study some 50 per cent of both boys and girls said they had been harassed in some way in the toilet. Some popular interventions to overcome this problem are: separate entrances for boys and girls, lights inside the toilets, lockable doors for the cubicles and minimising the space between the floor and the cubicle walls. The toilet should preferably be attached to the main school building. Other measures are to have a janitor around and to encourage reporting of harassment and dealing with those involved.

Additional functional criteria are brought up in the following slides.

5.3 - 6

The above pictures show toilets of varying sophistication, and there is a ***decent affordable option*** for every situation. Usually the ones which are less expensive to build require more work to operate. For instance, the grass-walled toilet shown above provides privacy and confinement of excreta, and soil bacteria take care of urine stains on the floor. But, hand washing is less straightforward since water has to be brought to the toilet. It is possible to identify some cost-reducing measures for any design. For instance, the basement (bottom-left) has thick walls which could be made thinner to save on material and labour. If there are no bends in ventilation pipes, natural ventilation will improve and there will also be cost savings. Having as few bends as possible on urine and wastewater pipes will improve flows and reduce costs (See Section 2.7). Urinals for girls can be constructed with tiles. They will result in savings on total cost and provide improved access.

The slightly higher investment cost of good construction and of the proper installation of durable devices will reduce long-term operational and maintenance expenses. The net result is likely to be that the initial extra investment is much less than the reduction in operations and maintenance costs. Moreover, there is a considerable opportunity cost due to the missed learning of schoolgirls who do not attend school due to unattractive and poorly maintained toilets. Therefore, time spent on fulfilling function criteria (see previous slides) pays off.

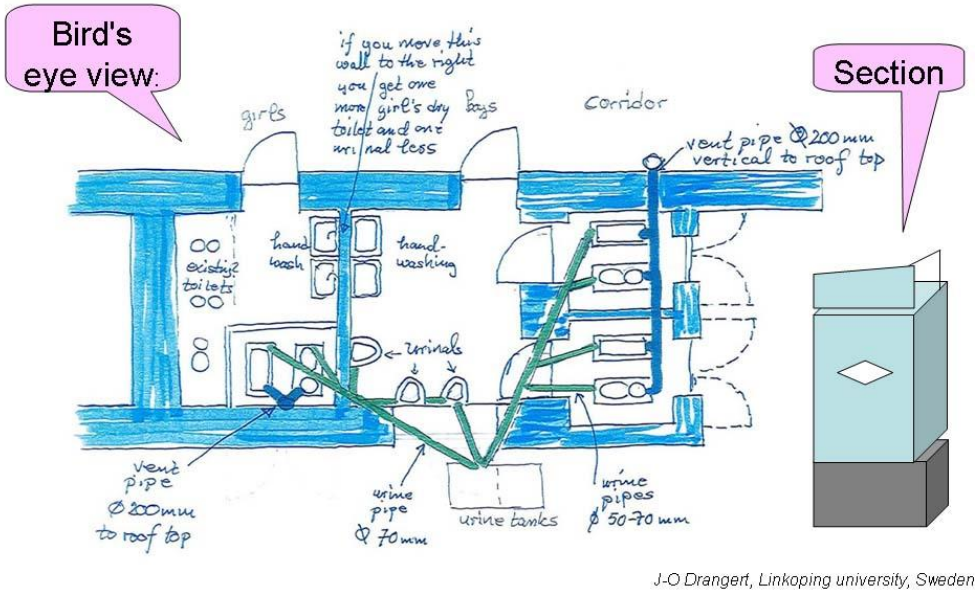
Good design and attractive finishing of surfaces, together with robust installations will ***prevent future problems and complaints***. Easy access to pipes and spots behind toilets and corners facilitates repair work as well as cleaning. However, a balance has to be reached between cost/affordability and physical sustainability. This applies to the selection of building materials, accessories, etc. But many installations, such as urinals and washing stands at different heights, involve no extra cost.

The school toilet unit should be built in a manner that enables all students to have ***equal access*** to facilities (CSIR, 2002). Children with special needs and those who are physically or mentally challenged should be able to use the facility with equal ease. Access for a wheelchair and hand rails on the wall or floor may need to be installed (see public toilets slides 5.2-7 and -16).

The ***toilet should be free from bad odours***. The most common origin of bad odours is from falling faeces before they reach the water in the WC or the collection chamber. Good ventilation is probably the only remedy. Even if there is an electric fan installed, the ventilation system should be designed for optimal natural ventilation, catching wind and using temperature gradients in case of a power cut (slide 2.7-6). Dry ventilated toilets leave no smell in the cubicle.

School toilet design

5.3 - 7



J-O Drangert, Linkoping university, Sweden

The design of school toilets is challenging for technical and cultural reasons. Most government regulations for school toilets are very rigid and, perhaps for cost reasons, provide only a few options. Still, there are very good reasons to take local conditions into account. An obvious condition is a lack of running water or an unreliable water supply. Where water supply is a perennial problem, a lasting solution is a dry toilet which has a vault or pit for faecal matter. However, a pit is not ecologically sustainable in cases where faecal pollution reaches the groundwater or where conditions are messy when collecting the nutrient content. A dry vault would reduce these problems.

