Malteser International
Order of Malta Worldwide Relief

WASH Guidelines for field practitioners

PART 2 Sanitation

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ANNEX

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Foreword

Malteser International is the worldwide relief agency of the Sovereign Order of Malta for humanitarian aid. With over 100 projects annually in more than 20 countries throughout Africa, Asia and the Americas, we provide emergency relief after disasters and support recovery efforts with a focus on sustainable development. For nearly 60 years, Malteser International has been standing by those in need – without distinction of religion, race or political persuasion.

Cooperation and participation are vital elements of our approach to humanitarian aid. Through a close collaboration with local communities, national and international partners as well as our public donors, we ensure our projects are sustainable and efficient. Transparency, accountability and the compliance with international standards of humanitarian aid are the fundamental basis for the quality of our programmes.

In order to provide a high-quality resource for our staff members and partners, so they can implement our projects according to the latest recognized standards, Malteser International is in the process of developing a series of guidelines on its focus areas: disaster relief, health and nutrition, water, sanitation & hygiene (WASH), livelihood and social programmes, and disaster risk reduction. What you now hold in your hands is the first part of these guidelines to be published: **The WASH Guidelines for Field Practitioners, Part 2: Sanitation.**

Over the past few years, the WASH sector has become an integral part of Malteser International's worldwide projects; wherever possible, WASH components are integrated in projects covering all of our focus areas, as water, sanitation and hygiene are closely related to health, nutrition, and many other aspects of our work.

Malteser International is continuously working on further developing WASH activities within its programmes. This process is supported by a WASH working group[1], whose members have contributed to the development of these guidelines. The working group meets during the annual Regional Learning Forums (RLF), and the participants share information and exchange experiences through an online WASH forum and direct communications between programmes and concerned headquarter staff. The Malteser International WASH Guidelines for Field Practitioners: Part 2 deals with sanitation, whereas separate guidelines will be developed for Hygiene Behaviour Transformation (HBT) as well as Community Water Supply, Household Water Treatment and Safe Storage. This document provides guidance for sanitation programme planning and should not be used as a blueprint, since each project location has a different context and unique needs.

These guidelines complement a variety of other useful WASH materials already produced by Malteser International: An overview of our WASH activities in Asia is presented in the WASH brochure[2] "From Safe Water and Sanitation to Good Health: Water, Sanitation and Hygiene Projects in Asia", which was published to mark the International Year of Sanitation in 2008. A documentary film also highlights Malteser International's WASH activities in Sri Lanka, and can be found on the resource DVD that accompanies this edition. In addition, all reference documents used in these guidelines are available for download at the Malteser International WASH online group and included in the DVD.

I authorise the use of the WASH Guidelines for Field Practitioners, Part 2: Sanitation, for application in Malteser International programmes worldwide.

Ingo Radtke
Secretary General
Malteser International

[1] WASH working group uses an online forum for communication and exchange www.groupspaces.com/MalteserInternationalWASH
[2] Malteser International WASH Brochure, 2008

© Valeria Tursi

School children receive sanitation education messages from MI staff, Myanmar

1 Introduction

The Sanitation Guidelines should be used to direct project development efforts so that positive outcomes are maximised and negative outcomes are minimised. They have been developed with the objective of providing proven planning and design options to Programme Coordinators and Project Managers, Engineers, and line managers working with Malteser International and its partner agencies worldwide.[3]

The guidelines include a basic sanitation section which should be useful to guide non- WASH professionals in the field of sanitation development and at the same time, offer a quick overview for WASH professionals. The guidelines also cover different planning and technical options from some of our project countries in Asia and Haiti, reflecting the wide experience Malteser International already has developed in the sanitation sector through its programmes. Experience has been gained in the field of on-site sanitation, including eco-sanitation, treatment of sludge through wetlands and emergency sanitation.

These guidelines deal with the main context of Malteser International projects in the post-emergency and developmental phase, and in a predominantly rural setting. A special chapter has been included to cover emergency sanitation concerns.

WASH reduces morbidity and mortality particularly for children and other vulnerable groups. Malteser International promotes measures that prevent illness and deaths due to lack of sanitation and poor access to safe drinking water.

Today 2.5 billion people, mostly living in developing countries, lack basic sanitation[4]. These people have to decide every day how to organise defecation without feeling ashamed and often have direct health problems due to lack of sanitation facilities. In many cases, people without proper access to sanitation have to wait until night time to defecate or hide in the bushes. Needless to say, this is particularly difficult for women and children, or for those who are ill or living with disabilities.

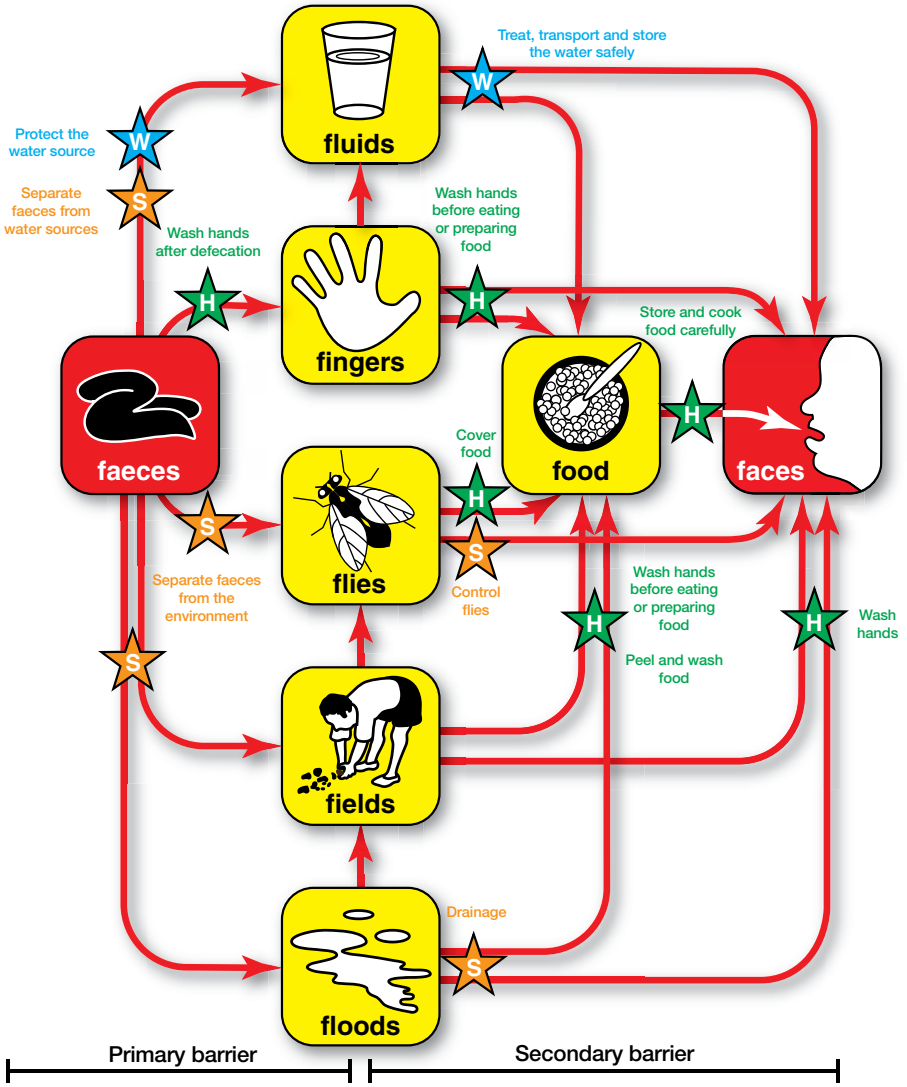
To highlight the importance of sanitation to human wellbeing, it has been recognized as a basic human right on 30th September 2010 by the UN Human Rights Council (Resolution A/HRC/15/L.14).

The world's sanitation problems cannot be solved exclusively by building water flush latrines and sewerage systems. The construction and maintenance costs for these are too high, and local conditions do not always allow these techniques to be implemented. Moreover, infrastructure alone cannot always ensure a clean environment especially when an adequate wastewater and sludge treatment is not in place. Therefore, cheap, technically simple but safe sanitation alternatives, which can be adjusted to meet the needs of different cultures and environments, are needed. It is also necessary to improve sanitation and hygiene education to increase awareness of the linkages between human and environment health. The aim of these sanitation guidelines is to contribute to the goal of improved access to safe sanitation systems.

Scaling up is essential to address the issue of lack of sanitation facilities world-wide. Combining approaches like Community-Led Total Sanitation (CLTS) and Sanitation Marketing have proven effective in stopping open defecation at scale and moving households up the sanitation ladder. This offers promising perspectives to accelerate the process of achieving improved levels of sanitation coverage.

The transmission of diarrhoeal and water-related diseases are directly linked to lack of hygienic practices, open defecation and inadequate access to safe drinking water. Inadequate disposal of human excreta can lead to contamination of water resources including ground water. This is a serious health hazard as the scarce water sources are used for as drinking and domestic water for the community.

[3] Recently Malteser International started more comprehensive WASH projects also in Africa, but more extensive experiences have been made in Asia and Haiti.
[4] Progress on Sanitation and Drinking-water, 2012 update, WHO/UNICEF, p 2



Note: The diagram is a summary of pathways: other associated routes may be important. Drinking water may be contaminated by a dirty water container, for example, or food may be infected by dirty cooking utensils.

W WATER S SANITATION H HYGIENE

Barriers can stop the transmission of disease; these can be primary (preventing the initial contact with the faeces) or secondary (preventing it being ingested by a new person). They can be controlled by water, sanitation and hygiene interventions.

Diagram developed by WEDC, 2011

Community meeting on safe WASH promotion, Cambodia

In communities which lack sanitary latrines, the majority of the diarrhoeal diseases originate from infected faeces[5]. The **F-diagramme** is a useful tool to show this:

The F-Diagramme (after Wagner & Laniox 1958 in Hunt 2001) illustrates the major transmission pathways of faecal-oral diseases. Sanitation breaks transmission by preventing the contamination of 'fluids' and 'fields' and via removal of breeding grounds for flies.

For a sanitation system to work effectively, it should remove excreta from the immediate environment. For example, if a family has a safe latrine and all its members use it consistently, they can still be at risk when their neighbors practice open defecation. As long as open defecation is practiced or unsafe sanitation facilities are used in a community, then the whole community is still exposed to high levels of environmental health risks. This is an aspect that is successfully addressed in the Community Led Total Sanitation (CLTS) approach[6]. A particular serious problem is indiscriminate defecation by children, whose faeces are particularly rich in pathogens (disease-causing organism) and more contaminated than those of adults[7].

From the above outline, the link between sanitation and the other two WASH components water and hygiene, is clear. Sanitation activities cannot be developed successfully without taking the access to safe water and good hygiene practices in consideration.

To date, the progress towards the Millennium Development Goals (MDG) for the WASH sector is weakest for the sanitation component, as reflected in the next chapter on MDGs. In planning WASH activities for Malteser programmes, the sanitation component should therefore get the due attention it deserves.

GOOD PRACTICE TIP

Children are more likely to suffer from excreta-related diseases, and they are also the main excreters of pathogens that cause diarrhoea[8]. Look at the special needs related to safe disposal of children's excreta and check that sanitation facilities are child friendly.

[5] Hygiene and Sanitation Software; An Overview of Approaches, WSSCC, 2010, F-Diagram, p 2
[6] Handbook on Community-Led Total Sanitation, Kamal Kar with Robert Chambers, 2008
[7] Excreta Disposal in Emergencies; A Field Manual, Peter Harvey, WEDC inter-agency publication, p 39
[8] UNHCR Handbook for Emergencies, 2000

2

Global Sanitation Goals

A MILLENNIUM DEVELOPMENT GOALS (MDG) FOR SANITATION

In 2000, the United Nations adopted eight Millennium Development Goals (MDGs) that were set to guide development interventions and set targets to be fulfilled by 2015. The MDGs are an agreement on the rules of international cooperation signed by UN member states, UN organizations and international financial institutions. In fact, the sanitation part of the WASH related millennium development goal was only included in 2002 at the "World Summit on Sustainable Development" in Johannesburg.

The MDGs can act as a guide for agencies like MI to plan and prioritise their programme activities to put them in line with wider initiatives of governments and international agencies. Sanitation related MDGs are grouped under goal number 7[9], and read as follows:

Goal 7. Ensure environmental sustainability

- Integrate sustainable development principles into country policies and programmes and reverse the loss of environmental resources
- Halve the proportion of people suffering the lack of access to safe drinking water and basic sanitation by 2015
- Achievement of significant improvement in the lives of at least 100 million slum dwellers by 2020

This seventh goal of Millennium Development Goals aims at ensuring environmental sustainability. It contains a target 10 with aims to halve the proportion of people suffering the lack of access to safe drinking water and basic sanitation by 2015.

The UNICEF/WHO report on 'Progress on Sanitation and Drinking-Water, 2012 Update', reports that 2.5 billion people do not use improved sanitation[10].

The report also mentions that progress in relation to access to basic sanitation is insufficient to achieve the MDG target in 2015. It states that at the current rate of progress, the world will miss this MDG target with 13 percentage points. The report concludes that if the trend remains as currently projected, an additional billion people who should have benefited from MDG progress will miss out, and by 2015 there will be 2.7 billion people without access to basic sanitation.

Sanitation coverage can vary a lot between different regions in a country. Statistics are supplied by the participating countries and assessment methods appear to be interpreted differently.

Official figures of MDG sanitation status (2012)[11] in countries where Malteser International has WASH interventions:

Country	% open defecation practices	% Un improved facilities	% Shared	% Total unimproved
Cambodia	61	03	05	69
Haiti	28	40	15	83
India	51	06	09	66
Indonesia	26	09	11	46
Myanmar	06	05	13	24
Nepal	49	06	14	69
Pakistan	23	23	06	52
Philippines	08	02	16	26
Sri Lanka	00	04	04	08
Thailand	00	00	04	04
Vietnam	04	16	04	24

[9] http://www.unmillenniumproject.org/goals/gti.htm
[10] Progress on Sanitation and Drinking-Water, UNICEF/WHO, 2012 Update, p 6
[11] Progress on Sanitation and Drinking-Water, UNICEF/WHO, 2012 Update, p 38-51

B POST 2015 DRAFT JOINT MONITORING PROGRAMME (JMP) AND SUSTAINABLE DEVELOPMENT GOALS (SDG)

Post 2015 JMP WASH targets that are currently being developed will lead to WASH Sustainable Development Goals (SDGs) to replace the MDGs that have 2015 as deadline.

Through broad consultation with experts and stakeholders, improved global WASH targets are being developed with corresponding indicators and incorporating human rights principles, to set the direction of the WASH sector development after 2015.

At the end of this process, this will lead to a possible Sustainable Development Goal on WASH.

The SDGs aim at addressing some weaknesses[12] that did not materialize well in the MDG set-up:

- WASH MDG Lacked ambition - focused only on basic/minimum level of service
- Average figures mask disparities within population – focus on easy to reach
- Definition of 'improved facility' inadequate proxy for 'services'
- Incentivizes new services over existing
- Defined for global not national level
- Proposed Overall Sanitation Goal:
- Universal use of sustainable sanitation services that protect public health and dignity

Proposed Targets

- By 2030, no-one practices open defecation
- By 2030, 80% of the poorest quintile, and 80% of the entire population uses an adequate sanitation facility
- By 2030, the excreta of 50% of households is safely stored, transported, and adequately treated, before being either re-used or safely returned to the environment
- By 2030, all schools and health facilities offer adequate sanitation facilities to all users

In the post-2015 JMP Goals for sanitation that are now under preparation, shared toilets are also proposed as adequate sanitation, provided that they are within or nearby the plot, shared by no more than 5 families or 30 people, whichever is fewer, and used by people who know each other.

No Toilet No Bride!

Union Minister for Rural Development and Sanitation Jairam Ramesh seems to be determined to provide toilets to all women in India, where 51%* of the population still practices open defecation. His zeal and commitment towards sanitation issues can be seen in his latest advice to women, mostly rural women, who hardly have toilets inside their house.

The Minister urged women not to get married into families which do not have toilets in their homes.

"Don't get married in a house where there is no toilet," Ramesh said while addressing locals in a village in rural India, majority of whom were women, and cited the slogan "No toilet, no bride".

"You consult the astrologers about rahu-ketu (planetary positions) to know about the suitability of stars before getting married. You should also look whether there is a toilet at your groom's home before you decide to get married," he said.

* Progress on Sanitation and Drinking-Water, UNICEF/WHO, 2012 Update, p 38-51

[12] JMP process on global post-2015 monitoring, presentation at World Water Week 2012, Stockholm, Guy Hutton

3

Sanitation 'hardware' systems and concepts

A DEFINITION AND BASIC CONCEPTS OF SANITATION

The World Health Organization (WHO) defines sanitation as *"a group of methods to collect human excreta and urine as well as community waste waters in a hygienic way, where human and community health is not altered".*

Use of sanitation methods should result in a decrease of spreading of diseases through adequate waste water, excreta and other waste collection (sewerage) and adequate storage and treatment. To make sanitation interventions more effective, hygiene promotion should be linked to the provision of sanitation facilities in order to raise peoples' awareness on how lack of sanitation facilities and unsafe sanitation behavior is linked with health problems and how the people can contribute to achieve better sanitation.

Improved sanitation services are defined in WHO's and UNICEF's Joint Monitoring Program (JMP) "Global water supply and sanitation assessment 2000[13]" as follows:

- public sewer
- septic tank
- pour-flush latrine
- pit latrine with slab
- ventilated improved pit
- ecological sanitation

Following facilities are considered as unimproved sanitation:

- service or bucket latrines (where excreta are manually removed)
- public latrines[14]
- open latrines
- open defecation

Basic sanitation was defined in UN's World Summit on Sustainable Development (WSSD)[15] in 2002. By the definition basic sanitation consists:

- development and implementation of efficient household sanitation systems
- improvement of sanitation in public institutions, especially in schools
- promotion of safe hygiene practices
- promotion of education and outreach focused on children, as agents of behavioral change
- promotion of affordable and socially and culturally acceptable technologies and practice
- development of innovative financing and partnership mechanisms
- integration of sanitation into water resources management strategies in a manner which does not have negative impact on the environment

Basic Sanitation Concepts

The elements of a sanitation system

Sanitation aims at protecting public health of communities by collecting and treating human excreta in order to prevent human contact. This can be done in different ways, and covers different steps in the process. Comprehensive sanitation system components need to address the complete cycle from collection of excreta to safe disposal (and possibly re-use).

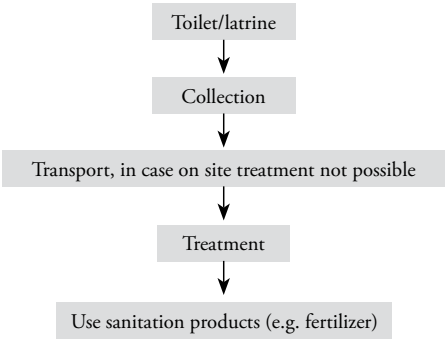
A very extensive description of sanitation systems and individual components can be found in "Compendium of Sanitation Systems and Technologies"[16]

Sanitation systems should be able to break the disease cycle caused by the bacteria in human excreta, as seen in the F diagram on page 1. It is important that excreta is "managed" until it is not infectious anymore. So, the often neglected phases of treatment and disposal should be taken in consideration right from the planning phase onwards. Promotion of re-use techniques as recommended by the German WASH

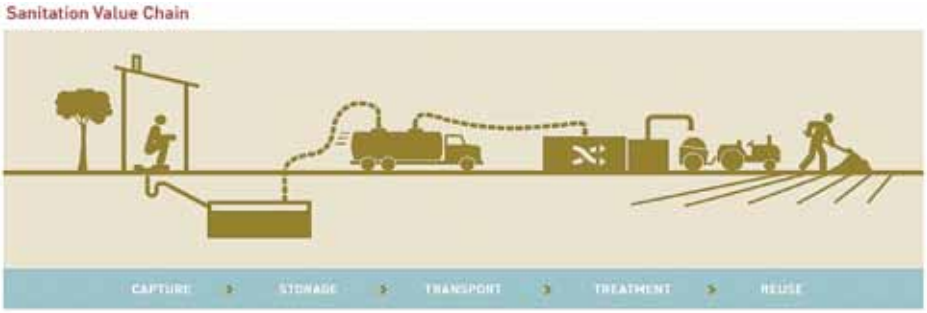
[13] http://www.who.int/water_sanitation_health/monitoring/globalassess/en/
[14] If managed properly, and if the approach is supported by the community, public or shared latrines could arguably also be an improved sanitation system.
[15] http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm
[16] Compendium of Sanitation Systems and Technologies" WSSCC, EAWAG, Elizabeth Tilley, 2008

Network at the Nexus conference in Bonn on November 2011 should be considered here (conference recommendation 1[17]). Too often, we still see sanitation projects that provide latrines with limited thinking and provision on how the communities should proceed once latrine pits are full and need to be evacuated safely.