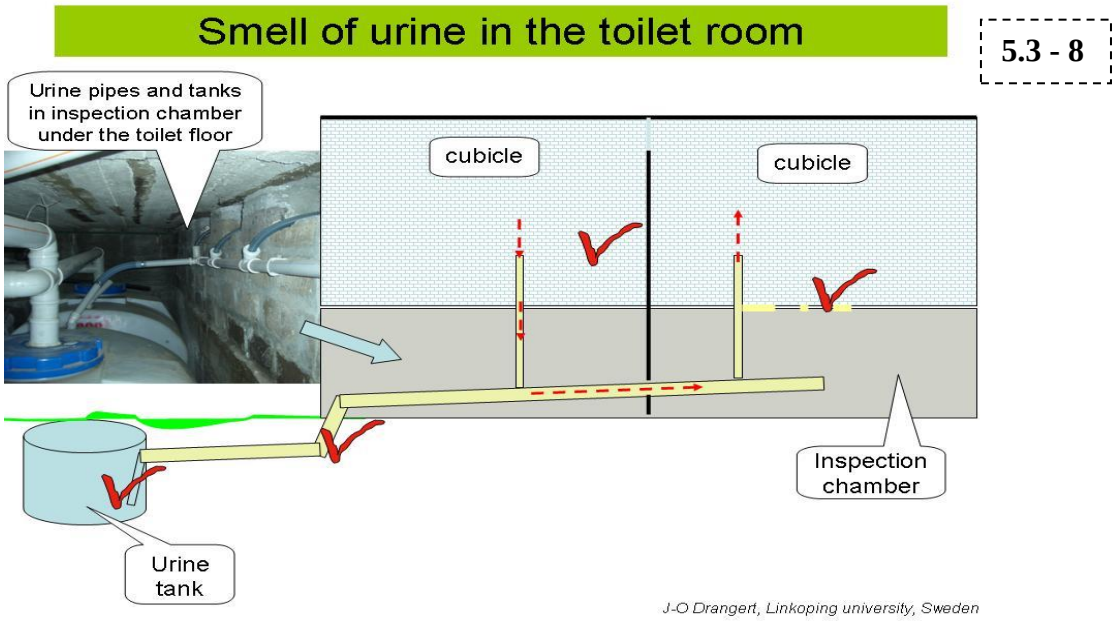
The slide shows a toilet unit with dry urine-diverting toilets and boys' urinals. Function-based criteria addressed in the slide include:

Enough space to allow easy inspection and repair of pipes. The slide indicates that there is a metre-high vault under the toilet floor (see Section: greyish part) for storage of faecal matter and urine, which at the same time serves as an inspection 'corridor behind the faecal chambers.

No blockages of the toilet, urine or sewer pipes. This can be ensured by having enough slope and no 90-degree bends. Incoming urine pipes should be higher than outgoing urine pipes. Ideally, they should be in a straight line to avoid flow-retarding bends (urine pipes are coloured green in the slide). If there are flush toilets, a disposal bin for sanitary pads has to be provided to prevent blockages

No bad odour in the cubicle. The ventilation (dark blue colour in the slide) must prevent back-flow of air, and facilitate through-flow. This is achieved by installing straight pipes with no 90-degree bends, the vent pipe extending 1.5 metres above the roof top, and no cooling of air towards the top of the pipe. The portion of the pipe outside the roof should therefore be insulated in areas with cold nights or cold seasons (slide 2.7-6). Also, in case of combined evacuation of air from more than one cubicle, backflow from one compartment to another must be prevented. A simple smoke test with a cigarette will reveal if the air flow goes in the wrong direction when cubicle doors are opened or closed. This can happen easily if the gap between the ceiling and the cubicle door is too small.

The next slide provides some instruction on how to trace and remedy foul urine odours in the cubicle.



There is a close relationship between movement of air and the design of urine piping. The drawing shows two cubicles with a joint urine pipe system leading into a collection tank. The picture shows the piping under the toilet floor. We assume that the ventilation of the block is properly designed (see previous slide). In the section below we give a *problem-solving guide* for dealing with bad smells in the cubicle on the right.

The smell may originate from one or more sources, indicated by the ticks ✓. The investigation starts with what is easy to check and remedy, and continues with more complicated problems.

Step 1. Look for urine spots on the floor, and clean if necessary.

Step 2. If the smell persists, sniff close to the floor, urinal and piping. This requires kneeling down and becoming another Sherlock Holmes. Otherwise, the source of the bad odour will be easy to miss. The investigator may find that the pipe fitting is loose and leaking urine. Fix the pipe and the bad smell will go if this is the only source.

Step 3. If the smell persists the investigation continues. While you are on your knees, someone else should open and close the cubicle or toilet door in order to catch the smell from the urinal when there is a change in pressure in the cubicle. A puff of bad air entering from the pipe (dotted arrows show this) indicates that there is an air-leak either in the second cubicle or further down the urine pipe.

If the back-flow comes from the other cubicle, a simple rubber (e.g. slit condom) can be attached to the connecting pipe from the urinal/squatting pan. The urine will slip though the two tight flaps, but there is no air going through, and thus no odour. A possible alternative measure is to shorten the doors to the cubicles so that air can flow more freely and the under-pressure is reduced.

Step 4. If the smell persists, check the connections between the pipe and the urine tank. If the pipe is dipping into the urine there is no air that can flow from there up through the pipe. But if the pipe is far above the surface of the urine in the tank, air can easily move up the pipe into the cubicle, particularly if air pressure in the cubicle is lower than the air pressure in the tank. Extend the pipe to 3 cm above the bottom of the urine tank.

Step 5. If the smell persists, it may be caused by a partial blockage of the pipe. In this case standing urine collects in the pipe and emits a bad odour that may enter the cubicle. The solution is to pour caustic soda into the pipe to dissolve the blockage. The appropriate/ideal pipe design is a straight line between the floor and the entrance to the tank to give the urine enough speed through the pipe (slide 2.7-2).

Girls´ school toilet

5.3 - 9

Girls´ urinals in a Musiri school, India with a water storage for washing

Girls´ school toilet, Indonesia with natural light and ventilation

Courtesy of Scope, India and Naning Adiwoso, Indonesia

School toilets in warm climates can use the luxury of building for good natural ventilation. In this case (right picture) there is no front door and privacy is achieved by an S-shaped entrance, which lets air flow freely through the building. At the same time the nuisance of broken entrance doors and dirty handles is avoided. The roof construction also allows daylight to enter.

With an open design like the one above, harassment and bullying becomes more exposed. A scream will be heard from afar.

One new feature that reduces queuing is urinals for girls. The simplest kind is shown in the left-had picture above. Each urinal has two foot rests (blue) and in between, a slanting V-shaped opening that prevents urine splashing onto the user's feet. The whole area is tiled and the urine is diverted in a sloping drain leading to a collection tank. The urinals have significantly reduced the pressure on latrines, thus allowing girls adequate access to facilities for both needs. Due to congestion, pupils would otherwise spend many minutes waiting for their turn to use the cubicle. Often this creates a situation where younger pupils are pushed to the back of the queue by older children.