The functional elements of sanitation systems can be grouped as below[18]: Individual components will vary considerably with local circumstances (e.g. traditions, culture as much as soil morphology and/or availability of technics such as gully suckers or sewerage treatment plants) and will differ from community to community; the division into elements creates flexibility and choice in developing appropriate solutions. Five elements need to be considered separately:



- Toilet/latrine – there are many different dry toilets, urine diverting dry toilet, pour-flush toilet, and cistern-flush toilet. Its use can be considered depending on local circumstances. Good overview of the various designs of toilet/latrine options can be found in Excreta Disposal in Emergencies[19]. Chapter 5, on "2nd Phase Technical Options" gives design details on simple pit latrines, ventilated improved pit (VIP) latrines, eco-san options, pour-flush latrines and latrines for institutions. Appendix 4 of "Excreta Disposal in Emergencies" provides Bills of Quantities (BoQ) for these toilet/latrine types.



Picture adopted from German WASH Network Nexus document

- The collection/storage system – dry toilet and VIP latrine, urine diverting dry toilet with double dehydration vaults, alternating water-based pits, septic tank, anaerobic baffled reactor; Designs can be found also in chapter 5 of "Excreta Disposal in Emergency". Including an example calculation for septic tanks on page101.
- Transportation – large or small sewer systems, motorised, mechanical or manual haulage may need to be considered. Where available, gully suckers can also fulfill this purpose;
- Treatment – constructed wetlands, waste stabilization ponds and sewerage treatment plants; Designs of these systems need specialised expertise, which is not covered in the context of these Sanitation Guidelines.
- Use of sanitation products – urine, composted excreta and biogas can all be good end products for further use. Although in some cultures, the use of fertilizer out of human excreta is not acceptable, and one should study the local context and cultural practices to assure that appropriate and feasible approaches for use of sanitation products are introduced. As mentioned above, sanitation projects focus on developing the toilet/latrine and collection system with insufficient attention to the more long-term aspects of transportation, treatment and use of sanitation projects. As a basic guideline, Malteser International sanitation interventions should address all five sanitation system components in the project planning and implementation to contribute to the provision of sustainable sanitation facilities to communities.

5 sustainability criteria[20]

The following 5 sustainability criteria should be considered and ideally met when planning sanitation projects:

- Human health should be protected
- System should be economically viable
- System should be technically and institutionally appropriate
- The system should also be socially, and
- Protect the environment

GOOD PRACTICE TIP

While selecting sanitation options with the community, discuss the complete sanitation cycle to look for suitable sanitation options that are sustainable in the local context.

Improved technologies	Unimproved technologies
Connection to a public sewer	Bucket latrines
Connection to a septic system	Public latrines[21]
Pour-flush latrine	Open latrines
Simple pit latrine, Ventilated improved pit latrine (VIP)	

[17] German WASH Network Nexus recommendations, November 2011
[18] Modified from": Sanitation Systems and Technologies; Sandec Training Tool 1.0 Module 4, Eawag/Sandec, 2008
[19] Excreta Disposal in Emergencies, A Field Manual, Peter Harvey, 2007
[20] Email communication with Robert Gensch, German Toilet Organisation, February 2012
[21] If managed properly, public latrines can provide safe sanitation as well (like school latrines…)

B SANITATION OPTIONS

Minimum criteria sanitation facilities:

- Facility should separate excreta from human contact and assure that it can not re-enter the immediate household environment
- Safe minimum distance from sanitation facilities to wells should be 25m*
- Facility should be safe, with particular attention to use by small children (that they can not fall in pits)
- In case of latrines made with cheap materials and sufficient space available to re-locate latrines, they should at least last one season, and be easily replaceable by users.
- Shared latrines within or nearby plot, maximum 5 families or 30 people who know each other
- Facilities accessible at all times (7 days per week, 24 hours per day)
- Accessible to all members, including those with disabilities
- Safe to use for women and children, with no culturally-inappropriate exposure or invasion of privacy
- Nearby access to handwash facilities

* JMP Post-2015 Sanitation Group presentation at World Water Week, Stockholm, August 2012, Eddy Perez

Comparison of Sanitation Options

Options	Advantages	Disadvantages
Sealed Pit Latrine	Cheap Requires small amount of water Does not require permanent super structure Small land requirement on-site Control of flies, mosquito with proper lid on the pan and a proper cover on the pit (flyproof)	Possibility of bad smell (inconvenience)
Pour Flush Latrine	Cheap Absence of smell in the latrine Control of flies and mosquito (sealed)	Only suitable if water is used for anal cleansing (possiblitiy of blockage when toilet paper used) Requires reliable water supply
Septic Tank	Users have convenience of a conventional cistern or pour flush toilet. Can be used in case of high ground water level.	High costs Reliable and ample water supply is essential Problems with effluent disposal Large land area is required for effluent disposal and unsuitable for high density of houses
Communal Latrine (various types possible)	May be the only option for the disaster and emergency situation	If the maintenance is not well done the latrines will be come very dirty and a source of spreading diseases. Bad smell Unless segregated for men and women there is risk of women for abuses
Sewerage	No concern from users after the toilet is flushed Suitable for high density housing in urban areas.	Very high construction and maintenance costs Efficient institutional organization such as municipality needed for construction, operation and maintenance. High level of water supply services required (minimum 70 liters/person/day) Only suitable water or soft toilet paper are used for anal cleansing Adequate sewage treatment process is required before discharging to a water course. If a sewerage treatment plant is not operated properly and it is close to the community high risk of contamination through flies and high risk of contamination of surface water.

The Joint Monitoring Programme (JMP) of UNICEF and WHO classifies sanitation facilities as either "improved" or "unimproved".

In the context of Malteser International sanitation activities, public sewerage systems are rarely used in rural areas of development countries and therefore not described in detail in these guidelines. For a more comprehensive overview of sanitation options, reference is made to the "Compendium of Sanitation Systems and Technologies"[22] developed by WSSCC. This document looks at all necessary components of sanitation systems; collection, storage and treatment.

Useful Sanitation facility option choice chart as developed by the ministry of Rural Development Department of Rural Health Care, Cambodia is provided in annex 1.

Objectives of sanitation systems[23]

Protect and promote health: Sanitation systems should keep disease-carrying waste and insects away from people and their food, both at the site of the toilet, in nearby homes and in the neighboring environment.

Protect the environment: avoid air, soil, water pollution, return nutrients/resources to the soil, and conserve water and energy.

Be simple: the system must be operational with locally available resources (human and material). Where technical skills are limited, simple technologies should be favored.

Be affordable: total costs (including capital, operational, maintenance costs) must be within the users' ability to pay.

Be culturally acceptable: it should be adapted to local customs, beliefs and desires.

Work for everyone: it should address the health needs of children, adults, men and women.

There are two major options for excreta disposal and can be classified as follow.

On-site Sanitation System:
In which safe disposal of excreta takes place on or near the settlement or housing plot. (Pit latrines and septic tanks fall into this category)

Off-site Sanitation System:
In which excreta are collected from individual houses and carried away from the site or plot to be disposed of. This option requires a sewer system and plant for purification. Sewerage is the most visible option in this category)

[22] Compendium of Sanitation Systems and Technologies, Eawag, ISBN 978-3-906484-44-0, Elizabeth Tilley et al, 2008
[23] Sanitation Systems & Technologies, 2008, EAWAG, p 5

Latrine pit digging, Vietnam

Simple Pit latrines[24]

Simple pit latrines are a very common technology, which is often the first choice latrine option for communities/ households that construct latrines without outside assistance. This latrine type can be very appropriate for promotion with communities who are in the process of moving up on the "sanitation ladder" (refer to page 6) to private latrine use. They are easy to construct and relatively cheap. The pit should be as deep as possible, taking into consideration of the soil quality (corn size and density), the water table level and the pit should be covered by a solid latrine slab. The rate at which the pit will fill will depend on the family seize, quantity of usage and the infiltration rate of the soil. The required size of the pit can be estimated based on these details. At least the top 1m of the pit should be lined to prevent collapse. In areas where the soil is unstable the entire pit should be lined. Once the pit is filled it either can be emptied (gully sucker) or the latrine super structure can be removed to a new pit.

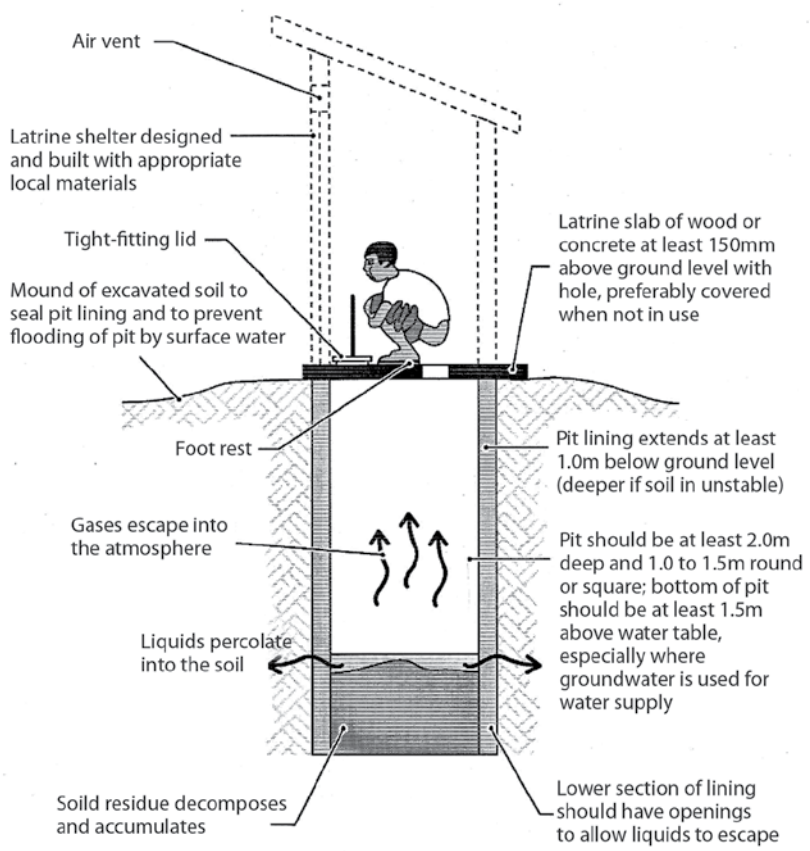
The slab with drop-hole can be made of concrete or wood, or a prefabricated plastic slab can be used. A removable lid should be present to seal the pit in order prevent flies having contact to the feaces and to minimise odor.

The superstructure can be made from local materials, or it can be a more permanent structure like bricks.

Ventilated-improved pit (VIP) latrines[25]

The Ventilated Improved Pit (VIP) latrine is an conventional pit latrine designed to minimise odour inside and prevent flies to gain contact to feces with a pipe connected to a pit which causes air circulation, as can be seen in the drawing below. The VIP Latrince is more expensive than the simple pit latrine. For that reason, independent community diffusion of VIP latrines without agency support is very rare[26]. Scope for scaling up latrine construction in communities using the VIP design without agency support is probably very limited; this should be taken into consideration when promoting latrine designs with communities.

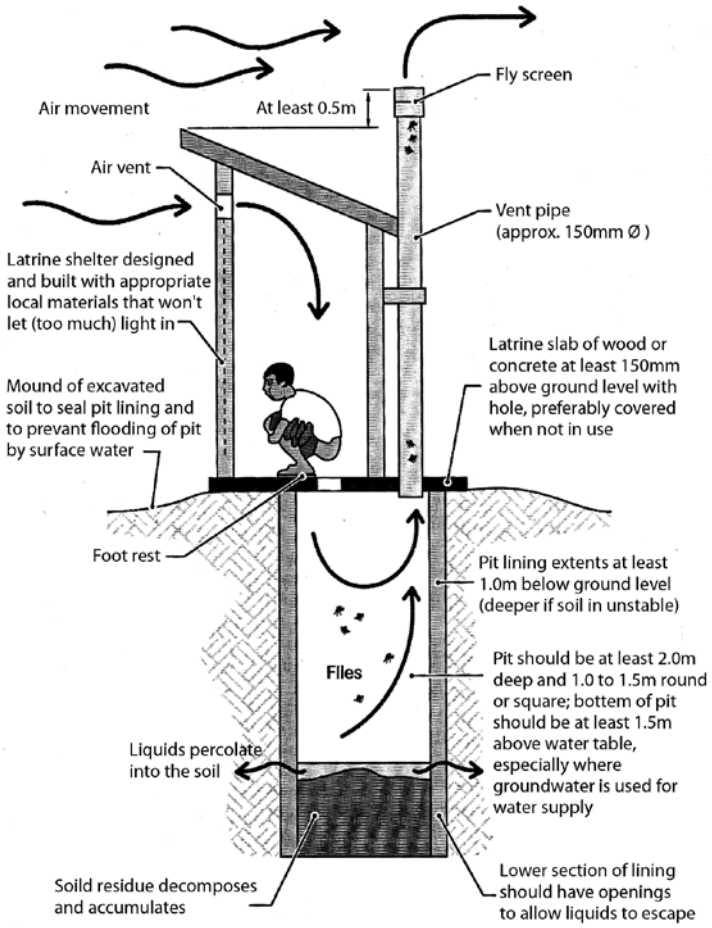
A vent pipe covered with a gauze mesh or fly-proof netting is fitted with the aim to remove odorous gases from the pit, prevent flies entering the pit and trap any flies trying to leave the pit. The pipe should extend at least 0.5 m above the superstructure roof so that the air flow is unobstructed, and should be at least 30cm from the squat hole. The movement of air across the top of the vent pipe creates low pressure which promotes upward air flow within the pipe



Excreta Disposal in Emergencies, Peter Harvey, page 69

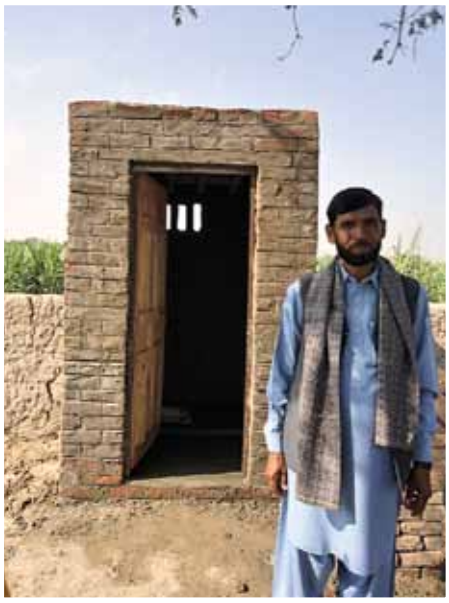
[24] Excreta Disposal in Emergencies; A Field Manual, Peter Harvey, 2007, p 68-69
[25] Adapted from "Excreta Disposal in Emergencies", p 70-72
[26] Waterlines, Volume 28, Number 3, Performance assessment for the VIP toilet in the Upper West Region of Ghana, Dumpert et al, July 2009, p 256

and aids ventilation. The vent pipe can be situated inside or outside the latrine interior. Inside has the advantage that the latrine slab is easier to construct since the superstructure can be built around it, and outside has the advantage that the pipe warms quicker which encourages air flow through it. Air should be able to flow freely through the squat hole and vent pipe; therefore no drop hole cover is required. The pipe can be of several material or a PVC pipe can be used (see pipe vent details).



Excreta Disposal in Emergencies, Peter Harvey, page 71

Latrine construction, Pakistan



The superstructure interior should be kept reasonably dark as a measure against flies, but there should be a gap, usually above the door, to allow air to enter. Air flow can be increased by facing the door of the superstructure towards the prevailing wind. Each drop-hole should have its own compartment and there should always be one vent pipe per compartment.

Vent pipe details

The vent pipe mesh or netting should have a mesh size of between 1.2 and 1.5mm. The gases given off by the decomposition of excreta are very corrosive. For this reason, fly mesh made from mild steel will rot very quickly and plastic mesh will last about two years. Mosquito netting is often used but aluminum or stainless steel is the best material for this purpose.

A wide variety of materials can be used for the vent pipe, such as PVC, asbestos cement, fired clay, concrete or even mud-covered bamboo or reed. If the pipe is smooth inside (such as plastic or asbestos cement) then an internal diameter of 150mm is recommended. The smallest PVC pipe diameter that can be used is 110mm, but only if larger diameters are not available. Otherwise vent pipes should be at least 200mm in diameter or square. Where large-diameter pipes are not available, or are too expensive, an alternative is to construct the vent pipe from block or brickwork.

A simple test can be used to check that the vent pipe is having the desired effect and that air is flowing from the pit up through the pipe. When a small amount of ignited paper and/or dry grass is dropped into the pit smoke should be seen rising from the top of the vent pipe if the ventilation effect is functioning correctly.

The majority of design and construction information for a VIP latrine, such as pit and slab design, is the same as for a simple pit latrine.

Studies[27] revealed that if the following design aspects must be met for the VIP to function properly:

- ventilation pipe design in proportion to the superstructure volume
- drop hole covered during early morning and evening
- superstructure door oriented to predominant wind direction

Pour-flush latrines[28]

Pour-flush latrines are often the preferred latrine choice in many Asian countries where Malteser International is intervening. These latrines rely on water to act as a hygienic seal and to help remove excreta to a wet or dry disposal system. The simplest pour-flush latrines use a latrine pan incorporating a shallow U-bend (siphon) which retains the water and functions as a seal for flies and odour. After defecation, a few litres of water must be poured, or thrown, into the bowl in order to flush the excreta into the pit or sewerage system below.

Pit cover transported to beneficiary site, Buthidaug, Myanmar

Concrete ring manufacturing in Buthidaung, Myanmar

[27] Waterlines, Volume 28, Number 3, Performance assessment for the VIP toilet in the Upper West Region of Ghana, Dumpert et al, July 2009, p 258
[28] Excreta Disposal in Emergencies, Peter Harvey, p 80

Malteser International engineers trained the villagers to build the walls of the latrines. As you can see in the pictures, **a plumb - line** was used to help the villagers construct more easily and avoid that the walls will be inclined (before the project, the villagers did not use this technique). Also, the villagers were instructed about safe bricklaying techniques to assure the necessary strength of the walls.

700 bicks are needed to construct the walls, together with 4 bags cement bags, and 2 cubic meter sand, which is supplied by the villagers.

After being trained step by step by Malteser staff, the villagers finished building their latrines. They are proud of their "products" because they now know how to build the latrines beautifully and correctly in all technical aspects, eventhough they were not skilled building workers earlier.

Latrine construction in Vietnam

Pour-flush latrines may be constructed directly above a pit or may be offset whereby the waste travels through a discharge pipe to a pit or septic-tank. The pour-flush latrine can also be connected to a double-pit system.

The amount of water required to flush the system will depend on the type and size of the water-seal construction. A 90mm (3") U-bend normally requires 2-3 liters to flush effectively, while a 120mm (4") U-bend generally requires 4-5 liters to flush.

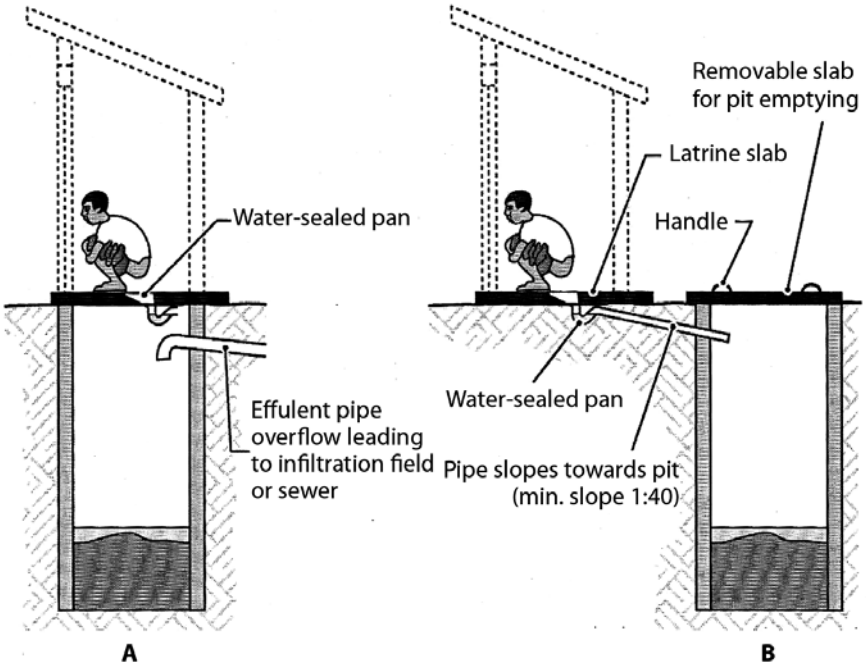
Where the waste pipe between the U-bend and the pit or tank is more than 2m in length an inspection chamber or roding point is needed along its length to allow roding upwards and downwards to prevent blockage

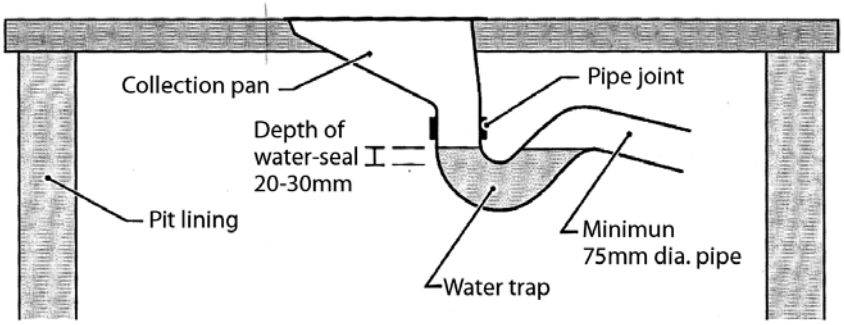
Advantages: Lack of odour; ideal where water is used for anal-cleansing;

Disadvantage: If the latrine is not flushed after every single use the hygiene situation is worsened.

Easy to clean; off-set design does not require a self-supporting latrine slab.

Constraints: Increased quantity of water required; solid anal-cleansing materials may cause blockages; more expensive than simple pit latrines.





Dimensions of sealed pan

Excreta Disposal in Emergencies, Peter Harvey, page 81

Inspection of completed latrine in Sri Lanka

Completed latrine in Myanmar with off-set pit. Annex 1 shows the drawing and Bill of Quantities (BoQ) for such latrine with galvanised iron sheet roofing.

Latrine constructed in Haiti

In many Asian countries, like the above example from Vietnam, the pour-flush toilet with off-set tank is the preferred sanitation option

Septic tanks[29]

In case several pour-flush latrines are required, they may be used in combination with a septic-tank. A septic-tank is designed to collect and treat toilet wastewater and other grey water. Its use is likely to be appropriate where the volume of wastewater produced is too large for disposal in pit latrines, and water-borne sewerage is uneconomic or unaffordable. They are also suitable for areas with higher groundwater table where conventional pits can not be used.

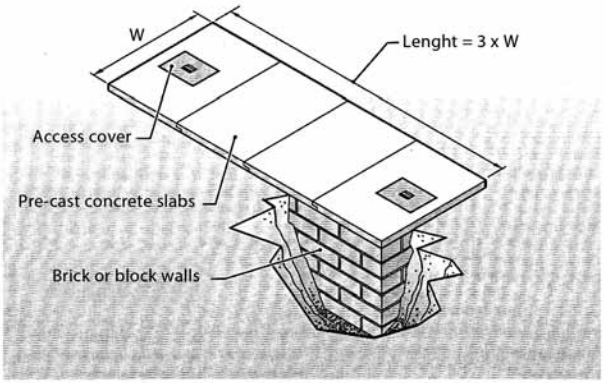
Wastes from toilets, and sometimes kitchens and bathrooms, pass though pipes to a watertight tank where they are partially treated. After one to three days the liquid wastes leave the tank and are carried to a secondary treatment system. This is usually some form of underground disposal system (such as an infiltration field), sewer or secondary-treatment facility.

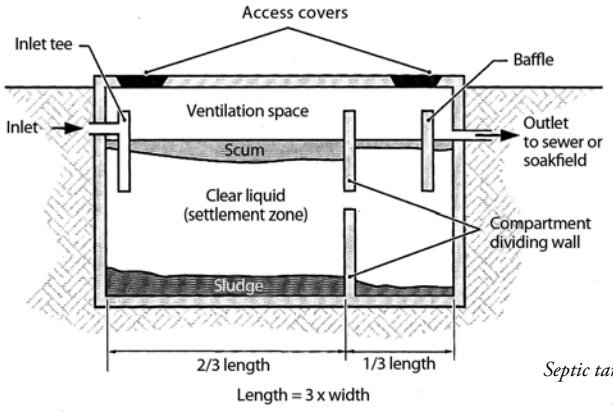
The treatment process in a septic-tank occurs in four stages:

Settlement: Heavy solids settle to the base of the tank to form a sludge which must occasionally be removed; about 80 per cent of the suspended solids can be separated from the liquid in a well-designed tank.

Flotation: Grease and oil float to the surface to form a layer of scum; over time this scum layer becomes thick and the surface may be hard.

Sludge digestion and consolidation: The sludge at the bottom of the tank is compressed by the weight of new material settling on top, increasing its density; and organic matter in the sludge and scum layers is broken down by bacteria which convert it to liquid and gas. It should be noted that use of too much bleach or other strong cleaning materials can reduce mineralization process.





Septic tank

Stabilization: The liquid in the tank undergoes some natural purification but the process is not complete; the final effluent is anaerobic and will contain pathogenic organisms such as roundworm and hookworm eggs.

The final effluent leaving the septic-tank will still be full of pathogens and must be disposed of in an appropriate location such as a soak away pit, infiltration field or sewerage system. All septic-tanks require a system for removing the sludge and disposing of it hygienically .

Detailed design details for septic-tanks can be found in *Excreta Disposal in Emergencies, by Peter Harvey* on pages 154-160. BoQ in annex 2.

Biofil

Construction of a wetland and leach field where the pre-treated effluents from the Biofil tank are further filtered and finally released into the ground, Indonesia

The Biofil Digester is a simple compact on-site organic waste treatment system. Living organisms (both microorganisms and macro-organisms) in an enclosed environment treat all organic degradable matter through the natural process of aerobic decomposition.

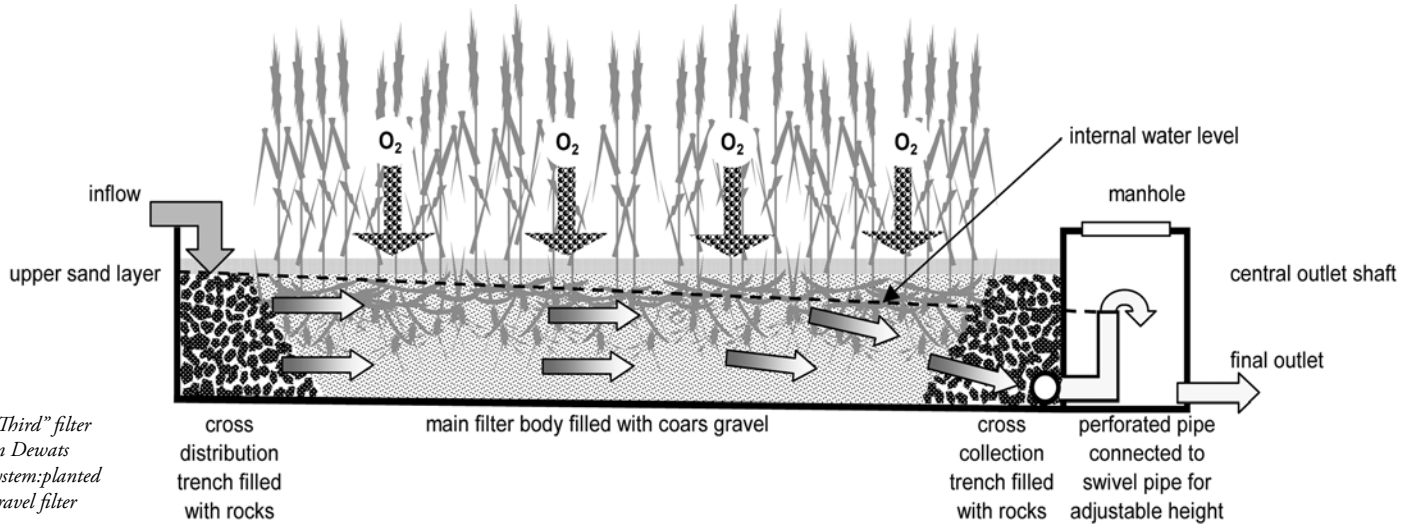
Wastewater and fecal matter enter at the top of the Biofil Digester where rapid separation of solids and liquid contents of the waste occurs. Micro and macro-organisms degrade solid fecal matter. All liquids are organically filtered out of the bottom of the digester and drained into the soil where further and final decomposition occurs. Other solids (toilet paper and all degradable anal cleaning material) are decomposed and converted into rich and safe soil.

Constructed wetlands[30]

Constructed wetlands or reed bed systems are natural systems treating solid-free wastewater. This can be pre-treated wastewater from a flush toilet/septic tank, possibly combined with wastewater from the kitchen and bathroom, or separate from it.

A planted soil filter, preceded by a settling and watertight storage tank, consists of a sand and gravel matrix (sealed at the bottom) planted with wetland plants like reeds. Solid free wastewater is discharged from the storage tank on top of the filter or though an underground inlet-system

[29] Excreta Disposal in Emergencies, Peter Harvey, page 81
[30] Modified from: Sanitation techniques, p 43



"Third" filter in Dewats system:planted gravel filter

and flows through (vertical) the filter. Horizontal-flow soil filters are commonly found, and easier to construct than vertical flow filters, but they are less efficient at eliminating nitrogen. After treatment, the effluent can be discharged into surface water, used for irrigation or groundwater recharge.

Applying conditions

- Planted soil filters can be implemented at household or community level. Their use in isolated
- settlements like rural schools is also possible.
- Design and construction require a solid understanding of the treatment process.
- The amount of technical equipment needed is very small.
- Costs can vary greatly, and depend, among other factors, on local availability of gravel, the kind of sealing and the cost of land.

Advantages:

- Removes pathogens are from water with high organic load.
- Effluent from wetlands can be used for irrigation.
- Operate without energy consumption
- Easy to operate

Disadvantages:

- Considerably large area is needed for wastewater. Some degree needed of post-treatment if the effluent is directly used for edible crop irrigation
- Pre-treatment generates sludge.
- Intensive maintenance during first 2 years.

Information: General
www.bodenfi lter.de/engdef.htm
www.constructedwetlands.org
www.gtz.de/ecosan

A horizontal planted gravel filter functions through the combined effects of the filter material, the plants and their roots growing in the filter media. The wastewater is re-supplied with oxygen while passing through the planted gravel filter; the effluent coming out is odor free. Since the planted filter becomes less prominent in the overall design due to the excellent treatment taking place in the baffled tank reactor and anaerobic filter, the minimizing of the planted filter results in drastic cost reduction, less needed space above ground and with an additional benefit of having reusable treated waste water. Around 80% of the original water load can be recuperated for reuse after having passed through the anaerobic and aerobic treatment phases.

DEWATS system[31]:

Dewats System Bharathi Nagar, India (Hand pump only used for cleaning purpose)

DEWATS stands for "Decentralised Waste Water Treatment Systems", and is based on different natural treatment techniques, put together in different combinations according to the needs, the possibilities, the challenges and the financial implications.

DEWATS applications are based on the principle of low-maintenance, the most important parts of the system work continuously and uninterrupted without energy inputs. DEWATS applications are affordable because most of materials / inputs used for the construction are locally available.

- DEWATS applications provide treatment for wastewater flows of 1-1000 m^3 per day.
- DEWATS applications are reliable, long lasting and tolerant towards inflow fluctuation.
- DEWATS applications do not need sophisticated maintenance.

The different devices/components cover primary, secondary and tertiary treatment. Natural effluent treatment processes are achieved using methods that are designed to utilise natural physical principles combined with biological activities of microorganisms. Microbes used in the treatment facility are generated from microbial populations that occur naturally in the wastewater itself.

[31] DECENTRALISED WASTE WATER TREATMENT SYSTEMS (DEWATS) Auroville Centre for Scientific Research, www.auroville.org

C DE-SLUDGING OF PITS AND SEPTIC TANKS

In case of on-site sanitation facilities, pits and septic tanks fill up after certain time, depending on capacity and use of the systems. If building and using a new pit is not an option, the existing one needs to be desludged. If no mechanical desludging equipment is available, this needs to be done manually. Oxfam has developed a Manual Desludging Hand Pump (MDHP) for this purpose, which can be fabricated locally.

There are four main issues that need equal attention when considering the manual desludging pump; the environmental feasibility, health and safety, social acceptance and technical feasibility

These aspects are all covered in detail in the handbook[32]. A drawing[33] and BoQ[34] of the pump is available as well.

A crucial aspect to the safety of desludging is of course how the contaminated material will be transported and how it will be disposed of safely.

Shortcomings in emptying, removal, and disposal services lead to the widespread dumping of untreated wastes into open drains, fields and watercourses. This causes pollution and is a serious public health concern. It is important to understand that simply collecting fecal sludge is insufficient; the sludge must also be treated. In a rural context, small treatment plants will be required to address this issue, but it might be more practical to avoid the need to de-sludge facilities all together and practice on-site composting (with double pits for instance) instead. The following chapter gives some guidance on this.

D SELECTED REUSE-ORIENTED SANITATION TECHNOLOGIES

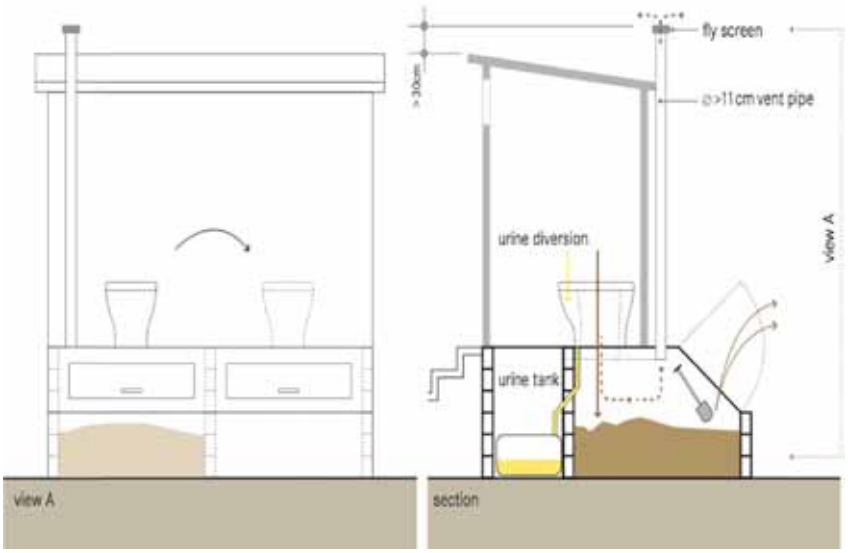
Urine Diversion Dehydration Toilets (UDDT)[35]

Urine-diversion dehydration toilets are simple, low-cost, on-site sanitation facilities that make use of desiccation (dehydration) processes for the hygienically safe on-site treatment of human excreta. Urine-diversion dehydration toilets divert all liquids (i.e. urine and anal cleansing water, if applicable) in order to keep the faeces as dry as possible. Adding wood ash, lime, dry earth etc. after defecation helps in lowering the moisture content and to raise the pH, which enhances pathogen die-off during storage. Separately collected urine is rich in nutrients and low in pathogens and can be used as fertiliser. Faeces from UDDTs can be composted or stored and dried before using them as soil amendment for crop production.

Reuse or safe disposal options[36]: The WHO recommends that the collected urine should be stored for around 1 month before it can be safely reused in agriculture. This storage time increases the pH inside the container and kills off remaining pathogens.

Urine can be considered a well-balanced nitrogen-rich, quick-acting liquid fertilizer since nutrients in urine are mostly water soluble, hence, are directly available for plant uptake. Urine is best utilised as a fertilizer for nitrogen-demanding crops such as corn and leafy vegetables (such as lettuce). Urine can be applied either with or without dilution. When applying undiluted urine, water should be applied right after the application of urine. When diluted, the dilution ratio could be between 1:1 (1 part urine to 1 part water) and up to 1:10 (1 part urine to 10 parts water). Urine should be applied 10 cm away from the plants and immediately covered with the soil to avoid loss of ammonia. Urine should not be sprayed on plants to avoid foliar burning. A waiting period of 1 month from the last urine application before harvest of crops should always be observed as an additional safety measure.

Pathogen concentration in feces is usually very high. Thus, for the safe reuse of feces in agriculture, it is critical that it has to be handled in such a way that the risk of disease transmission is minimised and the dried feces are appropriately treated. It is therefore, recommended to store the dry feces for at least 12 months with subsequent aerobic composting (temperature above 50°C should be achieved and maintained for at least 1 week in the compost heap) or vermicomposting (for around 60 days) as secondary treatment method before it can be considered safe for reuse as organic matter- and nutrient-rich compost in agriculture. After secondary treatment has been completed, the processed feces can be used like any other organic fertilizer where nutrients are slowly released as they are degraded in the soil by microorganisms. Although initial research trials have shown a safe product after secondary treatment, it is recommended that treated feces should not be used for vegetables but for (fruit) trees to ensure acceptance of the produce by customers and to further minimise health risks.



Schematic of a Double-vault UDDT (EAWAG 2008: Compendium of Sanitation Systems and Technologies)

[32] Oxfam MDHP manual
[33] Drawing of MDHP
[34] BoQ of MDHP
[35] SSWM Technology sheet: Urine Diversion Dehydration Toilet, http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/uddt
[36] Gensch et al (2010): Low-cost sustainable sanitation solutions for Mindanao and the Philippines, Xavier University Press, Cagayan de Oro, Philippines

Double-chamber school UDDTs in Negros Oriental, Philippines (source: Robert Gensch 2009)

Double-chamber UDDT using local materials, Mindanao, Philippines (source: Robert Gensch 2009)

If there is no further reuse intention or low local acceptance for the feces reuse, the dried feces can also be buried (in areas where the groundwater table is low) and covered with soil.

Double-vault UDDT[37]: Present-day designs of double-vault UDDTs are based on the Vietnamese double-vault dry toilet, which was developed in the 1960s by local authorities (WINBLAD et al. 2004). Adapted to local needs and climatic conditions (e.g. toilet seats, anal cleasing water diversion, etc.), double-vault UDDTs have been introduced, amongst other countries, in Bangladesh, China, Ecuador, El Salvador, Guatemala, India, Kenya, Mexico, the Philippines, South Africa, Sweden, Vietnam, Yemen, but also cold-climate countries such as Mongolia, Nepal and Romania as cost-effective sanitation component in rural, peri-urban and urban settings. With double-vault UDDTs, faecal matter is collected and stored in twin-pit compartments, which are used alternately. Daily deposits are made into one of the compartments. After each use, a handful of cover material (wood ash, sawdust, soil, lime, etc.) is sprinkled over the faeces to absorb moisture and help in speeding up the dehydration process. When one vault is full (which should take roughly one year), the respective compartment is sealed while the other compartment is put in use. The storage time is counted from the date of the last faecal matter contribution to a compartment, and should be at least one year to provide sufficient time for desiccation and hygienisation. Urine and anal cleasing water must be diverted for practical reasons; urine may be collected separately and be applied as nitrogen-rich liquid fertilizer to agricultural land, and water used for anal cleansing may be infiltrated locally into the soil. The compost-like material (desiccated faeces and cover material, also called humanure) can be applied to agricultural land as a soil amendment in order to increase

Double-vault UDDT, Vietnamese style, Bhutan. (Source: Martin Wafler 2009)
Kids looking at a urine diversion toilet bowl during a school orientation session, Mindanao, Philippines (source: Robert Gensch 2009)

[37] SSWM Technology sheet: Urine Diversion Dehydration Toilet, http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/uddt
[38] SSWM Technology sheet: Urine Diversion Dehydration Toilet, http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/uddt





Examples of Single-vault UDDTs, Mindanao, Philippines (Source: Robert Gensch 2010)

the organic matter content, improve the water-holding capacity and increase the availability of nutrients.

Single-vault UDDTs[38]: Unlike the double-chamber version, the single-vault UDDTs provide only one collection cum storage compartment for the containment of faeces. Therefore, secondary storage and drying or other types of treatment (e.g. co-composting, etc.) are necessary. Urine and anal cleasing water diversion is equally important for single-vault UDDTs in order to maintain the dehydration process. The most practical design of single-vault UDDTs is to provide moveable containers. They allow removing the faeces easily once the container is full without disrupting the functionality of the toilet. It is recommend to fill the bottom of the movable containers with some dry adding material in order to absorb leaking liquid and increase the stability of the bucket when it is still empty. An empty rice bag can serve as additional confinement for the faeces. It can be easily sealed with a piece of cord once it is full and stored for further drying and hygienisation without transferring the faeces or coming in contact with them. Once the hygienisation period is over, the humanure bags can be directly transported for reuse in agriculture, similar to compost bags.

Hanging UDDT examples in a costal fisher community, Mindanao, Philippines (Source: Gensch 2008-10)

For more detailed information on UDDTs see related SSWM technology sheet: http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/uddt

Hanging UDDTs[39]: The hanging UDDT is a 1-chamber UDDT specifically designed for coastal communities where houses are built on stilts. The toilet is directly integrated into the house and the urine and feces collection substructure is put underneath the houses in a 'hanging style.' This solution is geared towards promoting sustainable sanitation in depressed communities

[39] Gensch et al (2010): Low-cost sustainable sanitation solutions for Mindanao and the Philippines, Xavier University Press, Cagayan de Oro, Philippines

Schematic of a hanging UDDT (source: Gensch et al. 2010: Low-cost sustainable sanitation solutions for Mindanao and the Philippines)

located along coastal areas with little or no sanitation primarily because of the lack of space and resources. Like in the 1-chamber UDDT, urine and feces are collected separately. Urine is collected in a 20-liter jerrican and the feces are collected in a bucket lined with a plastic sack. Since there is often no possible direct use of urine and feces in coastal areas, there is a need to provide for a regular collection and transport service from the coastal households to a treatment facility (storage and vermicomposting), which should be ideally located close to the agricultural reuse area.