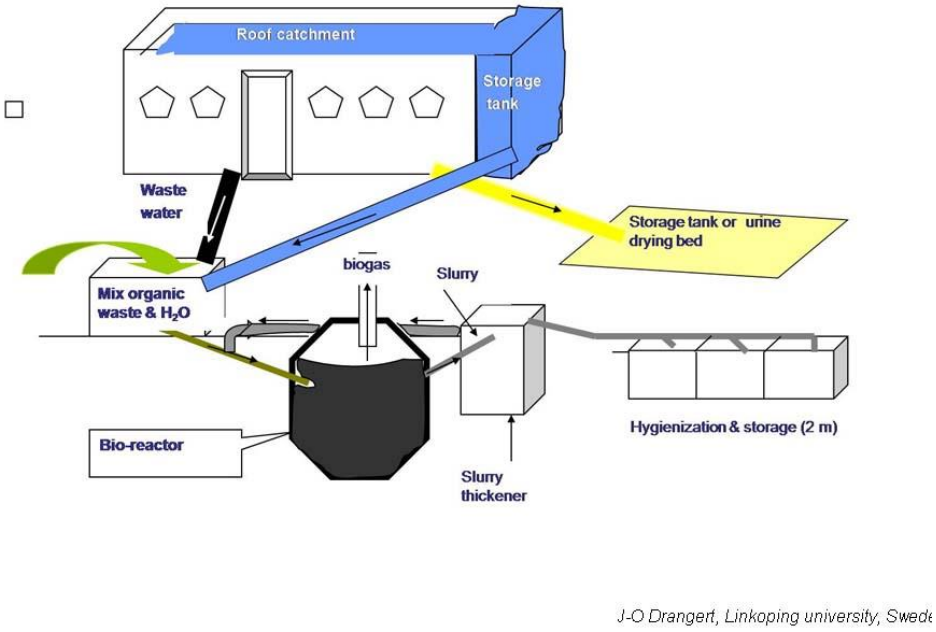
Such open urinals seem to be acceptable for younger pupils, but older girls prefer stand-alone urinals or a small partition between adjacent urinals, and at least units which are separate from the ones used by young pupils. This is partly explained by them having menstruation periods. The urinal should be located so that washing private parts becomes easy. Ideally, there should be a washbasin next to the urinals rather than an open tank (which is only possible if there is no problem with mosquitoes). Also, there is a need to have a place to dispose the sanitary pads (see slide 3) where these can be incinerated.

The urinals (above left) are easy to keep clean while the girls' urinals on slide 6 are poorly built and will smell because the tiles are not slanting enough and urine stays and dries on the tiles and in the corners. The slope should be at least 5 cm per 20 cm of tile, and they should be V-shaped at the bottom.

Case studies on school toilets:

- "UDD toilets at a Girl's secondary school Kalungu, Uganda" available at www.susana.org
- "Information Case: Girls_urinals_find (LeaPPS 090727) available at www.schools,watsan.net
- DeGabriels J, Keast G and Msukwa C (2004). Evaluation of the Strategic Sanitation and Hygiene Promotion for Schools Pilot Projects Nkhata Bay and Kasangu Districts, available at www.unicef.org/evaldatabase.

Where does urine and faecal matter end up? 5.3 - 10



Pupils and staff rarely ask about where their excreta end up – once defecation is done, they go back to other business. However, the toilet and urinal will not be sustainable unless the collected matter is disposed of in a safe and productive way. The amount of urine from a school is huge, and faecal matter, if flushed away, is an even more voluminous discharge.

Instead of being utilised, excreta from school toilets usually end up in overflowing septic tanks or in sewers which take it to a treatment plant. Designs need to view urine and faeces as resources rather than as waste. An NGO in Tiruchirappalli (Trichy) in the state of Tamilnadu in India (www.scope.org) has built dry urine-diverting toilets which use the urine as a fertiliser and the composted faeces as a soil conditioner. The Borda group (www.borda-sa.org) has done interesting work in Asia on a combination of biogas production and some treatment of the effluent, so that it can be safely disposed of into drainage ditches or preferably agricultural fields. They also make use of all organic waste in the area to feed a biogas digester. We provide details about such toilet complexes in the chapter on biogas, .

The slide shows a self-sustained sanitation block where rainwater is collected for hand washing and ablution. If rainfall is low or the dry season long, well water may be a supplementary water source. The design of this toilet block allows for recirculation of valuable nutrients. Urine from the urine-diverting toilets and waterless urinals is collected and delivered as fertiliser to neighbouring farms. In this example, wash water, ablution water and blackwater (if dry toilets are not being used) go into a biodigester together with organic waste. The treated slurry is a good fertiliser since only half of the organic material is converted to gas (See biogas chapter). Such a toilet block is independent of piped water supply and sewerage, and can therefore be used in a variety of locations and requires minimal infrastructure costs. A potential income may come from the sale of urine.

To make the toilet block more environmentally sustainable the gas can be used for lighting and cooking. Ideally, water for washing could be heated by the sun. Solar- and wind-powered electricity systems have been used in Australia and other countries.

The operation of such a toilet block requires trained staff, but we should not overstate this aspect since the technology is quite adaptable to changing conditions. Millions of farmers in the world run small biogas plants successfully.

School gardens and production of food

5.3 - 11

Soil from organic compost, Colombia

Urine fertilised plants in Brazil

Courtesy Ana Claudia Braga

Plant trials in Zimbabwe with only water (left) and also urine (right) given to canola, spinach and maize

Courtesy of Peter Morgan, Zimbabwe and Maria Ines Matiz, Colombia

Sustainable school sanitation contributes to better nutrition in two ways: the reuse of human-derived nutrients as fertiliser increases yields in school gardens, and the reduced incidence of diarrhoea allows the kids to keep and digest the food they eat. Intestinal worms – which thrive in poor sanitary conditions – infect close to 90 per cent of children in the developing world. They compete for the ingested food and may cause malnutrition, anaemia or retarded growth (UNICEF, 2006). A World Bank report comments on the interlinkages between sanitation, nutrition and water:

"*South Asia, where about one-fifth of the world population lives, still has both the highest rates and the largest numbers of malnourished children in the world. In Afghanistan, Bangladesh, India, and Pakistan, the prevalence rate varies from 38 to 51 percent and is only gradually declining, whereas in Sub-Saharan Africa, while the rate is lower at 26 percent, it is on the rise.*