Arborloo Toilet (Tree Toilet)[40]

Literally known as "tree toilet," the arborloo is a shallow pit latrine that is filled over time with human excreta. After each use, a cup of ash or soil is dumped into the pit to cover the excreta and as soon as the pit is filled up, the cover slab and the superstructure can be transferred to a new area while a tree (e.g. fruit trees like banana or mango trees) can be planted on top of the nutrient-rich substrate of the old pit. The arborloo - originally developed by Peter Morgan in Zimbabwe - is a variation of a pit latrine only that the cover slab, the toilet bowl, and the superstructure are transferable when the pit is filled up.

The cover slab can be made out of concrete or of wood poles with wood/ bamboo flooring. The wooden cover slab is less durable but lightweight and easier to carry (2- 3 persons can easily carry it), while the concrete slab is more durable but needs around 6-8 people to transfer it when the pit is full. For the superstructure, a variety of construction material options exists depending on what is locally available (e.g. banana leaves, recycled sacks, wood, nipa etc.).

The Arborloo can be used with or without urine diversion system. The advantage of a separate urine collection is that the nutrient-rich urine can be used directly as a liquid fertilizer in agricultural production and potential groundwater contamination caused by urine infiltration in the soil can be avoided. This requires a urine diversion toilet bowl and a separate container for the urine collection that can be placed below ground outside the toilet structure (see schematic below). Arborloo toilets should only be implemented in areas with a relatively low groundwater table in order to avoid potential groundwater contamination.

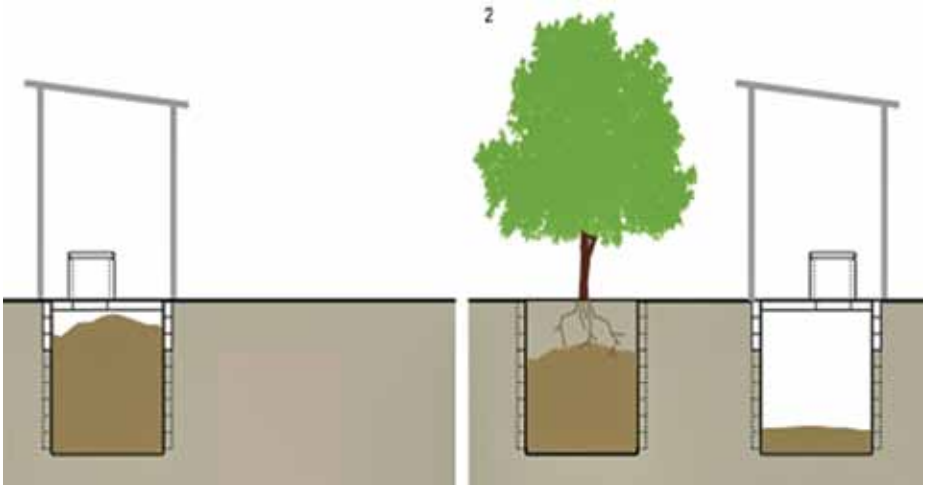
For more detailed information regarding Arborloo toilets see related SSWM technology sheet: http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/arborloo

Composting toilet

Composting is a biological process in which, under controlled conditions, bacteria, worms and other types of organisms break down organic substances to make humus, a rich, stable medium in which roots thrive. In a composting toilet human excreta, along with additional bulking agents are deposited into a processing chamber where soil-based micro-organisms decompose the solids. Temperature, airflow and other factors are controlled to varying degrees to promote optimal conditions for composting. The humus produced by the process is an excellent soil conditioner, free of human pathogens when the right conditions are achieved and adequate retention time is allowed in the digester. Odours, if any, can be extracted directly out above the roof through a ventilation system.

Two Arborloo examples from Mindanao, Philippines (source: Robert Gensch, 2010)

[40] Gensch et al (2010): Low-cost sustainable sanitation solutions for Mindanao and the Philippines, Xavier University Press, Cagayan de Oro, Philippines



Schematic of an arborloo toilet (EAWAG 2008: Compendium of Sanitation Systems and Technologies)

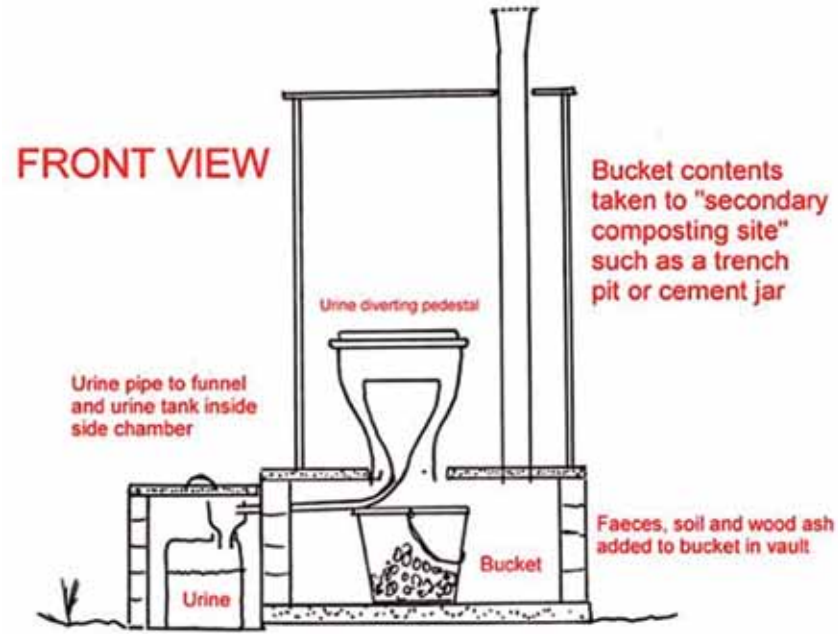
A composting toilet tries to achieve optimal conditions for biological decomposition. This means that sufficient oxygen should be able to penetrate the compost heap to maintain aerobic conditions, the material in the composting vault should have a moisture content of 50.60%, the carbon:nitrogen balance (the C:N ratio) should be within the range 15:1 to 30:1 and the temperature of the composting vault should be above 15°C.

A variety of organisms contribute to the breakdown of the material in a composting toilet. They range in size from viruses, bacteria, fungi and algae to earthworms and insects. They all play a major role in mixing, aerating, tearing apart and breaking down the contents of the pile in the toilets processing vault. As long as they remain inside the vault their activities are good and should be encouraged. It might even be a good idea to place earthworms in the toilet. If the environment is favourable for them they will multiply, burrowing holes through the compost heap, eating odorous organic matter and thereby converting it into rich organic soil.

Although that composting systems could often benefit from urine diversion, most examples of composting toilets collect urine and faeces together. In order to create conditions that promote composting, they usually rely on various design strategies to separate faeces and other solid material from urine after they have been mixed together within the processing vault. Since the urine is contaminated with pathogens once it has had contact with the faeces, it is more problematic to use it directly for fertilizer and it must be dealt with in some other way. Some composting systems allow the separated liquid to infiltrate into the ground, while others have adopted strategies to get rid of it through evaporation. While much of the nitrogen in urine is lost in composting systems, the resulting humus, or compost, retains other nutrients and is a valuable soil conditioner.

The double-pit or vault composting latrines do not separate the faeces and urine, so that both enter the same vault or pit. A handful of a mixture of soil and ash is added to the pit after each use which has the effect of keeping the pit contents relatively dry and aerobic, as opposed to anaerobic and smelly. After 12 months of storage the resulting 'humanure' can be applied to the land as a fertilizer and soil conditioner.

For more detailed information regarding composting toilets see related SSWM technology sheet: http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/composting-toilets

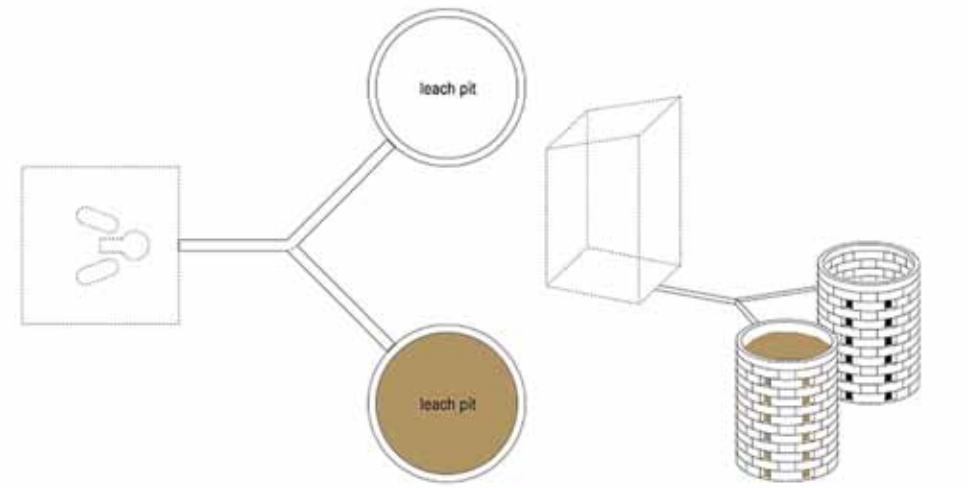


Front view of a composting toilet model "skyloo", and a brick single-vault composting toilet with a movable container (Source: Peter Morgan 2007)

Dry composting eco san latrine in Dehiathakandya, Sri Lanka

Double pit pour flush composting latrine

A pour flush latrine can be connected to a double pit[41] for alternate composting use. As this creates a more humid pit environment, composting can take up to 18 months. Two alternating pits are connected to a pour flush toilet. The blackwater (and greywater) is collected in the pits will slowly infiltrate into the surrounding soil. With time, the solids are sufficiently composted and can be safely removed manually. Only one pit is used at a time, in this way, a continuous cycle of alternating pits can be used. This system is particularly appropriate in areas with limited space, since the pits can be used alternatively for several years, and has been used by MI in Myanmar for that reason in some congested settlements.



Schematic of a twin pit pour flush toilet (EAWAG 2008: Compendium of Sanitation Systems and Technologies)

For more detailed information regarding double pit pour flush toilets see related SSWM technology sheets: http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/pour-flush-toilet and http://www.sswm.info/category/implementation-tools/wastewater-treatment/hardware/site-storage-and-treatments/twin-pits

Double pit latrine in NRS, Myanmar. When one pit is full, the contents will be covered with soil for composting (about 18 months) and the superstructure will be lifted up and positioned for use with the second pit. This idea of a "mobile superstructure" came from the villagers themselves.

Fossa Alterna[42]

The fossa alterna is an alternating, waterless (dry) double pit technology.

[41] Compendium of Sanitation Systems and Technologies, WSSCC/Eawag, Elizabeth Tilley et al, pg 21
[42] SSWM Technology sheet: Fossa Alterna, http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/fossa-alterna

Double pit latrine in NRS, Myanmar. When one pit is full, the contents will be covered with soil for composting (about 18 months) and the superstructure will be lifted up and positioned for use with the second pit. This idea of a "mobile superstructure" came from the villagers themselves.

Compared to the double-pit ventilated improved pit latrine (VIP), which is just designed to collect, store and partially treat excreta, the fossa alterna is designed to make compost, which can be used in agriculture to improve soil quality. The fossa alterna pits have a depth of maximum 1.5 m and require a constant input of soil.

For more detailed information regarding Fossa Alterna toilets see related SSWM technology sheet: http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/fossa-alterna

Small-scale Anaerobic Biogas Digester[43]

Small-scale biogas digesters are reactors typically designed to produce biogas at the household or community level in rural areas by the conversion of animal manure, kitchen and garden wastes or toilet products into biogas, a mixture of methane (CH_4) and carbon dioxide (CO_2) and a nutrient rich sludge. In the reactor, the anaerobic digestion transforms the organic matter into biogas, a mixture of methane and carbon dioxide, and a more or less stabilised sludge. The biogas can be used for cooking, heating or any other energy need. The remaining sludge - rich in nutrients - is a well-balanced soil amendment.

For more detailed information regarding biogas digesters see related SSWM technology sheet: http://www.sswm.info/category/implementation-tools/wastewater-treatment/hardware/site-storage-and-treatments/anaerobic-di

Advantages and acceptance of reuse-oriented sanitation solutions

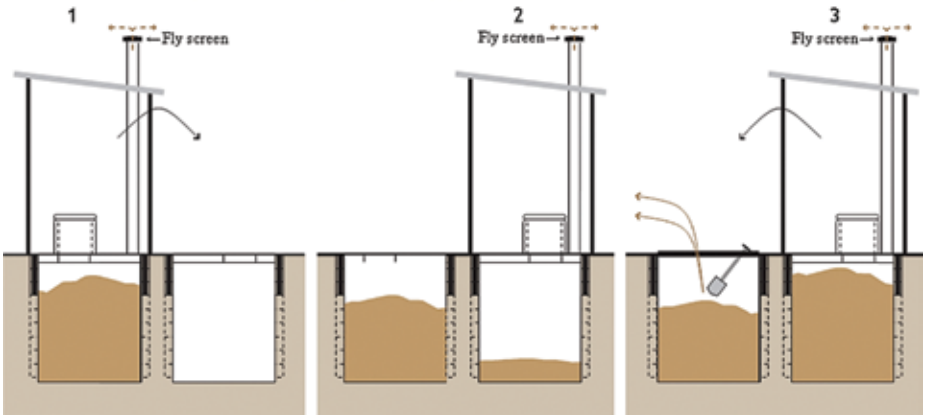
In many Developing Countries poor soil fertility and the increasing cost of artificial fertilizer is making it difficult for subsistence farmers to grow enough food to feed their families. Survival becomes even more crucial as population growth means new land to cultivate is not available.

Adding ash and/or soil and separating the urine has the effect of drying the faeces and the possibility of pathogen transmission to the water table is so eliminated. This makes eco sanitation a particularly good option in areas where contamination of groundwater is a sensitive issue.

In water stressed or arid areas, ecological sanitation (which needs no water for flushing) can help save this valuable resource.

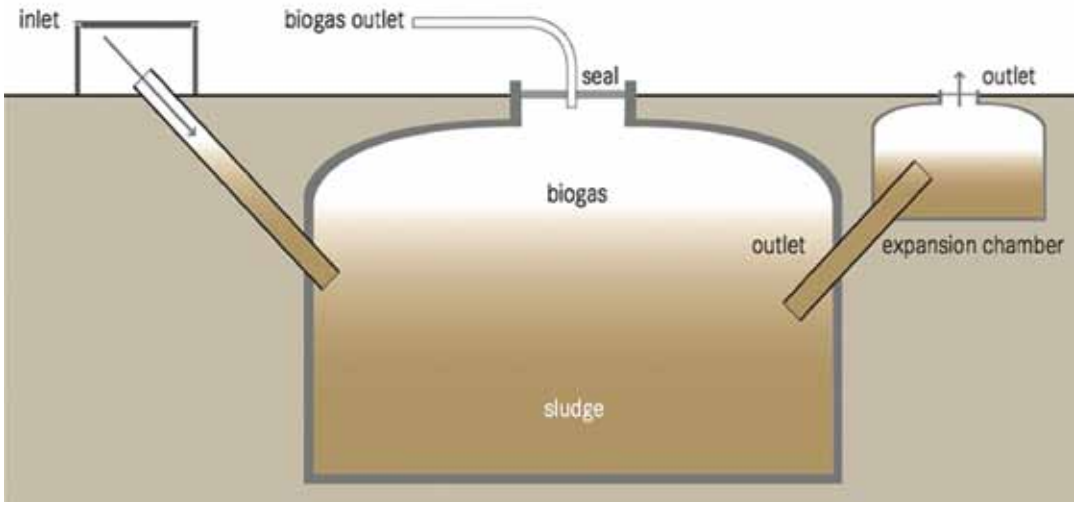
In developing countries, areas with high groundwater tables and collapsing sandy soils are challenging conditions to build permanent traditional latrines. Ecological latrines with their shallow pits or vaults can provide good, sustainable and affordable solutions.

Despite the obvious advantages of applying closed-loop sanitation solutions, it is often



Schematic of a Fossa Alterna toilet (EAWAG 2008: Compendium of Sanitation Systems and Technologies)

[43] SSWM Technology sheet: Anaerobic digester, http://www.sswm.info/category/implementation-tools/water-use/hardware/toilet-systems/anaerobic-di



Schematic of a biogas reactor (EAWAG 2008: Compendium of Sanitation Systems and Technologies)

very difficult to motivate communities to use these techniques, particularly when they are not accustomed to dry sanitation systems.

Also, people generally prefer toilets where faeces cannot be seen and where no further handling by the users is required. With reuse-oriented sanitation concepts there is always some form of secondary handling of the faeces and user reluctance to do this could be high. Experiences by Malteser International in Sri Lanka to adopt dry composting latrines proved to be difficult to sustain in the longer term for that reason. If the community is not used to this type of latrines, consistent correct use by all users is difficult, particular for visitors of the family and children. Unfortunately, many of the dry compost latrines constructed in Sri Lanka were converted to conventional wet pit latrines by the beneficiaries afterwards.

Sanitation systems are one of the key defences in breaking the faecal-oral transmission routes of many diseases. The capacity of a latrine to either ensure no further human contact with faeces or to reduce the pathogens to safe levels is an essential aspect. With ecological latrines, their ability to perform the latter is questionable.

In areas with high water tables, like here in Habaraduwa, Sri Lanka, dry compost raised Ecosan latrines are often one of the few options possible

Dry double pit compost latrine under construction in Sri Lanka, the double chambers under the latrine are clearly visible

4

Action planning and implementation process[44]

The starting point of action planning differs from country to country, community to community and depends on the stage that services have to be provided (emergency, post disaster recovery, rehabilitation or development). The target communities are also in different stages, geographical areas, and under different styles of Governments.

Project development must begin with the community and with their concerns and needs in mind. To obtain the essential trust and support for a sustainable project, Malteser and its partners should be prepared to work a sufficiently long time with the community for the necessary planning and preparations before starting any project implementation activities in the field. It is often better to work with traditional patterns of community leadership and organization that have proven to be effective in the past than to set up procedures and rules for project development that are imported from outside the community. The key is to identify successful traditional approaches and adopt them in project planning where possible. We should not add an unnecessary extra workload to the community for managing its community activities if this can be done by existing structures.

Participatory methods should be the basis for all contacts between Malteser and its partners and the community.

They provide the only reasonable foundation for generating full involvement and a sense of ownership in the community.

Preconditions

The following preconditions has to be satisfied prior to the planning of a sanitation programme.

Projects should be based on needs identified by the community.

The community should identify its own water and sanitation needs and corresponding project solutions through a process of internal discussion and external negotiation. Malteser and its partners should assist this process with information and technical guidance. There should be a commitment within the local authorities/ Government to improve sanitation services, which has higher level policy support from State/central Government.

This policy should support a more decentralised approach to planning which accepts the importance of involving and participating users in the process of sanitation improvement. The extent to which the above preconditions exist in a programme or a country is highly variable, but without these preconditions being in place, it is very unlikely that the potential benefits from improved planning of improved services will be fully met. A water supply and sanitation committee should be established at the start of the project to define and manage its operations.

Community group involved in WASH, Bardiya, Nepal

[44] The CRS Guidelines for the Development of small-scale Rural Water Supply and Sanitation Projects in East Africa is a useful reference document. Ideas from this have been used to write this section of the MI guidelines. You can download it on: http://www.ehproject.org/PDF/ehkm/crs-usaid_watsan.pdf

General procedure for Project Plan and Implementation for Sanitation*

Procedures/Steps	Clarifications
Strategy preparation	Institutional responsibilities for sanitation are often confused and may need to be clarified. An initial field assessment can investigate existing practices and behaviours and establish what is socially and culturally acceptable. Where is the community on the sanitation ladder? Sanitation programmes should be developed to upgrade current level in the sanitation ladder. Hygiene promotion components should be undertaken prior to sanitation hardware activities. Also the Malteser International programme should have developed its sanitation strategy for the various intervention areas, which should be supportive of strategies used by other agencies in the area that work in the field of sanitation. For example if one agency provides subsidies for sanitation construction materials and others do not, this will hamper overall sanitation programme development in the target area. In many areas, School based WASH activities might be an effective start of WASH activities with communities if the latrine use and hygienic standard is relatively low.
Selection	When assessing demand for sanitation, it is essential to consider the existing water supply situation in the area as well. Many of the potential benefits of sanitation and hygiene practices will only be realizable if sufficient water is available. If needed, a water supply component must be a parallel project intervention together with the sanitation programme. Secondly communities or areas with history high incidence of seasonal outbreak of diarrhea diseases should be given priority in the selection .
Planning	Once a community has been selected, options need to be identified, developed and costed. Community consultation meetings must be held inviting all members of the community including women, men, elders, community leaders to discuss detail about the sanitation programme to make decisions on types of latrines, community contribution, willingness to pay (contribute for partial implementation in kind etc.) Household contribution can be set accordingly. Perceptions, priorities and practices need to be assessed in order to identify and develop the key messages used to stimulate demand and to promote hygiene. Flexible supply mechanism with the capacity to respond to increasing demand should also be investigated. Community Based Organization (CBO) or Water User Group (WUB) should be formed by election by the community themselves. Half of the CBO members should be women. CBO will be working closely with all stake holders, namely local authorities, implementing agency, beneficiaries, donors etc. Beneficiary communities should be actively involved from the beginning of project planning through implementation and handover. Only with such participation right from the beginning, sustainability of the sanitation programme's outcome might be assured.
Appraisal	It is important to assess how project staff plan to stimulate and respond to demand for sanitation and promote appropriate behavioural changes. Project outputs, impacts and project expenditure have to be worked out involving all stake holders namely beneficiaries, local authorities, donors, and project implementing agency and others interested parties.
Implementation	Demand can be stimulated by communicating the benefits of sanitation and how people can benefit from the improved sanitation and subsequent better hygiene. There is also a key opportunity to develop the capacity building of local community for further expansion of the sanitation coverage and potential replication to un-served sectors of the region.
Operation, maintenance and management	In terms of sustainability and impact, this is the most important phase. By this time management of the implemented technical systems should be in place. Usually CBO (community based organization) will be suitable to operate and maintain the sanitation systems. One of the most important factors is to raise the funds for the maintenance. The CBO has to be trained and the project has to build the capacity in technical and non-technical aspects of the CBO for sustainability.