"Although lack of food is obviously an important reason for malnutrition, recent reports and studies ever more consistently suggest that much of malnutrition is actually caused by bad sanitation and disease, especially in young children. Thus, contrary to popular perception, in many countries where malnutrition is widespread, insufficient food production is often not the determining factor of malnutrition. A recent collective expert opinion stated that about 50 percent of the consequences of malnutrition are in fact caused by inadequate water and sanitation provisions and poor hygienic practices, thus highlighting the need to mainstream environmental health into the development agenda." (World Bank, 2008:6-7)

School gardens can produce complimentary food for pupils and also give them useful experience in the cultivation of food products. Sustainable sanitation can add to this experience by reusing composted organic material and faeces and hygienized urine (slide). Many schools conduct experiments with doses of fertilisers and their effect on plant growth and size of fruits. The picture shows the positive effect on growth of adding human urine (bottom left).

From garden via kitchen to the pupils' plates

5.3 - 12

Preparation of school meal Courtesy of Kitchengarden Foundation, Australia

In Australia, 139 schools participate in a 'Kitchen Garden Program' which provides pleasurable food education through growing, harvesting, preparing and sharing fresh seasonal produce. The pupils are involved in growing vegetables and tending fruit trees. They harvest food and prepare meals which are served in the school.

The program links into all curriculum areas, supporting both health and educational outcomes. Pupils learn about the natural world, how to care for it, and how best to use resources. They also learn an appreciation of healthy and enjoyable food. They are exposed to nutritious food and are encouraged to eat less sugary, salty, fatty processed food and more fruit and vegetables. The meals they prepare consist of what is available in the season.

The pupils spend 45 minutes per week in a productive garden which they help design, build and maintain on the school grounds according to organic and permaculture gardening principles. They also spend one-and-a-half hours each week in a home-style kitchen classroom preparing and sharing a variety of meals created from their produce. The intrinsic link between the garden, the kitchen and the table enhances the learning about food and about eating it. The pupils work in groups and serve food to their peers. There is hardly ever anything left over and everyone feels proud of their work.

The Government funds the program to enhance diets and reduce obesity (which in Australia stands at 25%). A nationwide nutrient survey reports that 39% of 4–8 year-olds and 99% of 14–16 year-olds fail to consume the recommended 1–3 serves of fruit daily. For vegetables, almost 80% of 4–8 year-olds and 95% of 14–16 year-olds fail to consume the recommended 2–4 serves of vegetables per day. Children with no habit of eating vegetables and other real foods tend to retain poor habits into adult life.

Recent studies show that pupils in the Kitchen Garden Program are more willing to try new foods when they grow and prepare them themselves. An evaluation of the program shows a positive impact on health behaviour change (www.kitchengardenfoundation.org.au). The book *Kitchen Garden Cooking with Kids* provides over 100 recipes which have been tried and tested by children participating in the program.

Example 1: Urban and rural schools in Kenya

5.3 - 13

✓	Girls´ observed handwash	Boys´ observed handwash	Girls reported toilet use	Boys observed toilet use	Clean toilets	Water for handwash in toilet	No of children per tap
School has all three facilities	✓✓✓	✓✓✓				✓✓✓	
Water for washing hands in toilet	✓✓✓				✓✓		
Number of pupils per tap	✓✓✓	✓✓					
O&M carried out			✓✓		✓	✓	✓✓
Perceived toilet cleanliness			✓✓	✓✓			
Perceived privacy in toilet			✓✓	✓✓			
Girls´ school absences	✓		✓				

Source: V. Njuguna et al. 2009

A very informative study of 100 schools in Kenya in two urban areas (Nairobi and Mombasa) and a rural area (Kwale District) was reported in 2009 (Njuguna et al., 2009). The average number of pupils was over a thousand in the town schools and over 600 in the rural schools. The focus of the study is on the use of toilets, washing hands with soap and drinking sufficient safe water – three behaviours with known positive impacts on health.

In order for pupils to perform well, school toilets, washing facilities and water must be available. In this case all schools had toilets, but 12 out of a hundred had no water for drinking, and 48 had no hand washing areas or facilities.

The installations must also be in operation to be of any value as indicated in the following.

Water Supply: In urban areas the water supply is not reliable, and some of the schools in Nairobi and Mombasa face major water shortages. The selected supply technology of piped communal water is not reliable and schools cannot manage on this source alone. This is an interesting case in which decision-makers know that when the water supply fails the schools will be in trouble. Yet, they are reluctant to think out of the box and install reliable alternative supplies using rainwater collection or local wells.

Hand washing: On average each school had three working water taps with a mean of 203 pupils per tap, and 26 schools had more than 500 pupils per tap. If each hand wash takes 15 seconds, and if all students washed their hands, the last pupil would have to wait 50 minutes for his or her turn to wash their hands before eating! In schools with more taps, pupils washed more: 68% of the girls washed their hands if adequate facilities were available; if not, the figure was 17%. The low rates of hand washing (27% for girls and 19% for boys) mainly reflect the reality that only a few of the available taps were working. Only 2% of students were observed to wash their hands with soap.

Toilets: There were about 70 toilets for every 1000 pupils or one toilet per 15 pupils. The proportion of flush toilets actually working was 29% for girls' toilets and 23% for boys' toilets. The study identified some possible reasons for the very high proportion of failed flush toilets in schools:

- not very strong construction – flush mechanisms break as do the small pull wires
- a lack of understanding about how to use the flush toilets and the use of heavy anal cleansing papers (e.g. pieces of paper taken from school notebooks) that are not appropriate for the toilet design/technology and tend to block the toilet pipes
- a lack of water in the schools for flush toilets.

Sanitation: Observation and interview responses indicate that some 43% of the toilets were considered clean. The clean toilets were also more used than the fouled ones.

Teasing and bullying. Two-thirds of the pupils in Nairobi and a quarter of the pupils in rural schools expressed a fear of teasing and bullying. Boys and girls reported the same frequency. Boys can be rough to each other, shouting or shoving younger boys, while girls may shout at little girls to get out of the toilet quickly, but they also fear being teased or harassed by boys.

The analysis of the observations provides interesting findings and they are summarised in the slide. The links between various observations are shown, and the checkmark ✓ shows the strength of the statistical association between the two variables.

✓✓✓ means a very strong statistical link (P< .001), ✓✓ means strong (p<.01), and ✓ means there is some association between the two variables (p<0.05). It reads as follows:

In schools with water supply, hand wash basins, and flush toilets, there was no evidence that the toilets were used more consistently or were cleaner than in the other schools. However, pupils washed their hands much more in these schools.

If water for hand washing was available in the toilet room there is very strong evidence that girls washed their hands, but no such correlation was seen for the boys. In this case there was also strong evidence that the toilet room is clean.

A higher number of taps influences strongly hand-washing habits among girls, but less among boys. There was no evidence that the number of taps affected the cleanliness of toilets.

If the toilets looked clean there was strong evidence of higher use by all pupils. However, no association with more hand washing was noticed.

Perceived privacy in the toilet had a strong impact on toilet use.

As expected, maintenance and repair (O&M) enhanced the supply of water to the toilets, increased the number of working taps and improved the cleanliness of the toilet. In turn, these factors had a strong positive impact on girls' use of the toilets, but no impact on boys' use.

In 60% of schools the head teacher or another teacher was in charge of the O&M fund. In schools where teachers (and not the education department) controlled the fund, the supply of water was greatly improved, and more taps were available for the pupils. Boys in particular washed their hands much more frequently in these schools (Njuguna et al., 2009).

These interesting findings show that boys and girls are likely to use the toilet if it is perceived to be clean and to provide privacy. Thus, toilet use can be 'sold' with cleanliness and privacy. Clean toilets with hand washing facilities will help reduce school absenteeism. The frequency of hand washing was, as expected, strongly influenced by the provision of water in the toilet room (girls) and of enough taps (boys). There was no evidence that schools with active WASH clubs scored better on hand washing than schools without clubs.

Toilets with all facilities were not cleaner than other toilets. This is not surprising and relates more to how the toilet units were managed and maintained. Two out of three schools had janitors and in half of the schools pupils were involved in the cleaning activities. We come back to this issue in slide 5.3 - 17.

Example 2: Rural schools in Colombia

5.3 - 14

Sanitary services in rural schools in Anapoima

TABLE #9

Name		wash bowls	soap	towel
El Cabral		yes	yes	yes
El Copial		yes		
El Consuelo		yes		
El Higuerón				
Las Mercedes		yes		
Santa Lucía		yes		
San Antonio		yes		
La Guasima		yes		
Lutaima		yes	yes	yes
La Palmichera			yes	yes
El Rosario				
Santa Ana			no	no
Andalucía			no	no
Calichana				
La Esmeralda			no	no
La Esperanza				
Golconda	2	no	no	no
Panamá	3	yes	no	no
Patio Bonito	1	yes	no	no

Courtesy of Maria Ines Matiz, El Bosque University, Colombia

A school is not a unit isolated from the community, yet school issues do not appear often enough in community meetings or municipal planning. Monitoring of conditions at schools is often inadequate and is a neglected responsibility. Teachers may think that toilet conditions are the responsibility of the administration. There is often an abyss between the stakeholders, resulting in inactivity. A researcher at El Bosque university in Bogota in Colombia, Maria Ines Matiz, decided to raise the issue of school sanitation with decision-makers by sharing the results of an instructive monitoring template in which sanitary conditions in 34 rural schools with a total of 1,110 pupils were recorded. The objective was to establish management priorities and propose solutions that were socially, economically and environmentally sustainable.

The findings were as follows:

The rural schools in Anapoima and Apulo, in the east branch of the Andes mountains, have few pupils (usually 10 to 60 and only two schools had some 150 pupils), and therefore pupils of different ages (5–15 years) were mostly taught in the same classroom by one teacher. The pupils were responsible for cleaning and keeping the whole school well maintained. Toilets and taps did function, and was promptly repaired. For instance, extra drums of water were provided that could replace the piped water for a while if there were cuts to the usual supply.

The following limited set of indicators, which were easy to observe and record were used to assess the sanitation status. Monitoring these indicators was an effective way of identifying problems.

Water: Source of water, service level and treatment were recorded. Fourteen schools were connected to a communal water supply and received water five days per week, four schools were supplied three days a week and two schools were supplied two days a week. Two schools used rainwater and a water truck, while seven schools had no regular water supply. Eight schools provided pupils with treated water and the other 26 did not. The schools with a daily water service also had a storage tank in case of tap failure. However, these tanks were not routinely maintained.

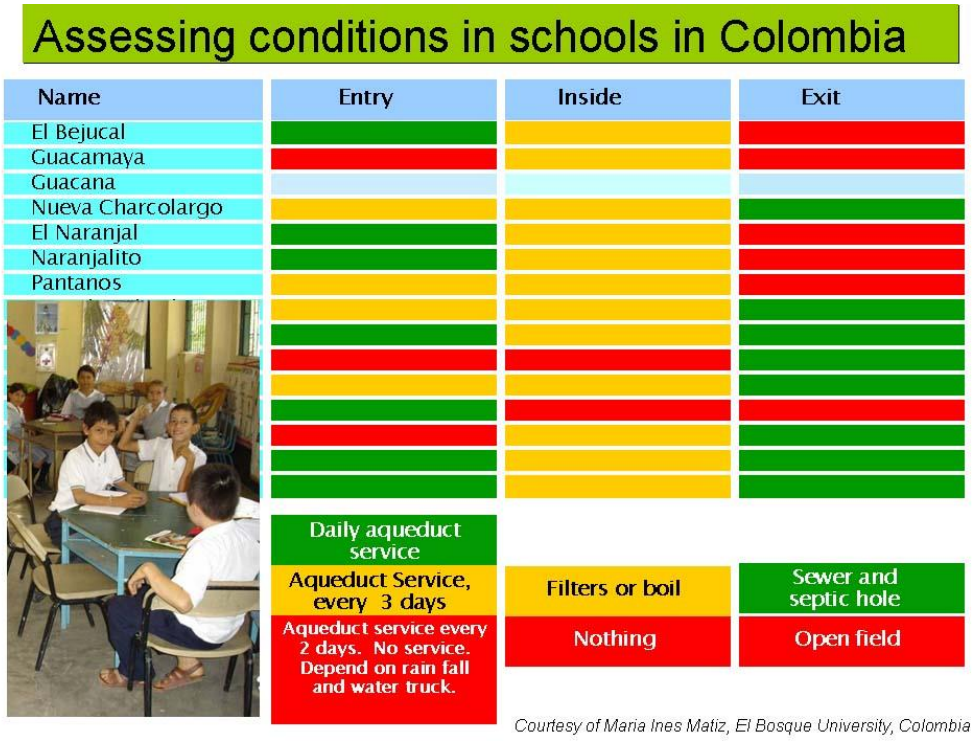
Water treatment in the schools: 22 schools boiled the water for drinking, but children playing in the field drank untreated water from any nearby tap. Six schools had ozone filter or sand filter treatment, but mostly these were not well managed. The microbiological analysis performed on filtered water showed that out of 18 filters only two provided potable water.