* Refer to Annex 2 for WASH software and assessment techniques.

Water and sanitation activities need a dedicated group at the community level to oversee and be responsible for project implementation as well as system operation and long-term sustainability. Malteser International and its partners should assist the community to set up and support a water supply and sanitation committee to take on these tasks. If the committee is to carry out its responsibilities on behalf of the entire community, the members of the committee should be representative of all the main interest groups, including women, ethnic minorities, the poor and the weak.

Priorities and Demand

It is essential what services people want and what are their priorities. The project staff will have to use participatory techniques to make an initial assessment for community priority and demand for improved services. Demand should be based on a desire for a particular service, but should always be based on the investments people are prepared (and able) to make to receive and sustain it. But maybe the poorest and most vulnerable members of the community do not have the necessary resources to participate. In that case, the community should consider a welfare approach so that the most vulnerable families and people in the target community are not excluded. If provision of facilities for such groups are "front-loaded" in the programme planning before the needs of the other community members are addressed, it is more likely that this approach will be successful.

What also often is the case in communities with poor sanitation habits is that demand for improved sanitation facilities is weak and must be stimulated before it can be responded to. This strengthens the idea of doing hygiene promotion activities prior to starting with the sanitation hardware component. A difficult aspect is that achieving sustainable behavioural change often takes more time than the project time frame.

Community meeting in Sri Lanka

Sanitation intervention checklist:

(This check list only provides guidance, and needs to be interpreted in line with local context)

1. Assess current sanitation practices of concerned community (place on sanitation ladder)
   a. Open defecation
   b. Un-improved latrines
   c. Improved latrines
2. Identify challenging environments for sanitation development that need specific attention, like high groundwater tables, flood prone areas, congested areas, soil with high content of rocks and boulders, etc.
3. Identify any ongoing or recently implemented sanitation interventions in the target area
   a. Identify lessons learned from such ongoing or past sanitation interventions
4. Map out sanitation coverage in the community
   a. Identify pockets with low sanitation coverage
   b. Check access sanitation facilities for women, children, disabled and elderly
5. Assess sanitation facilities status schools and health centers in the community
   a. Compare with SPHERE and locally applicable standards
   b. Assess menstruation hygiene management status of school sanitation facilities
6. Identify optimum sanitation intervention for local sanitation context
   a. For communities that largely practice open defecation; consider CLTS as a basis for the process towards improving sanitation practices
   b. For households that have un-improved latrines: hygiene promotion campaigns, where possible combined with sanitation marketing
   c. For households that have improved latrines; promote re-use and safe disposal
   d. Child-friendly WASH approach at schools
7. Assure adequate sanitation facility development knowledge at the appropriate level exists in the community
   a. To support the right choice for local physical context, affordability, acceptability and local construction capacity
   b. Provide learning experiences for communities through exchange visits to successful sanitation interventions in similar context, and exposure to relevant sanitation facilities/services that might be new for the community (like ecosan)
8. Assure enabling environment for successful sanitation interventions exist
   a. Sufficient water quantity available nearby for cleaning toilets and supplying handwashing stations
   b. Existence of handwashing stations near toilets
   c. Availability of soap for Handwashing With Soap (HWWS)
   d. Encourage involvement and support of health authorities and concerned health projects in the target area for sanitation interventions
9. Promote sustainability of sanitation facilities and services
   a. Facilities and services should protect human health and the environment, and promote safe re-use and/or disposal of sludge
   b. Interventions to be community-led, and technically and institutionally appropriate.
   c. Sanitation facilities and services should be socially accepted and economically viable.
   d. Promotion of use of locally available materials and techniques
   e. Promote community support mechanisms to most marginalized sections of community who otherwise would have difficulties in building and maintaining their sanitation facilities (note: sanitation interventions are only successful if the entire community practices safe sanitation)

Hand washing competition in Myanmar

Mother and child in Oddar Meanchey in Cambodia. Safe Sanitation provides for good health for children.

5

Sector Issues

A SANITATION IN SCHOOLS

The SPHERE 2011 guidelines[45] specify the following minimum standards for school sanitation:

	Short & Long term
Schools	1 toilet to 30 girls 1 toilet to 60 boys

In a development context SPHERE standards are not always applicable and national standards are used instead

In addition, the provision of boys urinals is effective to promote proper use of sanitation facilities. Urinals are low-cost solutions that can be offered where more than one toilet is needed, and are therefore perfect for school settings. Urinals can be built as separate buildings or as part of a toilet block, placed along the back or sidewall of the toilets. They use little or no water. The use of urinals may prevent the accidental fouling of the boys' toilets, which is in many cases the prime cause of unpleasant odors.

As reported by IRC/UNICEF/WSSCC in their 2010 document "Strengthening Water, Sanitation and Hygiene in Schools[46]; A WASH guidance manual with a focus on South Asia", in many countries, schools suffer from:

- Non-existent or insufficient water supply, sanitation and handwashing facilities;
- Toilets that are not adapted to the needs of children, in particular girls;
- Broken, dirty and unsafe facilities;
- Non-existent or irrelevant health and hygiene education for children;
- Unhealthy and dirty classrooms and school compounds. Under these conditions, schools become unsafe places where diseases are transmitted.

The guidance manual mentions the following lessons learnt:

Use and maintenance

- Attendance of children, particularly girls, improves when they can use good sanitation facilities. The benefits of school facilities, beyond health, are probably greater for girls than for boys.
- Dirty facilities become unused facilities. Children need to be taught to use, clean and maintain facilities. Teacher training should give a prominent role to learning how children can be organised for this in school. Maintenance and use of facilities are great challenges.
- If the number of toilets is too few, then they tend not to be used. The use of toilets and handwashing facilities, in particular, will increase over time if they are maintained in good order. If the toilets are too few, then they may not be used.

Children and teachers

- Children are potential agents of change in their homes through their knowledge and use of sanitation and hygiene practices learnt at school.
- Teacher commitment is crucial. Without teacher commitment to the programme, it will fail. Training teachers is a key issue. Refresher training should include organisation of children/staff for maintenance and use of school facilities, making work plans and activity plans for school health clubs. Giving too many responsibilities to teachers in a top-down way will not succeed. Teachers are often working in poor conditions. Planning should take account of this fact.
- Learning and teaching materials are important. Creative use of local materials for hygiene education is a subject to be incorporated into teacher training.

[45] SPHERE Project, 2011, Annex 3, p 130
[46] IRC/UNICEF/WSSCC in their 2010 document "Strengthening Water, Sanitation and Hygiene in Schools"

School handwashing practice, Myanmar

Programme planning and management

- Sustainability must be a major focus of the WASH in schools programme.

A central objective is to achieve sustained behaviour and facilities that are consistently used.

WASH in schools in India is recognised as an important tool for promotion of good WASH practices in the wider community.

Sanitation is just one component of Water, Sanitation and Hygiene (WASH) in Schools, which refers to a combination of technical (hardware) and human development (software) components that are necessary to produce a healthy school environment and to develop or support appropriate health and hygiene behaviours.

The technical sanitation components include handwashing and toilet facilities in and around the school compound. The human development components are the activities that promote conditions within the school and the practices of children that help to prevent water and sanitation related diseases and worm infestation.

WASH in schools is a very effective WASH promotion tool as children are often far more receptive to new ideas related to habits of good personal hygiene.

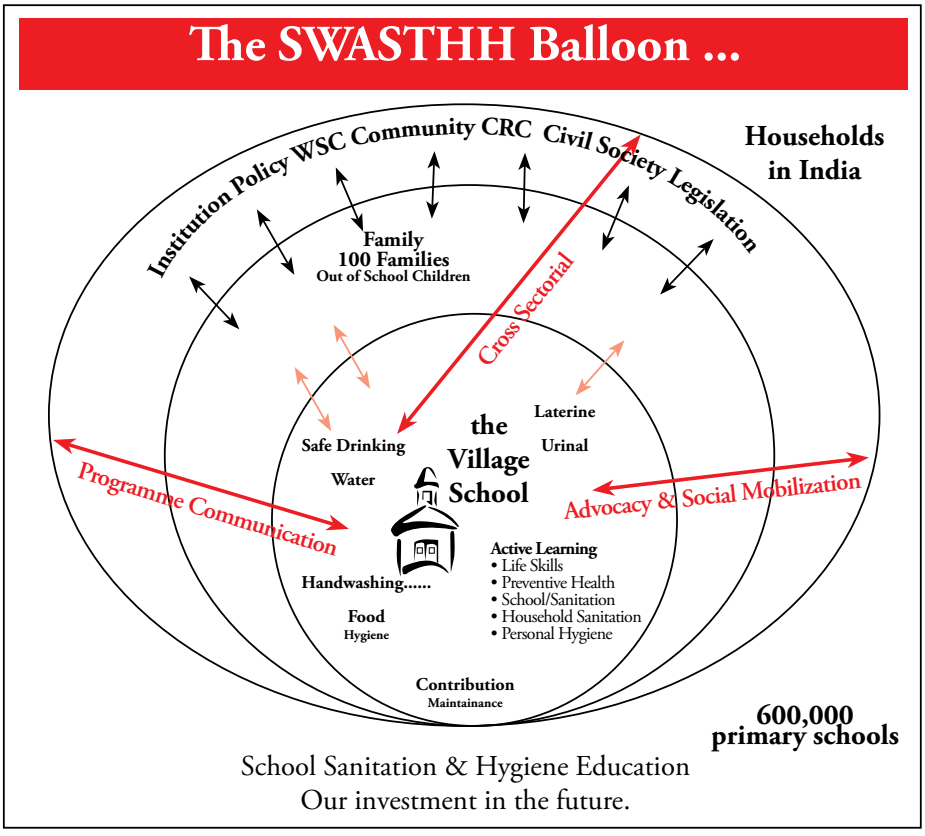
Malteser has realised this potential and therefore has already undertaken WASH in school programmes in may of its intervention countries. The Malteser International Sri Lanka programme has developed guidelines[47] for Participatory Health Education in Schools, module 1 deals with WASH in schools. WASH facilities at schools need to be child-friendly. Approaches need to be adapted to the local context but generally can follow the guidance (including design criteria) provided by the relevant section in the IRC document in Annex 4.

UNICEF/WHO WASH in Schools manual[48] mentions the following sanitation related aspects that need to be addressed:

Toilets are:

- In sufficient numbers
- Appropriate for local technical and financial conditions
- Designed to culture, gender, age, user groups
- Safe to use and provide privacy
- Have enough light and ventilation
- Have enough water supply for routing cleaning and maintenance
- Have convenient handwashing facilities
- Easily accessible (e.g.: children with a disability)
- Have a routine cleaning & maintenance system in place
- The guidelines also provide an easy school sanitation related assessment checklist:

Drawing competitions at schools are an effective tool to promote safe WASH habits (example from Sri Lanka)



[47] Malteser International Sri Lanka Guidelines for Health Education at Schools. Part 1, WASH

[48] Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings, WHO, 2009

The absence of clean and private sanitation facilities that allow for menstrual hygiene may discourage girls from attending school when they menstruate. While designing school sanitation systems specific hygiene management needs of girls should be taken into consideration. Girls should be consulted on what is culturally appropriate, and latrines should include provision for appropriate disposal of menstrual material and private washing facilities.

UNICEF has developed a WASH in Schools monitoring package[49], which includes a lot of excellent practical tools to monitor and guide the development of school WASH activities. Fit for School also has a lot of useful School WASH related information on their website, http://www.fitforschool.ph/, including details on development of handwash stations and methods to mobilise teachers for WASH activities.

Checklist School Sanitation

	Design and construction	Operation and maintenance
1	Are there sufficient toilets in the school for girls, boys and teachers? Are there separated blocks?	Are there sufficient toilets actually in use?
2	Are the toilets situated at the right place?	Are access paths kept in good condition?
3	Do the toilets provide privacy and security? Are they safe to use?	Are there working locks on the toilets doors and lighting?
4	Are the toilets appropriate to local culture and social conditions, gender and age of the children? Are they appropriate and accessible for children with disability? Is there on accessible cubicle for disabled females and one for disabled males?	Are the toilets being used properly? Are there sufficient toilets for use by males, females and children with disabilities?
5	Are the toilets hygienic to use and easy to clean?	Is anal cleansing material available at all times? Are the toilets clean and without too much smell? Are flies and other insects controlled?
6	Are there handwashing facilities close by the toilets?	Is there water and soap available?
7	Is there a cleaning and maintenance plan?	Is there an effective cleaning and maintenance routine in operation?

Child Friendly School toilet in Vellaveli, Batticaloa, Sri Lanka, with hygiene promotion message

Child Friendly School toilet in Karadianar, Batticaola, Sri Lanka

School latrines in Cambodia

[49] WASH at Schools monitoring package, UNICEF , 2011

School sanitation good practices:

- Promote child clubs as change agents for sanitation related behavior at schools (and beyond)
- Develop and implement yearly school sanitation plan
- Assure development of child, gender (including proper menstruation hygiene management) and disabled-friendly WASH facilities at schools
- Develop O&M funds for school sanitation facilities, with necessary management procedures
- Assure presence and use of facilities for handwashing with soap nearby school toilets, with ample access to water and soap
- At least maintain local standards for maximum number of students per toilet, and consider use of boysí urinals to increase capacity and safe costs

B EMERGENCY SANITATION

"Excreta Disposal in Emergencies; A Field Manual[50]" by Peter Harvey provides and excellent comprehensive guide to sanitation activities in emergencies. The manual considers a 1st Phase acute emergency, lasting from a few weeks up to three months, and a 2nd Phase stabilised emergency which can last from several months up to several years, depending on the type and severity of the emergency. It outlines the key issues that need to be considered while assessing excreta disposal needs and priorities, and gives details on how best to plan, design and construct effective systems, and how to promote its appropriate use. The MI Myanmar programme "Rapid Humanitarian Assistance in Disaster Situation" Country Protocol which includes chapter on WASH in emergencies as well.[51]

SPHERE Standards 2011[52]

The SPHERE Project has developed a modified set of guidelines in 2011.

Key actions:

- Implement appropriate excreta containment measures immediately
- Carry out rapid consultation with the affected population on safe excreta disposal and hygienic practices
- Carry out concerted hygiene promotion campaign on safe excreta disposal and use of appropriate facilities

[50] Excreta Disposal in Emergencies; A Field Manual " by Peter Harvey
[51] Rapid Humanitarian Assistance in Disaster Situation" Country Protocol, MI Myanmar, 2012
[52] Adapted from "Sanitation section in SPHERE 2011", p 105-110

Key indicators:

- The environment in which the affected population lives is free from human faeces
- All excreta containment measures, i.e. trench latrines, pit latrines and soak-away pits, are at least 30 metres away from any groundwater source. The bottom of any latrine or soak-away pit is at least 1.5 metres above the water table
- In flood or high water table situations, appropriate measures are taken to tackle the problem of faecal contamination of groundwater sources
- Drainage or spillage from defecation systems does not contaminate surface water or shallow groundwater sources
- Toilets are used in the most hygienic way possible and children's faeces are disposed of immediately and hygienically
- Consult and secure the approval of all users (especially women and people with limited mobility) on the siting, design and appropriateness of sanitation facilities
- Provide the affected people with the means, tools and materials to construct, maintain and clean their toilet facilities
- Provide an adequate supply of water for hand washing and for toilets with flush and/or hygienic seal mechanisms, and appropriate anal cleansing material for use in conventional pit latrines .
- Toilets are appropriately designed, built and located to meet the following requirements:
- they can be used safely by all sections of the population, including children, older people, pregnant women and persons with disabilities
- they are sited in such a way as to minimise security threats to users, especially women and girls, throughout the day and the night
- they are sufficiently easy to use and keep clean and do not present a health hazard to the environment. Depending on the context, the toilets are appropriately provided with water for hand washing and/or for flushing
- they allow for the disposal of women's menstrual hygiene materials and provide women with the necessary privacy for washing and drying menstrual hygiene materials

Village level survey activity, Sri Lanka

- they minimise fly and mosquito breeding
- they are provided with mechanisms for desludging, transport and appropriate disposal in the event that the toilets are sealed or are for long-term use and there is a need to empty them
- in high water table or flood situations, the pits or containers for excreta are made watertight in order to minimise contamination of groundwater and the environment
- A maximum of 20 +P+P')P
- Separate, internally lockable toilets for women and men are available in public places, such as markets, distribution centres, health centres, schools, etc.
- Toilets are no more than 50 metres from dwellings
- Use of toilets is arranged by household(s) and/or segregated by sex
- All the affected population is satisfied with the process of consultation and with the toilet facilities provided and uses them appropriately
- People wash their hands after using toilets and before eating and food preparation

The SPHERE 2011 Guidelines include related Guidance notes for all safe excreta disposal key actions and indicators

1st Phase technical options

Any sanitation option that will be selected for the 1st phase, should be able to be implemented very rapidly in the given local context. Sometimes this will mean that all socio-cultural acceptability aspects of the target can not be met, but if the community is as much as possible involved in the planning process, and is convinced of the immediate action to be taken, this point can be overcome for the time of the initial 1st phase sanitation facilities operations. Awareness about where the target population are on the sanitation ladder prior to the disaster, is an important factor to consider the choice of appropriate emergency sanitation facilities as well.

Possible alternatives for safe excreta disposal

Safe excreta disposal type		Application remarks
1	Demarcated defecation area(e.g. with sheeted-off segments)	First phase: the first two to three days when a huge number of people need immediate facilities
2	Trench latrines	First phase: up to two months
3	Simple pit latrines	Plan from the start through to long-term use
4	Ventilated improved pit (VIP) latrines	Context-based for middle- to long-term response
5	Ecological sanitation (Ecosan) with urine diversion	Context-based: in response to high water table and flood situations, right from the start or middle to long term
6	Septic tanks	Middle- to long-term phase

Managing open defecation

When faced with a sudden onset disaster combined with a high influx of displaced people when adequate sanitation facilities are not in place yet, immediate action in the form of managing open defecation is often a necessary first step towards establishing a safe sanitation system.

In this stage of the emergency, it should be clear to the community where they can defecate and where definitely not (close to shelters and water supplies). Minimum facilities like defecation fields, separated for men and women, and minimum equipment like shovels should be provided. Appropriate hygiene messages should be used to enforce well managed and safe use of the managed defecation fields.

While developing managed open defecation fields, it is important to consider the following aspects[77]:
Defecation areas should be:

- Far from water storage and treatment facilities
- At least 50m from water sources
- Downhill of settlements and water sources
- Far from public buildings or roads
- Not in field crops grown for human consumption
- Far from food storage or preparation areas
- Adequate separation by distance/and or barriers for male & female open defecation fields

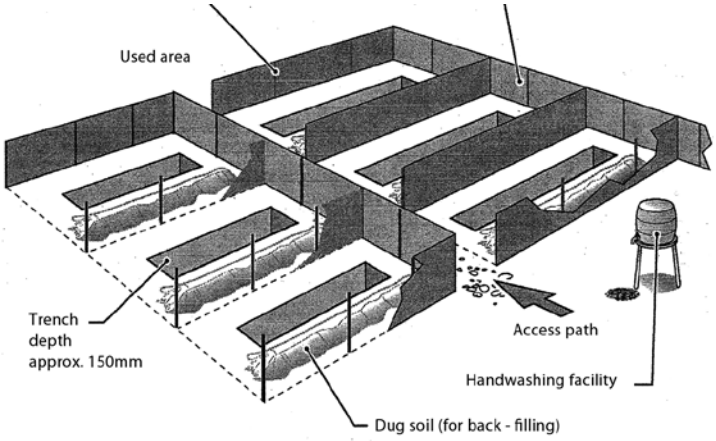
Although managed open defecation fields can serve its purpose at the onset of emergencies when no other facilities are in place yet, issues like limited privacy and enforcing proper use are real limitations of this approach. The advantage is however that such managed defecation fields can be established very quickly with limited means. Consideration should be given to providing cleansing material and handwashing facilities near the defecation fields.