Discharge of used water: 16 schools used a septic “hole” in the ground (a pit with stones), 9 used open field discharge, and five were connected to a sewer service.

Sanitary service in schools: thanks to the small size of most schools, they had a favourable ratio of pupils per toilet. Five schools had less than five pupils per toilet, 9 had 5–10 pupils per toilet, 8 had 11–15, 2 had 30–35, and only one school had 60 pupils per toilet.

Hand washing: 26 schools provided washbasin s and 8 did not. All schools required the pupils to bring their own soap and towel.

Solid waste disposal: solid waste from kitchens, gardens and classrooms was picked up by a truck from seven schools, six schools buried the waste in a hole in the ground, 12 schools burned the waste (unlawful), and 7 dumped it in a field.



Quality concerns about school toilets and hygiene practices can be investigated with the help of a reliable and user-friendly survey of relevant parameters. In the above study of Colombian schools, in order to give decision makers and other stakeholders the sanitation messages and survey results in a pedagogical form, comparative charts were colour-coded for ease of understanding (see slide). The red colour indicates that the situation is already a problem that affects health or the environment or is unlawful. The green colour indicates that the parameter is satisfactory. The yellow colour indicates there is no problem now, but one may occur if nothing is done to improve the situation.

The charts were shown to relevant departments of education and health, and to community leaders. They were either proud of their achievements shown in this comparative way, or felt exposed by the fact that they lagged behind other schools. This comparison helped in raising the pressure on the “low achieving schools” to aim higher, and bring about improvements.

The process of analysing possible reasons for identified shortcomings included both technical and management aspects. This process was inclusive since most solutions required the participation of many stakeholders – pupils, teachers, directors, O&M staff, education managers and politicians.

The two mayors of the areas studied were informed about the sanitary conditions. Although both were shocked by the results of the survey, only one of them was willing to provide help and economic support to improve the situation. It was decided that the following areas, listed here in descending order of importance, should be addressed to improve the situation: (a) water quality within the schools, (b) water storage, (c) sanitary conditions, and (d) solid waste management.

After two years, the work in the 14 schools in Apulo led to the following improvements. Water tanks which were in poor condition were replaced with new tanks. Due to the agreeable climate, it was possible to place washbasins outdoors between the dining hall and the toilet rooms. Where new WCs were installed, separate rooms were created for boys and girls. In some cases the urinal was placed in the space where the washbasins had been located before. Cheap water filters of an easy-to-handle design (PAHO) were also installed. Recently, Oxfam water filters were installed in order to carry out a comparative study of the two models.

Example 3: Rural and urban schools in the Ukraine

5.3 - 16

The Ukraine with its 46 million people (2006) has some 20,500 schools. Two hundred of the 7,400 urban schools have no water supply and rely on wells or water delivery by truck. Erratic water supply means that urban schools with flush toilets have intermittent problems with flushing. In rural areas 3,800 schools lack a water supply and most rely on pit latrines.

Rural schools face a serious problem with rapidly decreasing populations and shrinking pupil enrolments. Schools have very strained budgets, leading to poor maintenance and dilapidated toilets. Mama-86, a national environmental NGO, promotes improved school sanitation including dry toilets where water supply is a problem. They have managed to get approval to build seven school toilets. They negotiate with the local health authorities and refer to the WHO Guidelines (2006) to get approval from local hygienists and others.

The pictures show the dry urine-diverting toilet which was installed in the Gozhuly village education centre on the outskirts of the town of Poltava. It has 155 pupils, 20 children in a kindergarten and 30 staff. The erratic water supply, malfunctioning sanitation system and the poor reserve pit latrine in the yard necessitated a better dry system. A private contractor built three toilet cubicles and one urinal inside the school building. The block is heated, tiled and well maintained by a janitor. Each cubicle has a bin with wood chips and a brush. A washbasin is located outside the cubicles (bottom right).

The faecal matter and tissue paper drops into a chamber which is easy to empty from outside the building (bottom left). When full, an adjacent chamber is opened, and the matter in the first chamber rests for almost two years. Then it is emptied onto the organic compost. The urine is collected in an underground tank and after some storage it is used by a local farmer.

A recent survey showed that following the construction of the new toilet, water use fell drastically and the total school water bill went down 20%. The training/information on the use of the dry indoor toilets started before the block was built and is repeated every year. It has been successful. Three-quarters of the pupils are satisfied with the toilets and 90% of the staff. Half of the staff members are positive about the application of composted material.

The technical drawing (top right) shows a similar toilet block. The experience from Gozhuly is that visitors to the school can easily relate to what they see, because a similar cubicle could be located in the visitor's own home. Some villagers have invested in dry urine-diverting toilets in their homes. Thus, functioning, clean and well maintained school toilets can be an inspiration for individuals.

Management options

5.3 - 17

Item	Conditions (OK, fair, needs)	Measure to take (repair, replace)	Who is responsible	Cost estimate
Toilet room:				
Toilet floor	✓			
Pedestal or pan		✓	janitor	
Water seal	✓			
Ventilation				
Urine pipes		✓	janitor	
Water seal	✓		H/master	
Drainage pipe	✓			
Soak-away				
Door and hinges		✓	H/master	
Plaster on walls	✓			
Paint of urinal	✓			

J-O Drangert, Linkoping university, Sweden

The preceding three examples show some of the variations that occur in real situations. The general impression is that it is fairly easy to build good school toilet blocks, but it is difficult to maintain the quality of hundreds or thousands of school toilet blocks in a country. Often, facilities are not used or maintained as intended. They gradually become dirty and unappealing even for the needy, and fall into disuse (UNICEF, 2006). It seems to be more common to let the conditions deteriorate and await a total rehabilitation of the toilets, rather than to maintain them regularly. Many schools have seen several generations of toilet blocks over the years. An effective management system is crucial for continued proper use and operation. Therefore, management guidelines must be in place to take on the challenge of O&M, not the least as part of the large school-toilet programs that are being launched nowadays.

It is necessary to train teachers, elect a management committee or group of supportive adults and active pupils, include sanitation in the syllabus, etc. That is the easy part, but experience shows that this is far from sufficient. The deep challenge is to have an effective management system dealing with the operation and maintenance of the school toilet block day after day. The users need to be involved and they need to be responsible and accountable for the use and operation of their toilet block. But, cleaning of soiled toilets must never be used as a punishment for any offence other than for being the one soiling the toilet. The toilet and sanitation issues are integral parts of the school syllabus, and O&M activities are part of normal school activities.

The operation of a school toilet block comprises many activities: cleaning toilets and urinals, sweeping, emptying baskets, urine storage, filling up water tanks, checking light bulbs, locking the door after school hours, etc. Maintenance comprises a number of installations to be inspected and repaired if need be (some example on slide). Who is responsible for all these activities and their frequency has to be decided, and also who will monitor that the tasks are carried out satisfactorily.

A management blueprint to suit all situations is not possible. A big school is different from a small one, and a rural school is different from one in the city. A boarding school needs a different type of management system to a day school. A school in a country with rapid population increase has very different preconditions to a school in a country with low or no population increase. Therefore, different local conditions require different management solutions (slide 5.3 - 18).

Experiences of how O&M is organised and implemented vary a lot. The International Reference Centre IRC database in the Netherlands, provides many examples. Their website www.irc.nl gives 430 hits for schools! The Watsan website www.schools.watsan.net also provides extensive information.

Management of school sanitation facilities

5.3 - 18

Courtesy of Oliver Ives, 'Amanz' abantu Services Ltd, South Africa

Here we have highlighted a recent effort to use a contractor to carry out much of the O&M in schools. Such a model is not exactly new, and the method has been used in developed countries for some time. This example is from Butterworth Educational District in Eastern Cape, South Africa, where the department of education has signed a contract with a company (franchisor) to manage 400 school toilets in the district (*Financial Mail*, April 2, 2010). The reasons why the authorities embarked on this project were: loss of dignity for pupils and staff due to facilities being poorly maintained or not maintained at all, insufficient access to maintenance support due to geographical spread and internal system constraints, the low priority given to health and hygiene-related issues, issues related to solid waste management and disposal, and insufficient funds due to a higher priority being given to school construction rather than O&M activities.

The franchisor – in turn – has engaged local small and medium enterprises on a franchisee basis to do the work. The franchisor provided training for them and signed a detailed contract with them concerning the tasks, the required quality of work, and reporting. Under this arrangement, the trained local franchisee undertakes the following general tasks:

1. Clean inside and outside of the toilet block (top right picture)
2. Undertake basic maintenance of facilities
3. Remove solid wastes and dispose them safely at a designated waste site (bottom right)
4. Remove excess liquids and dispose them safely through irrigation nearby
5. Educate school-board members on water and sanitation
6. Make presentations to pupils about good health and hygiene practices (top left)
7. Report to district managers on activities and the state of facilities.

The franchisees – mostly women – take on a large part of the O&M tasks including providing hygiene-related information to the pupils. This effort to professionalise the franchisee staff is intended to boost their status. If successful, they will gain confidence and status in the school and in the community. An incentive for the franchisor is the possible scale-up of the approach to the remaining 22 educational districts if the pilot project is successful. A maintenance job is a job for life since it will always be there.

Below is a list of the types of problems encountered in the first year of the project. Many were due to the procedural requirements of the Department of Education (DoE:

- Payment delays due to “incomplete paperwork”
- Communication problems between the various DoE managers and the schools
- Logistical issues due to poor planning and the inexperience of franchisees
- Difficulties due to different stakeholder viewpoints, need for a common understanding
- Franchisee dropout.

Some of the observations made by the franchisor so far are as follows:

Franchisees are very enthusiastic and positive about their ability to succeed

DoE officials are cooperative, thanks to the leadership from the provincial managers and district directors

DoE officials are keen to ensure the success of the pilot

The school heads and teachers are generally happy with the concept. A number of letters have been received expressing gratitude for the initiative

The process of shared experience and learning needs to be managed.

The Water Research Commission is involved in this development project (bottom left) and will evaluate the process and progress and identify lessons learnt from the project (www.wrc.co.za).

Population increase as a challenge

5.3 - 19

Number of additional teachers and classrooms required to provide primary education for all new-born

Year	Population	Increase 000´ in Total	Increase 000´ in Newborn	Number of classes (000´) in Standard I	II	III	IV	V	VI	VII	New class-rooms
0	23.0	690	1.150	-	-	-	-	-	-	-	-
1	23.7	710	1.185	1	-	-	-	-	-	-	1,000
2	24.4	732	1.220	2	1	-	-	-	-	-	3,000
3	25.1	754	1.257	3.1	2	1	-	-	-	-	6,100
4	25.8	774	1.290	4.1	3.1	2	1	-	-	-	10.200
5	26.6	797	1.330	5.2	4.1	3.1	2	1	-	-	15,400
6	27.4	821	1.369	6.3	5.2	4.1	3.1	2	1	-	21,700
7	28.2	846	1.410	7.3	6.3	5.2	4.1	3.1	2	1	29,000

J-O Drangert, Linkoping university, Sweden

The main problem with high population growth lies with providing public services for all newcomers rather than finding housing and food for them. The school sector can illustrate what happens if all families send four children instead of two to school. There must be twice as many teachers and classrooms available. Let us assume that the total population of a country is 23 million, the growth rate is three per cent and the fertility rate is five per cent and that each class has 35 pupils and one teacher. The requirement for additional teachers and classrooms over a seven-year period is given in the red column in the table above.