Managing open defecation should only be considered as a short-term measure before latrines are constructed. Immediate and fast implementation of more controlled sanitation facilities like shallow trench latrines should be developed to phase out the managed open defecation practices soonest.

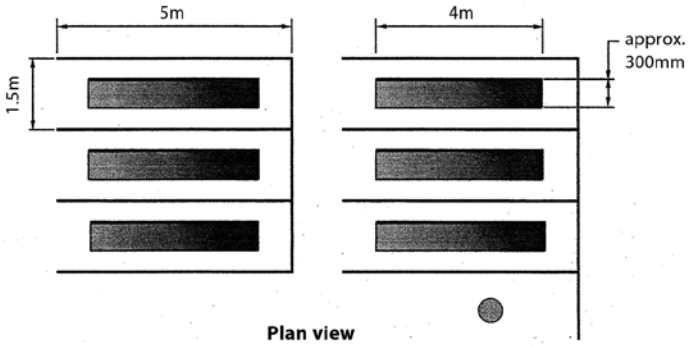
Shallow trench latrines[78]:

Shallow trench latrines are already a significant improvement compared to managed defecation fields, as the location where to defecate is clearly fixed, and more privacy can be given in the form of screening. This method can also be established very quickly with minimum means, but requires a large amount of space as the trenches are shallow and new ones are needed all the time to keep up with the demand. If possible, it is therefore better to go for the deep trench latrines.

For the latter option [deep trench latrines] proper protection & lighting during the night must be constructed to avoid accident fall into the deep trenches.

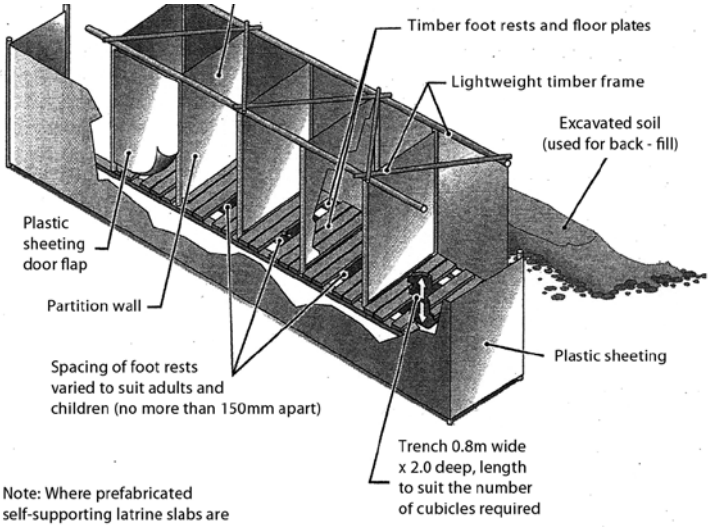


Superstructure



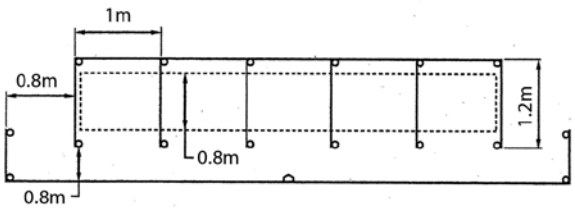
Plan view

Excreta Disposal in Emergencies, page 57



Note: Where prefabricated self-supporting latrine slabs are to be used in place of timber cubicle sizes may need to be adjusted to fit slab with (e.g. 0.8mk)

Superstructure



Plan view

Exreta Disposal in Emergencies, page 59

[53] Excreta Disposal in Emergencies, p 53-54
[54] More details in "Excreta disposal in Emergencies" p 56-57 and in annex 4

Oxfam GB undertook a trial of the Peepoo bags in IDP camp settings in Haiti in April/May 2010 . They conclude that with a proper collection and removal system and strong hygiene promotion component, Peepoos and other bags can be viable excreta disposal options in emergencies.

Deep trench latrines[79]

This is often the preferred emergency sanitation option used at the time of the onset of a disaster as it is relatively quick to establish and allows for a controlled emergency sanitation management, pending construction of individual family latrines. Available space, unstable soil quality or high water-tables can be limiting factors to apply this method. The top 0.5m at least should be lined to avoid collapse of the trench. Lining can be done with bricks, concrete blocks, timber, even sand bags or other materials. Plastic sheeting and bamboo poles (when available) are often the preferred materials for the walls, water-resistant (treated) plywood can serve as an appropriate material for the floors. As an emergency preparedness activity, it is advisable to check already in advance where such treated plywood is available in the market in the required quantities.

Shallow family latrines[80]

If the target community is already accustomed to using latrines prior to the emerghency and willing and able to get involved in latrine construction activities, shallow family latrines might be an option provided sufficient land is available as well.

A hole needs to be dug of about 0.3x0.5x0.5m, with a wooden slab over it and a simple superstructure to provide privacy. Once the pit is full up to the level of 0.2m under the top of the pit, it needs to be abandoned and backfilled with soil. This option should only be considered if there is insufficient time to make the more sustainable conventional family pit latrine (refer to p 61 of Excreta Disposal in Emergencies)

Excreta bags

During some recent emergencies, agencies have distributed specially adapted plastic bags for defecation. The bags contain enzymes which support the breakdown of the excreta. The bags should be collected and disposed in a safe way. The user should also have access to a place where the bag can be used discretely. The text box below provides more information on developments and practices related to the use of these bags.

In a recent article[81] by D.Patel et al. , Peepoos and other bag exreta systems were identified as viable in the following scenarios:

1. An immediate intervention at household-level until community toilets can be provided
2. A short intervention before proper latrines are built
3. Settlements with chronic space or land-use limitations
4. Settlements where de-sludging is difficult or impossible
5. Populations where certain groups (women, children, disabled people) prefer to defecate in personal shelters.

Based on its pilot project in Haiti, Oxfam has some technical and programmatic recommendations for the use of Peepoo bags:

Technical recommendations:

- Peepoo bag width to be enlarged to make it easier to use with locally available containers, and lenght to be increased to make knotting the Peepoo after use easier
- About 20% of the Peepoos were found to have very small tears in the connection between the outer and inner layer of the bag, with the potential of leakage of excreta after use
- As Peepoo bags are biodegradable, shelf-life should be taken into consideration if they are used as contingency stock.

Programmatic recommendations:

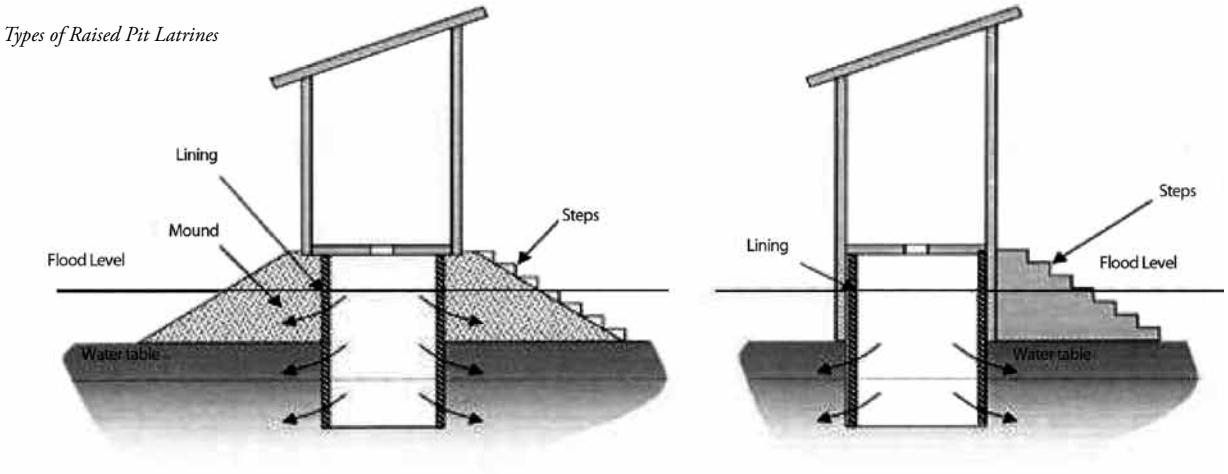
- Peepoos and standard bags are viable excreta disposal options in the first phase of an emergency response
- As odour is minimal, Peepoos can be used inside shelters, and used bags then deposited in communal containers.
- Proper bag deposit and removal is crucial
- Hygiene promotion component is essential to ensure continued safety and efficacy of the bag excreta system

If accompanied with a strong hygiene promotion component, and adequate provision and support for collection and safe disposal, Peepoo bags could be a viable option for emergency sanitation interventions in Malteser projects as well.

The floating latrine may be used where there is no space on dry land to build a toilet

[55] More details in "Excreta disposal in Emergencies" p 58-59 and in annex 5
[56] Excreta Disposal in Emergencies, p 60- 61
[57] Waterlines (January 2011) by D.Patel et al. , Peepoos and other bag exreta systems

Types of Raised Pit Latrines



For 2nd phase emergency sanitation options, refer to the chapter Sanitation options, p 19

Sanitation in flood situations

Sanitation provision during floods is very challenging, particularly for communities that did not practice safe sanitation prior to the onset of the emergency. To find any acceptable solutions for safe sanitation during flooding, its is essential that affected communities are involved in the design and siting phase of the latrine construction.

Different ways of provision of adequate excreta disposal facilities for displaced people during flooding are described in Excreta Disposal in Emergencies, p 105-111, and are divided in 1st phase options for rapid-onset floods and 2nd phase options.

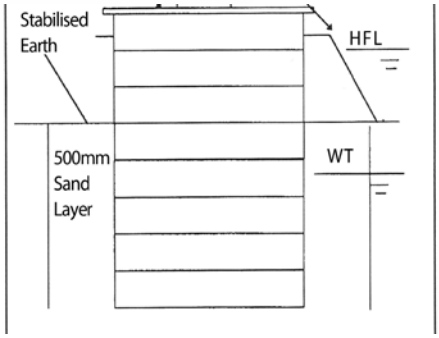
Some 1st Phase options:

Over-hung toilets:
In case of floods where there is still flowing water, over-hung toilets can be considered where faeces directly fall in the water, provided this will not affect water fetching areas for drinking and domestic purpose.

Floating toilets:
In case of floating latrines, faeces also drop directly in floodwater or the river.

Plastic bags:
As described on p……
Some 2nd Phase options:

Raised latrines:
As contact between excreta in pits and the surrounding water should be avoided to prevent contamination, raised latrines is a viable option for sanitation facilities during flooding. Attention should be given to raise the houses in flood prone areas as well, to allow families to continue living in these areas were possible.



Sealed pits or tanks:
Pre-cast ferrocement tanks or plastic tanks can be used to temporally store faeces during floods, and needs to be disposed of safely once filled. Tanks should be raised if contamination of surface water needs to be assured.

Sand envelope around the pit can be provided with any of the three technological options recommended for flood-prone areas, Such latrines are called Sand Enveloped Raised Pit Latrines. The extended portion of the lining above ground level can be water-sealed or earth mound can be made to prevent leakage as discussed in case of the step or mound latrine.

Integration of DRR in the emergency response phase[58]

The emergency response phase is the period just before, during, and after the hazard event. If there is a forewarning of an approaching event, the emergency response may start before the event occurs. The priorities in this phase are avoiding loss of life and injury, limiting damage to assets and environment, and preparation to recovery. This phase will last until the situation is in some measure stabilised, mortality brought back to an acceptable level, imminent threats controlled and where recovery can start. Depending on the situation, the emergency response phase typically last from some weeks to some months.

The aims of DRR with regard to WASH in the emergency phase are:
1. To maintain adequate service levels through the reduction of the impact of potential hazard events on existing WASH services.
2. To set up resilient emergency WASH services.
3. To ensure rapid service level and structural recovery of WASH services after hazard events.
4. To ensure WASH services have minimal negative effects on society (i.e. do no harm).

[58] Disaster Risk Reduction and Water, Sanitation and Hygiene, Global WASH Cluster, p 22.

Emergency sanitation check list*:

- Conduct rapid assessment (annex... with 20 Rapid Assessment Questions) to identify any need for immediate action as well as longer-term interventions
- Outline programme design with rapidly produced action plan to address most urgent actions to protect public health and stabilize the situation
- Immediate action on first-phase emergency measures to minimize the spread of excreta related disease; cleaning up open defecation areas, provide trench latrines or other rapid options
- Conduct more thorough assessment and identify and develop longer-term sanitation options, in this stage there are more options to include the target population in the planning and implementation process.

* Excreta Disposal in Emergencies; A field Manual, Harvey p 5 1.4 Programme Process

C SUSTAINABLE SANITATION[59]

Renovating a compost latrine. Image courtesy of WEDC © Rod Shaw

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order for a sanitation system to be sustainable, it should not only protect and promote human health but should also aim to minimise environmental degradation and depletion of the resource base, while being technically and institutionally appropriate and maintaining social acceptability and economic viability in the long run[60].

Sustainable sanitation is a general term used for locally appropriate and locally acceptable sanitation interventions that does not favor any specific technology and includes a variety of hardware and software measures. A wide range of conventional sanitation solutions as well as reuse-oriented ecological sanitation and productive sanitation approaches can be subsumed under the term 'sustainable sanitation' given that technical, institutional, environmental, social and economical aspects are appropriately addressed.

The Sustainable Sanitation Alliance (SuSanA) has developed a set of sustainability criteria[61] that should always be considered when improving an existing and/or designing a new sanitation system:

(1) Health and hygiene: includes the risk of exposure to pathogens and hazardous substances that could affect public health at all points of the sanitation system from the toilet via the collection and treatment system to the point of reuse or disposal and downstream populations. This topic also covers aspects such as hygiene, nutrition and improvement of livelihood achieved by the application of a certain sanitation system, as well as downstream effects.

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

(3) Technology and operation: incorporates the functionality and the ease with which the entire system including the collection, transport, treatment and reuse and/or final disposal can be constructed, operated and monitored by the local community and/or the technical teams of the local utilities. Furthermore, the robustness of the system, its vulnerability towards power cuts, water shortages, floods, etc. and the flexibility and adaptability of its technical elements to the existing infrastructure and to demographic and socio-economic developments are important aspects to be evaluated.

(4) Financial and economic issues: relate to the capacity of households and communities to pay for sanitation, including the construction, operation, maintenance and necessary reinvestments in the system. Besides the evaluation of these direct costs also direct benefits e.g. from recycled products (soil conditioner, fertiliser, energy and reclaimed water) and external costs and benefits have to be taken into account. Such external costs are e.g. environmental pollution and health hazards, while benefits include increased agricultural productivity and subsistence economy, employment creation, improved health and reduced environmental risks.

(5) Socio-cultural and institutional aspects: the criteria in this category evaluate the socio-cultural acceptance and appropriateness of the system, convenience, system perceptions, gender issues and impacts on human dignity, the contribution to food security, compliance with the legal framework and stable and efficient institutional settings.

Most sanitation systems have been designed with these aspects in mind, but in practice they are failing far too often because some of the criteria are not met. In fact, there is probably no system, which is absolutely sustainable. The concept of sustainability is more of a direction rather than a stage

[59] For further background reading on this topic; SuSaNa vision document
[60] Department of Health, Philippines (2010): Philippine Sustainable Sanitation Sector Roadmap, Manila, Philippines
[61] Sustainable Sanitation Alliance (SuSanA) vision document: Towards more sustainable sanitation solutions, version 1.2, February 2008

to reach. Nevertheless, it is crucial, that sanitation systems are evaluated carefully with regard to all dimensions of sustainability. Since there is no one-for-all sanitation solution, which fulfills the sustainability criteria in different circumstances to the same extent, this system evaluation will depend on the local framework and has to take into consideration existing environmental, technical, socio-cultural and economic conditions[62].

Related sanitation approaches whose terms are sometimes used synonymously are 'ecological sanitation' and 'productive sanitation'. Both approaches have a strong reuse-oriented closed-loop focus and can be considered sustainable if they comply with the sustainability criteria outlined above:

Ecological sanitation (ecosan[63]) recognises human excreta and household wastewater as resources that can be recovered, treated where necessary and safely reused. Ecosan systems enable the recovery of nutrients contained in excreta and wastewater, and their safe reuse in agriculture. In this way, they contribute to improved soil fertility and food security, whilst minimising the consumption and pollution of water resources. They also have the potential to produce renewable energy from biogas systems. Ecosan does not equate to a specific technology but is rather a way of thinking. It includes diverse technologies such as urine-diversion dehydration (UDD) toilets, composting, rainwater harvesting, constructed wetlands, vacuum sewers, biogas reactors and many more.

Productive sanitation[64] is a general term used for the variety of sanitation systems that make productive use of the nutrient, organic matter, water and energy content of human excreta and wastewater in agricultural production and aquaculture. These systems enable the recovery of nutrients and/or energy in household wastewater, minimise consumption and pollution of water resources and support the conservation of soil fertility as well as agricultural productivity and thereby contribute to food security. Treated human excreta and wastewater, animal manure and organic solid waste can serve as important sources for soil amelioration, as they deliver relevant micro and macronutrients, organic matter and water needed for plant growth.

Urine diversion pedestal.
Image courtesy of WEDC © Bob Reed

Double Pit Composting Latrine, Myanmar

D SANITATION LINK TO HEALTH AND NUTRITION[65]

Studies show that improved sanitation reduces diarrhoea death rates by a third. Diarrhoea is a major killer and largely preventable: it is responsible for 1.5 million deaths every year[66], mostly among under-five children living in developing countries.

Evidence suggest that health benefits of sanitation occur mostly when nearly all households use toilets. This arguments is in favour of promotion of CLTS.

Health effects of poor sanitation - 3,600 children under the age of 5 die daily of diahrea related diseases (Black R.E. et al., for the Child Health Epidemiology Reference Group of WHO and UNICEF: Global, regional, and national causes of child mortality in 2008: A systematic analysis, The Lancet, 5 June 2010; 375 (9730): 1969-87). 1 billion people worldwide, mostly children, are infested with intestinal worms and suffer nutritional deficiencies and poor growth. Both of these groups of diseases are transmitted through human faeces in the environment[67]

There are different health benefits of improved household sanitation; reductions in diarrhea and worm infections, reduced risk of accidents and/or sexual harassment, and enhanced psycho-social well-being linked to issues like improved dignity and social standing.

[62] Sustainable Sanitation Alliance (SuSanA) vision document: Towards more sustainable sanitation solutions, version 1.2, February 2008
[63] GTZ (GIZ) Topic sheet, Ecosan – recycling oriented wastewater management and sanitation systems, pg 1
[64] Text adapted from: Sustainability Sanitation Alliance (SuSanA), Factsheets, Working Group 5, Productive Sanitation, December 2011
[65] Modified from WELL FACTSHEET, Health Impacts of Improved Household Sanitation, Beth Scott, November 2006
[66] http://www.who.int/features/factfiles/sanitation/facts/en/index5.html
[67] Stockholm Environment Institute, 2004, Ecological Sanitation

Diseases Associated with Lack of Sanitation (Hunt, 2001)

Faecal-oral diseases represent the largest health burden associated with a lack of improved sanitation, diarrhoea being the most burdensome of these and accounting for over 1.6million child deaths each year. Their major transmission routes are shown in Figure 1.

The major *soil-transmitted helminths* showing association with poor access to improved sanitation are hookworm, roundworm and whipworm, all of which are transmitted when eggs are passed in human faeces which is then left in the environment.

Beef and pork tapeworms infect humans when infected and inadequately cooked animal meat is eaten. Humans can then contribute to the continued life cycle by defecating in such a manner that the eggs in their faeces are eaten by the original animal hosts.

Water-based helminths have aquatic intermediate hosts, for example snails, and are responsible for diseases such as schistosomiasis/bilharzias. Humans can become infected through contact with water carrying schistosome larvae and contribute to the transmission cycle when the excreta or urine of infected persons contaminates water bodies containing the aquatic snail hosts.

Excreta-related insect vectors include mosquitoes, flies and cockroaches which breed in sites contaminated with human faeces. Sanitation-related diseases in this category include trachoma, transmitted in part via *Musca sorbens* flies which breed in scattered human faeces, and filariasis which is spread via *Culex* mosquitoes which breed in septic tanks and flooded latrines.

Most evidence exists for the impact of sanitation on diarrhoeal diseases, though there is also evidence for the protective effect against hookworm, roundworm and whipworm, and a growing body of evidence for prevention of trachoma transmission via reductions in fly populations.

The provision and consistent use of sanitation isolates contaminated faeces from the environment breaking down the faecal-oral transmission of disease, as shown in the F-diagramme on page 6. The evidence for the protective effect of sanitation against diarrhoea is greatest, with latrines potentially reducing the diarrhoea disease by an average of 36%. The German WASH Network document[68] prepared for the Nexus conference elaborates further on this on page 2 of their Issue paper for the Bonn Nexus meeting of November 2011.

Safe disposal of excreta, so that it does not contaminate the environment, water, food or hands, is essential for ensuring a healthy environment and for protecting personal health. This can be accomplished in many ways, some requiring water, others requiring little or none. Regardless of method, the safe disposal of human faeces is one of the principal ways of breaking the faecal–oral disease transmission cycle. Sanitation is therefore a critical barrier to disease transmission.

"No Food and Nutrition Security without WASH". This message was promoted through a seminar hosted by the German WASH Network and WSP at the World Water Week which was held in August 2012 in Stockholm. WASH interventions have the potential to contribute to the advancement of food and nutrition security, and thereby improving the overall health status of the community. Sanitation can contribute to the increase of agriculture production through recovery and reuse of resources from household wastewater (water, nutrients, organic matter), by using sanitation materials as a resource, and not as a waste. Sanitation interventions also help avoiding faecal infections, which allows for a more efficient use (absorption) of available nutrients.

Functioning latrines, like the above one in Haiti, are effective in preventing the spread of diseases

[68] http://www.water-energy-food.org/documents/hottopicsession/7_hot_topic_issue_paper_no_food_and_nutrition_security_without_water_sanitation_and_hygiene.pdf

E THE LINK BETWEEN SANITATION, AGRICULTURE AND FOOD SECURITY[69]

Background

Food security and the access to safe water and sanitation are fundamental human rights that for many people remain a promise unfulfilled. Globally still some estimated 2.5 billion people do not use improved sanitation facilities (WHO, UNICEF, 2012) and around 925 million worldwide are chronically undernourished (FAO, 2010).

To meet the dietary demands from a growing world population, projected to reach 9 billion by 2050, the world food production in 2050 would need to increase by 70% (FAO, 2009). A great deal of the population growth will take place in urban areas leading to a substantial increase in urban food demand and which needs the volume of organic waste, human excreta and wastewater from cities to be managed in a safe and productive way.

Facing the number of people to be fed and the existing resource limitations, it is important to approach the food security issue from a perspective of resource preservation and recovery, in which productive sanitation systems play a key role.

Cities as hot spots for resource recovery

The current global urban population is expected to double by 2050, with 90% of urban growth taking place in developing countries (Drechsel et al., 1999). A transition is needed to sustainable and resilient cities, which requires enhancing quality of life while minimising resource extraction, energy consumption, waste generation and safeguarding ecosystem services. This is directly related to city planning: to the development of city-based energy, waste, transportation, food, water and sanitation systems (Lüthi et al., 2011).

Urban and peri-urban agriculture (UPA) is the production of food and related services within and around cities. UPA includes urban horticulture, livestock, (agro-) forestry, aquaculture and related processing and marketing activities. Production of food by poor urban households can supply up to 20-60% of their total food consumption (De Zeeuw and Dubbling, 2009). Urban households that are involved in farming or gardening have in many cases a better and more diverse diet and are more food secure than households not involved in urban agriculture. UPA also increases the availability of fresh, healthy and affordable food for a large number of other urban consumers.

Urban centres are hubs of consumption of all kind of goods including food, which makes them major waste generation centres, and, if this waste remains in the urban area, vast sinks for resources such as water, nutrients and organic matter, posing environmental and health challenges, as well as an economic challenge. But, water demand for food production is increasing due to rising populations as well as due to changes in urban food consumption patterns.

In areas with high water tables, like here in Habaraduwa, Sri Lanka, dry compost raised Ecosan latrines are often one of the few options possible

Urban producers and farmers have a variety of motives for using untreated or partly treated wastewater. In semi-arid and arid areas it is often the only source of water available all year round. It is also an inexpensive source, not just of water but also of nutrients. Irrigated urban agriculture provides livelihoods and has an important niche function (Drechsel et al., 2010).

Management of urban wastes is a high-cost concern for many cities. Instead of flushing waste out of the city or bringing the waste to heaps in landfills, illegal dumps or transfer stations, there is growing understanding that composting and local reuse is an environmentally attractive way to manage parts of these otherwise wasted resources.

Decentralised safe reuse of wastewater and composted organic waste in UPA will help to:

- Adapt to drought by facilitating year-round production, making safe use of wastewater and nutrients in water and organic waste;
- Reduce the competition for fresh water between agriculture, domestic and industrial uses;

[69] Adapted from SuSanA factsheet, "Productive sanitation and the link to food security", December 2011

- Reduce the discharge of wastewater into rivers, canals and other surface water and thus diminish their pollution;
- Make productive use of the nutrients in wastewater and organic wastes

Resource recovery in rural areas

Almost 50% of the world population still live in rural areas, where local reuse can be relatively simple and make a big difference, especially for smallholder farmers. The resource potential of human excreta needs to be emphasised, and a close collaboration with the agriculture sector established.

Agriculture and sanitation[70]

Domestic wastewater and human excreta (urine and faeces) are essentially the same as animal manure and can serve as important sources for soil improvement, as they deliver all relevant nutrients, organic matter and water needed for plant growth.

Indeed, growing food and achieving food security are historically strongly linked with the idea of reusing liquid and solid waste from households in agriculture. The idea that human residues including excreta are wastes with no useful purpose can be seen as a modern misconception, and this system has been copied blindly in developing countries. At present farmers worldwide use around 150 million tons of synthetically produced nutrients in household wastewater, minimise the consumption and pollution of water resources and support the conservation of soil structure as well as agricultural productivity.

A major shift in sanitation approaches, favoring a recycling-oriented closed loop approach is needed to bring nutrient resources back to the fields. This requires a different collaboration between the agricultural and sanitation sectors, supporting resource recovery as a key requirement for sustainable sanitation concepts.

Installation of double pit composting latrine in Oddar Meanchey Province, Cambodia.

[70] Text adopted from: Productive Sanitation: Increasing food security by reusing treated excreta and greywater in agriculture, Robert Gensch, 2008

Staff of MI and partner agency Cambodian Health and Human Rights Alliance (CHHRA) inspecting a newly built toilets with bathing facilities in Oddar Meanchey Province, Cambodia.

6

Cross cutting issues for sanitation

However, it should be taken into consideration that increased sanitation coverage alone does not guarantee a beneficial improvement on health[71]. So-called "hardware" latrine construction components of sanitation programmes should be accompanied with "software" components like handwashing and hygiene promotion, as well as assuring access to water, to achieve the health benefits of latrine construction. Also, there is evidence[72] that if latrines are poorly constructed and or maintained, it can be more dangerous to health than having no latrine at all.

For sanitation facilities to be effective, it is essential that they are used by everyone all the time, and that they are adequately maintained. Health improvement comes from the proper use of sanitation facilities, not simply their physical presence, and they may be abandoned if the level of service does not meet the social and cultural needs of community members at an affordable cost. Within a community, several different sanitation options may be required, with varying levels of convenience and cost (sanitation ladder). The advantage of this approach is that it allows households to progressively upgrade sanitation facilities over time[73]

Evaluating the Evidence for the Role of Sanitation in Disease Prevention, Esrey et al (1991) reviewed available evidence and concluded that latrine ownership could reduce diarrhoea incidence by 37%. A further review (Fewtrell et al 2005) showed similar figures that latrine ownership could reduce diarrhoea incidence by 32%.

A GENDER PERSPECTIVES

For women in particular, access to adequate and sanitary latrines is a matter of security, privacy, and human dignity.

In societies where men control household income, hygiene promotion and education need to be targeted at them to ensure that resources are available for the construction and maintenance of sanitary facilities.

The Gender Alliance identified that women are acutely affected by the absence of sanitary latrines in the following ways[75]:

- When women have to wait until dark to defecate and urinate in the open they tend to drink less during the day, resulting in all kinds of health problems such as urinary tract infections (UTIs).
- Women are sexually assaulted or attacked when they go into the open to defecate and urinate.
- Hygienic conditions are often poor at public defecation areas, leading to worms and other water-borne diseases.
- Girls, particularly after puberty, miss school due to lack of proper sanitary facilities.

At the community level, hygiene and sanitation are often considered a women's issue, but they impact on both genders. Yet societal barriers continually restrict women's involvement in decisions regarding sanitation

> "Gender[74] is a concept that refers to socially constructed roles, behavior, activities and attributes that a particular society considers appropriate and ascribes to men and women"

improvement programmes. Thus, it is important that sanitation and hygiene promotion and education are perceived as a concern of women, men and children and not only of women. Separate communication channels, materials, and approaches have to be developed to reach out to men and boys. It is also important to target community leaders for gender sensitisation; this would facilitate mainstreaming gender in sanitation and hygiene promotional activities.

In a school setting, it is important that separate sanitary latrines are constructed for boys, in order to prevent boys from taking over the latrines that are meant for the girls. And toilet blocks for girls and

[71] Waterlines, Volume 28 Number 4, October 2009, Crossfire: "Increased coverage in sanitation may not translate into health impacts, because we are still not sure about its consistent use", Cameron, Bibby, p 269-274
[72] Waterlines, Volume 28, Number 4, October 2009, p 270
[73] WHO, 2002, Healthy Villages, A guide for communities and c community health workers
[74] World Health Organization, 2009: http://www.who.int/topics/gender/en/.
[75] Gender and Water Alliance (GWA) document

School toilet for the disabled in Sri Lanka

boys should not be constructed next to each other.

The IASC Gender and WASH in Emergencies Handbook has a gender check list[76].

Some of the main issues raised are:

- Communal latrine and bathing cubicles for women, girls, boys and men are sited in safe locations, are culturally appropriate, provide privacy, are adequately illuminated and are accessible by those with disabilities.
- Women and men are equally and meaningfully involved in decision-making and programme design, implementation and monitoring.
- Both women and men participate in the identification of safe and accessible sites for water pumps and sanitation facilities.
- Unequal knowledge levels on hygiene and water management are addressed through trainings.

CAWST (Center for Affordable Water and Sanitation Technology) has developed a WASH roles activity which provides an opportunity to discuss gender roles related to water, sanitation and hygiene (WASH). It is an interactive sorting tool which allows participants to explore household WASH activities and who is generally responsible for each one in their context.

You can download it at: http://www.cawst.org/en/resources/pubs/category/31-wash-roles-activity

B INCLUSIVE SANITATION FOR PERSONS WITH DISABILITIES AND ELDERLY[77]

The needs of disabled people in developing countries in relation to provision of sanitation services are often overlooked, which has severe consequences for the health, dignity, education and employment of disabled people. If we consider that 10%[78] of the world population are disabled, we can see that this is an issue that needs close attention.

For years, the sanitation needs of disabled people have not received the priority it needs to get. The barriers that disabled people face when using sanitation facilities have been categorised in the following groups:

- Environmental: steps, narrow doors, inadequate access paths.
- Institutional: lack of information from authorities, exclusion from consultative procedures
- Attitudinal: prejudicial attitudes from the community and service providers

Thanks to the international agreements like the UN Convention on the Rights of People with Disabilities, a major positive change in disability awareness is now ongoing. Interventions have shown how inclusive design can be inexpensive and benefit pregnant women, older people, chronically ill and disabled people.

In a developing country context like for many locations where Malteser International is operational, disabled people and their families are often among the poorest of the poor because of factors like:

- Lack of education
- Limited job opportunities
- Reduced family income because of caring for a dependant
- Increased medical expenditure

Due to reasons often related to the above factors, families with disabled persons can not make the necessary inclusive sanitation facilities for them, resulting in unhygienic and dangerous practices of this group. Health of disabled people with poor access to sanitation facilities can also be impacted unhealthy practices by the disabled persons who restrict their intake of food and water to avoid needing to go to the toilet.

To address the issue of access to sanitation for disabled persons, it is essential that this matter is already included during the planning phase of any sanitation programme. A Water, Engineering and Development Centre (WEDC)[79] study in Ethiopia showed that sanitation facilities that are inclusive for disabled people are only 2 to 3 % more expensive if special needs for this group are taken on board right from the onset of the project. An accessibility audit like presented in Annex 3, is a useful tool develops by WEDC to define inclusiveness from sanitation point of view (including checklists on accessibility design criteria).

Inclusive sanitation check list:

- Identify people with disabilities in the community and assess their status of access to sanitation facilities; persons with injuries or temporary impairments, elderly or weak people (e.g those affected by HIV/AIDS), pregnant women, children, disabled)
- Sensitize community on sanitation access issues and options
- Promote 'inclusive' toilet designs in programme planning (also consider needs of accessible surroundings of sanitation facilities)
- Involve persons with disabilities throughout all phases of sanitation programme planning

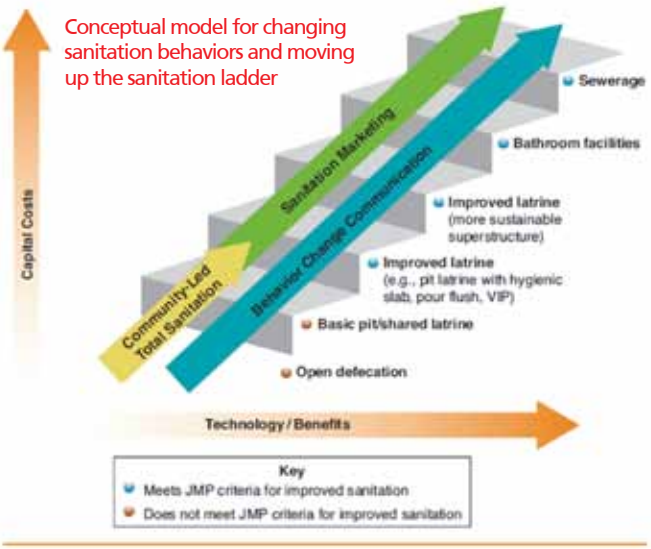
[76] IASC Gender and WASH in Emergencies Handbook
[77] Text mainly adapted from: Share & WaterAid Briefing Note on "Including disabled people in sanitation and hygiene services", Guy Collender, June 2011
[78] UN(2006) Enable! International Convention on the Rights of Persons with Disabilities. www.un.org/disabilities
[79] WEDC Briefing Note 1, "Inclusive design of school latrines", 2011

7

Sanitation software and assessment techniques

(General assessment techniques and software approaches for WASH are described in Annex 2)

A THE SANITATION LADDER[80]



WSP Scaling up Rural Sanitation; Introductory Guide to Sanitation Marketing, J. Devine, 2011, p 4

There are many alternative approaches to sanitation promotion. To select the right one, it is important to link up with the current sanitation context of a community. The improvement of hygiene behaviours and sanitation use can be seen as a process (like the above mentioned ladder). In sanitation, we could expect people to move following a continuum from open defecation to fixed place defecation, possibly with sharing basic facilities, and then on to using private hygienic toilets that in the end will include adequate treatment and re-use of waste.

It is important that sanitation interventions are selected that respond to the current set of behaviours in order to have a better chance to make a sustainable move up the ladder. Providing hygienic toilets with treatment of waste is not always a feasible option for communities used to open defecation. Understanding the sanitation ladder could help to identify the most suitable / sustainable sanitation option according to the existing behavior of the community. Motivating communities to move up step by step towards improved sanitation conditions, using cheap local materials together with a strong community mobilization component could be the best approach to achieve sustainable sanitation development.

If we refer to the table on page 4 on unimproved sanitation arrangements in Malteser intervention countries, we see that several countries have a high incidence of open defecation. These countries will require a different sanitation programme approach than countries where private latrines are already widely in use. The Community-Led Total Sanitation (CLTS), as mentioned on page 17, is most effective for communities that are positioned in the two lowest sections of the Sanitation Ladder.

Sanitation ladder should be based on the local context and practices, main issue is that along the ladder, sanitation practices become safer and more sustainable. In Thailand and Cambodia people often aim at combining latrine and bathroom facilities.

The sanitation ladder concept also indicates that it is important to realize that different sections of a community can be at different levels on the sanitation ladder and therefore require different approaches to move up one step on the sanitation ladder.

Once communities have the habit of latrine use and recognize the benefits, they are more motivated to maintain and upgrade their facilities, and will continue moving up on the sanitation ladder.

There are also various external factors that motivate people to move up on the sanitation ladder. Due to increased population pressure, it becomes increasingly difficult for such communities to find discrete places relatively nearby their dwellings to practice open defecation, and people are then motivated to look for alternative options, like simple latrines. Such context should then be recognized and used to promote the use of latrines and move people up on the sanitation ladder.

[80] Adapted from "Hygiene and Sanitation Software, an overview of approaches", WSSCC, 2010, p 13

B SANITATION RELATED BEHAVIORAL CHANGE[81]

The IRC booklet on "Sustainability of hygiene behaviour and the effectiveness of change interventions", mentions that WHO has indicated the following three hygiene behaviours as most important to prevent illness:

- Handwashing
- Latrine use
- Storing drinking water safely.

In the context of the sanitation guidelines, we will look more in detail to the first two hygiene behaviours.

Handwashing[82]

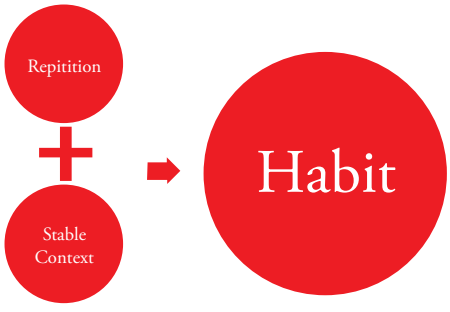
Having clean hands is important to prevent disease. Handwashing is a complex behaviour, for which several things are needed such as knowledge, skills and enabling environment. Four elements that one can use as approaches to measure handwashing are:

- knowledge of handwashing times that are important for health reasons. The "critical" handwashing times are: before cooking and eating, after defecation and after handling excreta of infants.
- skills in washing hands correctly. In practice this means rubbing both hands with a cleaning agent like soap or ash and using enough running water.
- enabling environment, for example existence of a convenient location with soap and water for handwashing in the household.
- The person's actual practice of handwashing.

Enabling environment for handwashing

An enabling technology[83] is an external or environmental factor that influences an individual's opportunity to perform a behavior, regardless of their ability and motivation to act. This is an important aspect in the design of handwashing initiatives, enabling technologies have been shown to facilitate handwashing behavior in several studies.

The enabling environment supports a "stable context" as shown in the picture above, which together with the aspect of repetition will result in developing new habits (handwashing with soap).



Habit formation (Verplanken & Wood, 2006)

As mentioned on http://www2.wsp.org/scalinguphandwashing/enablingtechnologies//, enabling technologies for handwashing with soap can be achieved by the following:

Store and regulate the flow of water in sufficient quantity to facilitate handwashing. Tippy-taps – which are devices made from commonly available materials (such as a jerry can suspended on a stand) - are perhaps the best known example.

Some of the handwashing devices only take a minute or two to make

Example from MI Myanmar

Plastic bottles with screw caps filled with water, and a hole pierced in the botten, can provide a convenient flow of water when the screw cap is loosened to let air in and allow water to flow from the hole. After washing the hands, simply tighten the screw cap again and the water flow will stop.

Tippy-tap

[81] Adapted from "Sustainability of hygiene behaviour and effectiveness of change interventions" IRC, 2004
[82] Text adapted from "Sustainability of hygiene behaviour and effectiveness of change interventions", booklet 1, IRC, E.Bolt, 2004, p19
[83] http://www2.wsp.org/scalinguphandwashing/enablingtechnologies//

GOOD PRACTICE SUGGESTION

For any initiative undertaken to promote and develop the construction of latrines, the issue of convenient handwashing facilities should be dealt with simultaneously. Schools are often good places to develop handwashing devices that are suitable for the community as children like to experiment with the various possibilities.

Manage or store soap within a household or institution (e.g., school, workplace). It should be managed in a way that prevents theft or spoilage of soap, and to facilitate access. Experiences with soap-water[84] have been positive to avoid mis-use of soap at schools in particular. Soap nets, soaps on a rope and soap dishes are examples. Several handwashing facilities that can be easily replicated in MI projects are shown in the article "Teaching schoolchildren about handwashing: Experiences from Zimbabwe"[85]

Below you see a picture of a tippy tap, and a reference[86] with instructions how to make one.

For handwashing to be effective, it is key to bring together water and soap in one place. If a facility is easy accessible and all necessary products are available, it is more likely that people will use it consistently. Enabling technologies such as handwashing stations should be placed in close proximity to the toilet or the food preparation area.

For public sanitation facilities, the aspects of operation and maintenance of hand washing facilities is of particular concern, and clear responsibilities and necessary resources should be discussed with the relevant community to address the sustainability aspect in the long term.

The webpage mentioned above gives a good overview on enabling technologies for handwashing with soap.

"Beyond Tippy Taps: The Role of Enabling Products in Scaling up and Sustaining Hand Washing"[87], includes observations and insights that will be very useful in designing Hand Washing Stations.

Hygiene promotion session in Ywar Thar Yar, Myanmar

Handwashing in Haiti

[84] Waterlines, Volume 29, number 4, October 2010, Is soapy water a viable solution for handwashing in schools? Saboori et al.
[85] Waterlines, Volume 29, number 4, October 2010, "Teaching schoolchildren about handwashing: Experiences from Zimbabwe", p 337-342
[86] Tippy tap manual
[87] Beyond Tippy Taps: The Role of Enabling Products in Scaling up and Sustaining Handwashing, Jacqueli Devine, 2010

GOOD PRACTICE SUGGESTION

The above mentioned behaviours for handwashing and latrine use should be at the basis of a hygiene promotion programme that will accompany the sanitation activities.