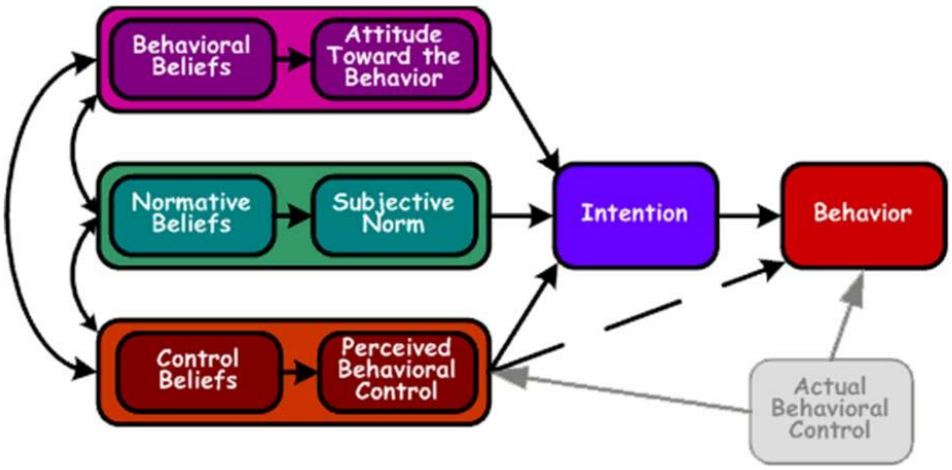
We may assume that in Year 0 there are sufficient facilities for all pupils and that there exists the capacity to train new teachers to replace retired staff. The number of new-born (blue column) increases by 35,000 in Year 1 and one thousand additional teachers and classrooms are needed in Standard I. These pupils will enter Standard II the following year (together with their teachers) while the intake to Standard I in Year 2 is 70,000 more than in Year 0. Another 2,000 new teachers and classrooms are required for those joining Standard I. Over the period of seven years the cumulative requirement will be about 28,900 teachers and classrooms. At least four new teacher training colleges are needed per year on average, each with a capacity to train 1,000 teachers annually. Additional institutions to train trainers of teachers will also be needed.

Governments cannot keep up with such rapid population growth and the situation is unmanageable, not because there is a lack of good planners, but because of the magnitude of the task. This applies to all communal services that require financing through taxes. Food and shelter, on the other hand, can always be managed by the individual family (see module 1.4). The result is that teachers are rarely adequately trained and classrooms are not adequately equipped. Lots of rural schools hire Standard VII leavers as teachers and classrooms lack desks, chairs, and school materials.

Worse still, pupils may think that they do not need to learn about traditional knowledge in the society, since they believe they have enough formal training and “book knowledge” as evidenced by their certificate. If the school functions poorly the pupils are likely to end up knowing too little about both the traditional and the modern world.

Awareness raising

5.3 - 20



From Ajzen (2002)

According to Ajzen (2002) human behaviour is guided by three kinds of beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (*behavioural beliefs*), beliefs about the normative expectations of others and motivation to comply with these expectations (*normative beliefs*), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour (*control beliefs*). A weighted combination of the three considerations guides the individual to form a behavioural intention. As a general rule, the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behaviour in question. Intention is assumed to be the immediate antecedent of behaviour or action.

We can apply this scheme to the use of school toilets and hand washing. Experience suggests that a pupil's behavioural beliefs rarely include health aspects as a major factor. This may be the reason why WASH projects emphasise information and education aspects to convince pupils about the close connection between good health and proper hygiene behaviour. As for normative beliefs, pupils in schools without proper sanitation facilities may conclude that there is no expectation or motivation for washing hands from the school staff or authorities. The lack of facilities also impacts on control beliefs, and actual conditions in the toilet block have been shown to be decisive in determining what pupils can do. The suggestion that pupils be required to bring along paper/water and soap is aimed at reducing this limitation.

A successful approach to improved school sanitation has to include all three interlinked beliefs. The South African effort (slide 5.3-18) to engage franchisees to remould reality as well as beliefs can be viewed as a way to strengthen the intention, and consequently action, to practice better hygiene.

An interesting finding brings out how difficult it is for individuals to revise basic perceptions through education. A training session was conducted for ten medical and anthropology students who were to do field observation of residents' behaviour around water wells and pit latrines in a poor, un-serviced periurban area in Eldoret in Kenya (Drangert, 2004). The students were asked "*What is safe water to you?"* The immediate response from one of the medical students was that water has to be boiled and chlorinated. Immediately a peer student disagreed, saying it would be enough to boil the water. Another maintained that chlorination would do. The other seven students contributed further diverse ideas on the topic. For example, one mentioned that he could drink any water without getting sick, while his room-mate had loose stools despite only drinking

boiled water. His conclusion was that it all depends on how susceptible a person's body is to ingested microorganisms. Despite 12–15 years of formal training, these students entertained the full range of possible views that would be found among common residents.

This is not to say that successful education is impossible; only that the change agent has to understand what persons think about the issue at stake, and find persuasive arguments that take account of the person's preconceived views. One drastic example of this is used in the "No-open defecation" programs in Bangladesh where the crucial piece of information is that poor sanitation makes all people eat the others' faeces (see Module 2.3).

Another example is from a study in Ghana where 91% of the respondents who agreed to the statement *sanitised human excreta can be used as fertilizer* were willing to use sanitised human excreta for their crops, while only 1.8% of those who disagreed said they would apply it for their crops (Mariwah & Drangert, 2010). In the context of Ajzen's theory of planned behaviour, this finding is an example of how beliefs are likely to impact outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs). Thus, respondents who know about the likely positive outcomes (increased crop yield) of applying excreta-based fertiliser on the farm or garden, were significantly more willing to apply it than those who did not recognise this usage.

A treatise on norms and attitudes towards ecological sanitation systems with recirculation of human-derived nutrients in African countries provides examples of promoting as well as prohibiting factors (Drangert, 2004).

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