IEC material from Sri Lanka to promote proper latrine use

Latrine use[88]

Having and using a latrine is essential to prevent diarrhea and worm infections, as it prevents human excreta to get into contact with humans.

The following latrine use related behaviours are essential for a successful sanitation programme:

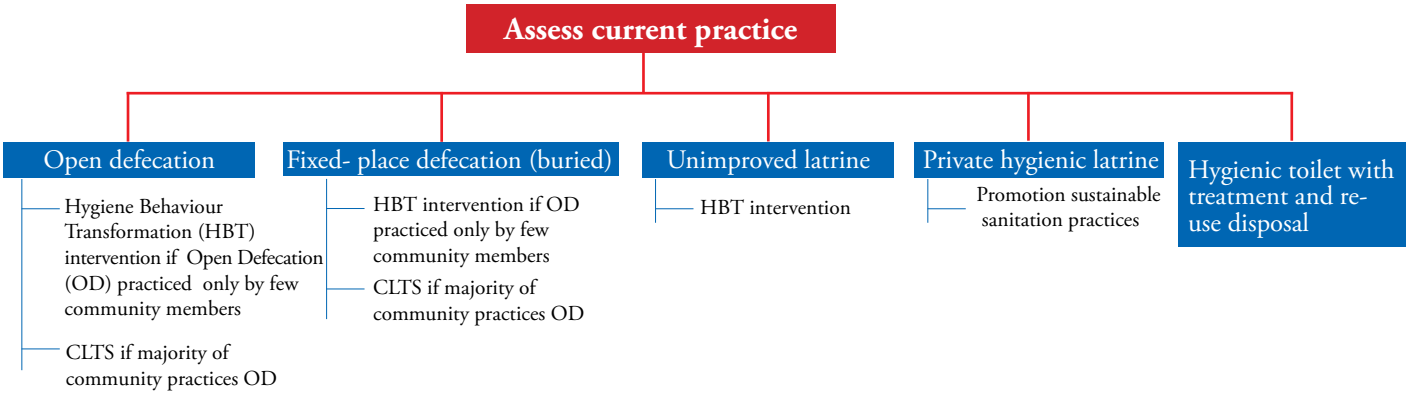
- Evidence of latrine use. A clear path to the latrine, excreta in the pit, and an environment free from excreta.
- Evidence of latrine use consistently by each person when they are around the household.
- Latrine is maintained. The floor is clean, the hole and walls free from excreta. The hole of the pit latrine is covered.

Sanitation programmes that focus on number of latrines constructed have largely failed to deliver desired outcome and impact related results[89]. Building further on these failures, Mukherjee explains in his article in Waterlines, October 2009, that new, behaviour-changing approaches to improve sanitation can be very successful. Focus is on changing behaviours of individuals, households and communities, instead of simply pushing for toilet construction with externally provided subsidies. Mukherjee argues that *raising collective awareness about the need for better sanitation along with offering individuals a range of choices for sanitation solutions leads to increased consumer demand for, and the adoption of, improved sanitation facilities and behaviours.* This approach is further elaborated on in the chapters on Community-Led Sanitation and Sanitation Marketing.

Very well maintained latrine in Batticaola, Sri Lanka, with tiles provided by beneficiary

[88] Text adapted from "Sustainability of hygiene behaviour and effectiveness of change interventions", booklet 1, IRC, E.Bolt, 2004, p21

[89] Waterlines, Volume 28, Number 4, "What does it take to scale up and sustain rural sanitation beyond projects?, Nilanjana Mukherjee, p 293-310



C COMMUNITY LED TOTAL SANITATION (CLTS)

CLTS is an innovative way to mobilise communities with the aim of eliminating open defecation. They are facilitated to do their community appraisal and analysis, and make a plan to watch becoming Open Defecation Free (ODF). CLTS' basic concept takes account of the following;

1. It is a community led process that encourages people to recognise and solve their own sanitation problems. Problem recognition in CLTS goes together with promotion of universal feelings of shame and disgust associated with faecal contamination.

   As mentioned in the article "Community-led total sanitation, Zambia:Stick, carrot or balloon?[90]" by Peter Harvey, a criticism of CLTS is that it "shames" people into building toilets. It is also explained that communities are "triggered" by trained CLTS facilitators, which enables them to see, and feel, the negative aspects of open defecation. If the triggering process is conducted properly, people are treated respectfully and the programme actually enhances personal and collective dignity.

2. Minimal (or even zero) hardware subsidies are provided to the communities. Therefore it is less costly than most conventional rural sanitation programmes. Projects that promote CLTS should provide details on cheap but safe latrine options to the community that are within the reach of their financial capacity.

   The Household Latrine Construction manual[91] of Ministry of Rural Development, Department of Rural Health Care of Cambodia includes a "Latrine Decision Aid" which is a very useful to guide communities to select their most appropriate latrine type.

3. Focus is on collective behavior change, particularly the eradication of open defecation (OD), so not only simply building latrines.

4. If applied correctly and in the right communities, CLTS can result in rapid behavior change. Villages take pride in the fact if they are declared Open Defecation (ODF) Free, with some villages reported to even mention this at the village sign board.

The CLTS approach has been particularly successful in a rural Asian context.

Findings of a review of seven "total sanitation" programmes in India and Bangladesh confirm that this approach can be very successful in stopping open defecation and empowering local communities. Link to 66 CLTS good practice examples by Robert Chambers is given in the online reference chapter on page 70.

CLTS practiced in Cambodia by MI partner CHHRA

[90] Waterlines Vol 30 Number 2, "Community-led total sanitation, Zambia:Stick, carrot or balloon" by Peter Harvey, p 99
[91] Household Latrine Construction Manual, Ministry of Rural Development, Cambodia, 2010

D SANITATION MARKETING[92]

In the absence of a local sanitation products market, communities often depend on outside assistance to be able to construct their latrines.

Subsidised forms of sanitation projects, where agencies provide materials like concrete rings for pit-lining and slabs, have proven not to be the most effective approaches to achieve sustained latrine use and maintenance in many cases. Often, problems are encountered with the sustainability of the use of sanitation facilities in the long run. The CLTS approach in its "pure form" therefore does not provide subsidised materials to promote the use of safe sanitation facilities in communities. As these communities need to have access to effective and affordable sanitation materials and services at their community level, sanitation marketing is essential to complement this approach. In general, to improve sanitation coverage, it is essential to undertake interventions that address the supply part (hardware) as well as the demand part (software) of latrine construction. The CLTS and sanitation marketing approaches can work complementary to each other. In Indonesia[93], as well as in many parts of Nepal and other areas in South Asia, authorities now forbid the use of subsidies for household sanitation facilities.

The following basic step should be considered while developing a sanitation marketing approach:

1. Assess the current supply chain for sanitation materials
2. Assess current demand for latrines and understand the market for latrines and sanitation material
3. Develop marketable designs for latrines that are desirable[94] and affordable by the users and at the same time marketable and profitable for the suppliers
4. Create appropriate marketing messages and plans for promotion and communication to market the products and services to the consumers.
5. Strengthen the sanitation materials supply chain at community level
6. Advocate for an enabling environment at community and national level.
7. Develop and implement sanitation promotional campaigns

The article "Sanitation marketing in Cambodia[95]" describes a successful sanitation marketing project that promotes its own design, the prize winning "The Easy Latrine" .

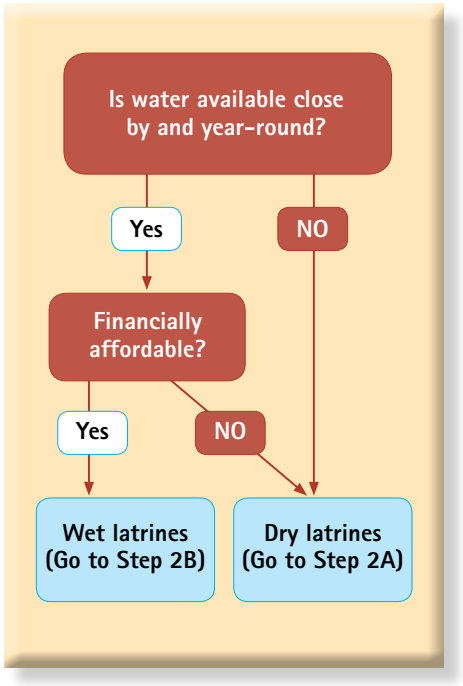
Promotion by MI Kenya of Tippy-Tap handwashing stations in Illeret, Kenya

[92] An excellent reference document to learn more about sanitation marketing: Introductory Guide to Sanitation Marketing, WSP, Jacqueline Devine and Craig Kullmann, September 2011 and SANITATION MARKETING FOR MANAGERS GUIDANCE AND TOOLS FOR PROGRAM DEVELOPMENT, USAID/ HIP, July 2010

[93] Waterlines, Volume 28, Number 4, October 2009, p 302

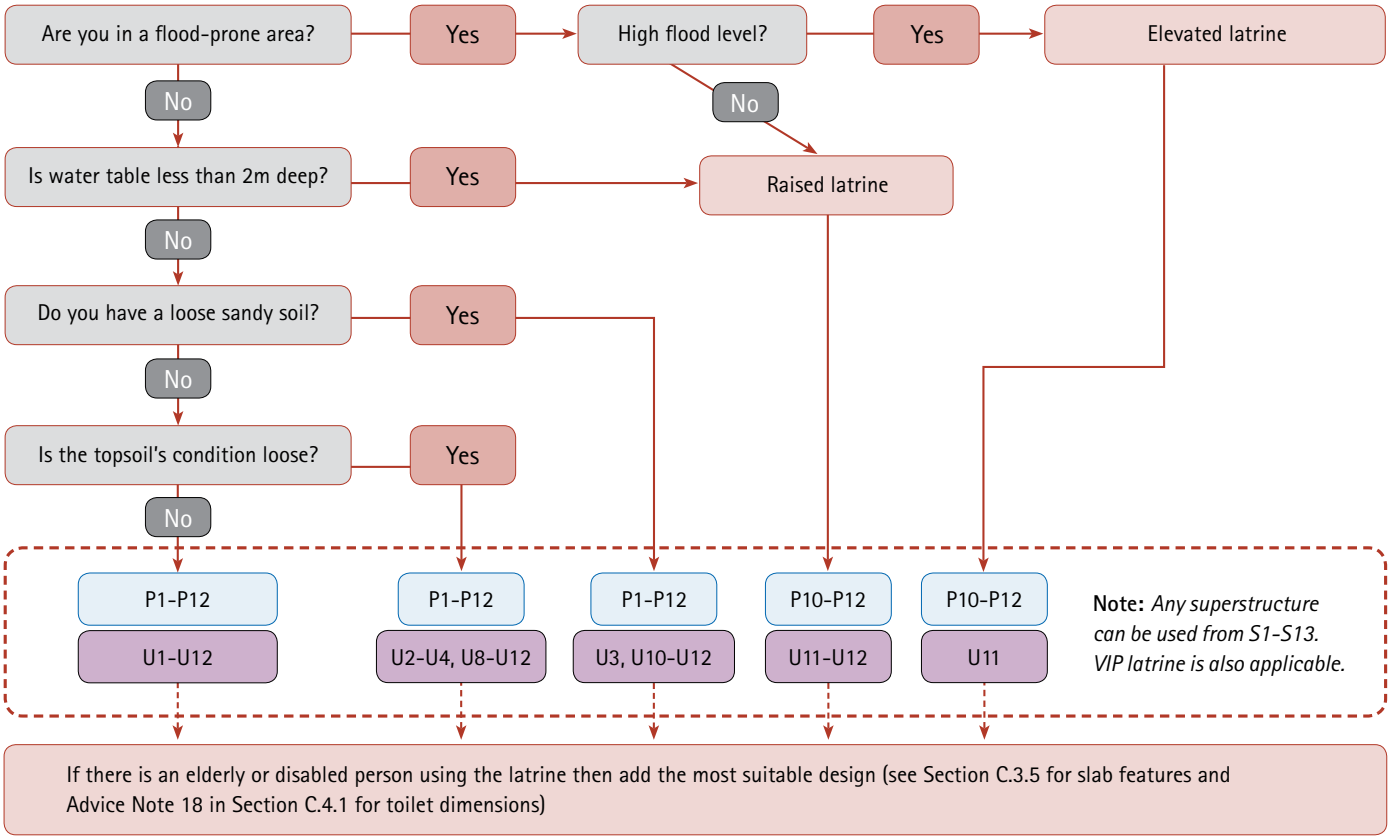
[94] Health is not always the major factor driving the latrine purchase decision; status, convenience and other life style benefits resulting from latrine ownership appear to be crucial factors as well. Waterlines, Volume 30, Number 1, January 2011, p30

[95] Waterlines Volume 30 Number 1, "Sanitation marketing in Cambodia" J W Rosenboom, January 2011



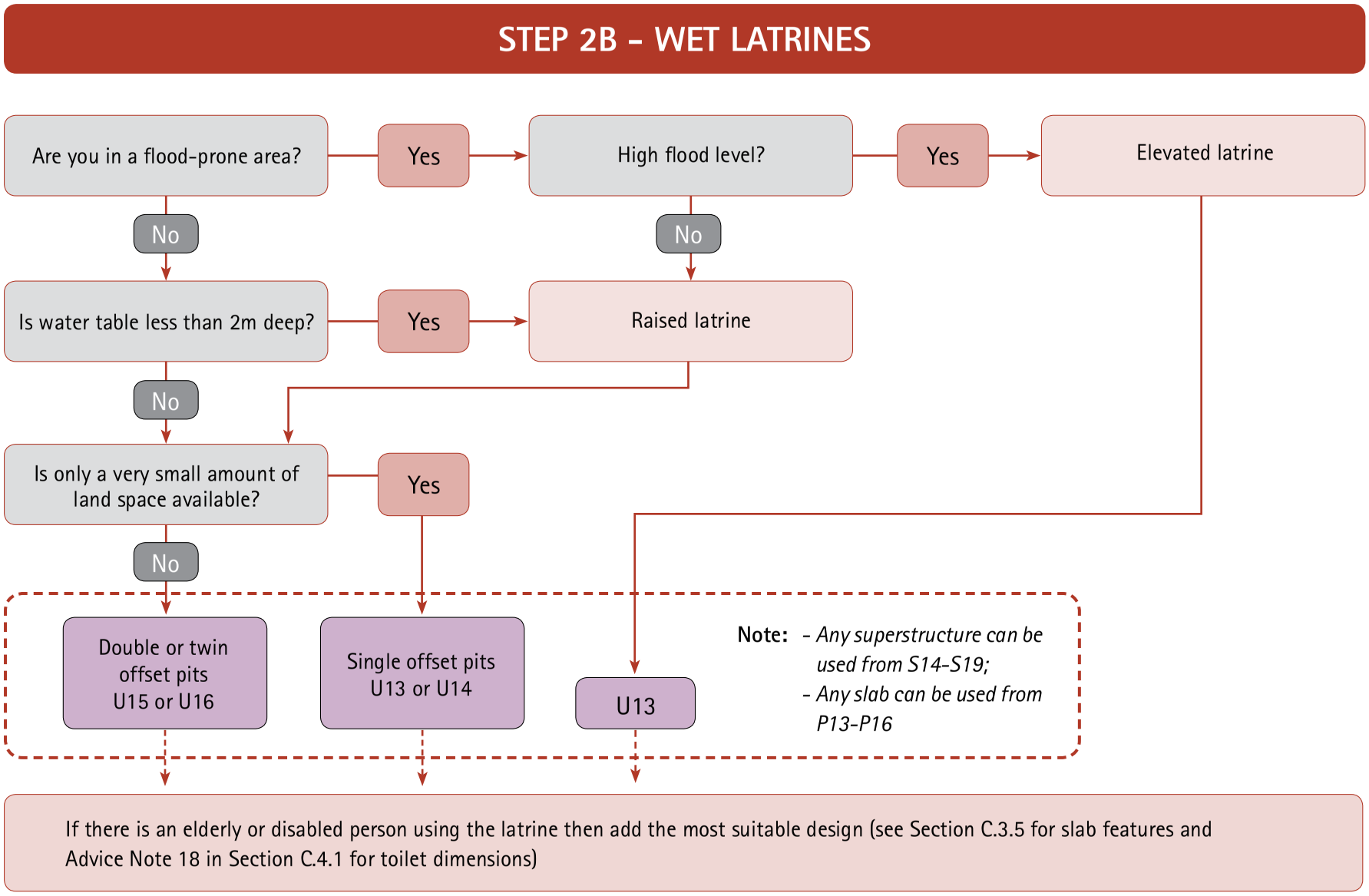
ANNEX 1
Latrine option charts[96]

STEP 2A – DRY LATRINES



Note: Latrine codes are available on page 14-16

[96] Household Latrine Construction Manual, Ministry of Rural Development Department of Rural Health Care, Cambodia, March 2012.

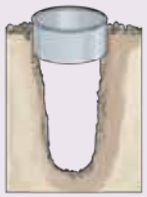
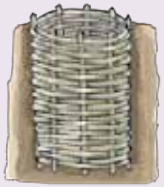
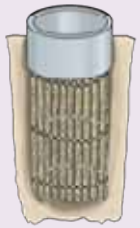
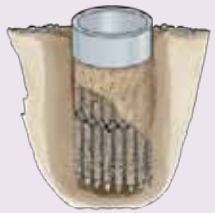
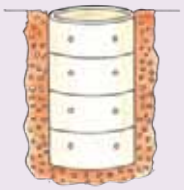
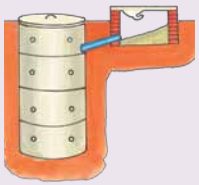
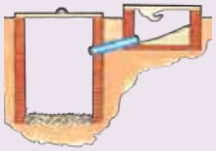


Note: Latrine codes are available on page 14-16

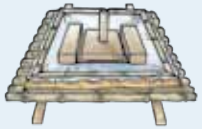
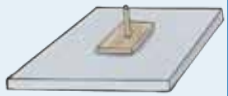
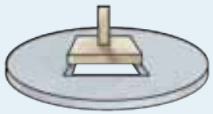
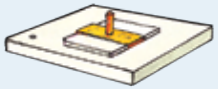
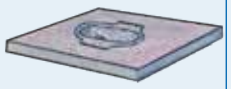
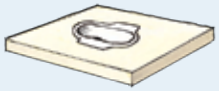
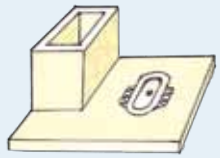
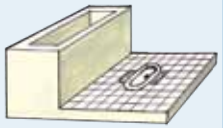
Raised latrine: Ref. Figure 2, page 58 of the ICM. This type of latrine is suitable to areas with a high groundwater table. See Section C.6 on Page 181 for details.

Elevated latrine: Ref. Figure 3, page 60 of the ICM. This type of latrine is suitable to flooded areas. See Section C.6 on Page 181 for details.

Pit Lining Codes

U1	U2	U3	U4	U5	U6	U7	U8
Unlined 	Jar 	Oil drum 	Topsoil lined with concrete ring 	Woven bamboo 	Bamboo pole 	Wood pole 	Bamboo pole and concrete ring 
U9	**U10**	**U11**	**U12**	**U13**	**U14**	**U15**	**U16**
Wood pole and concrete ring 	Wood pole with mesh and concrete ring 	Concrete ring 	Brick 	Concrete lined offset tank 	Brick lined offset tank 	Double lined pit 	Alternating twin offset pits 

Slab Codes

P1	P2	P3	P4	P5	P6	P7	P8
Bamboo and clay 	Bamboo, clay and plastic 	Bamboo mat, clay and plastic 	Bamboo, thin clay and plastic 	Bamboo-reinforced clay 	Bamboo and sack 	Wood pole 	Bamboo and wood 
P9	**P10**	**P11**	**P12**	**P13**	**P14**	**P15**	**P16**
Wood 	Rectangular concrete 	Round concrete 	Concrete and footrest 	Concrete slab and pan 	Concrete slab and ceramic pan 	Ceramic pan, concrete slab and tank 	Ceramic pan, tiled slab and tank 

ANNEX 2

WASH software and assessment techniques

A PARTICIPATORY LEARNING AND ACTION (PLA)[97]

In PLA the process of the participatory method is in the centre and perceived as part of the solution process, i.e. the people take already action in deciding etc. Detailed information on PLA is available on : http://www.iied.org/natural-resources/key-issues/empowerment-and-land-rights/participatory-learning-and-action.

PLA is an approach for learning about and engaging with communities. It combines an ever-growing toolkit of participatory and visual methods with natural interviewing techniques and is intended to facilitate a process of collective analysis and learning.

The approach can be used in identifying needs, planning, monitoring or evaluating projects and programmes. Whilst a powerful consultation tool, it offers the opportunity to go beyond mere consultation and promote the active participation of communities in the issues and interventions that shape their lives. The approach has been used, traditionally, with rural communities in the developing world. There it has been found extremely effective in tapping into the unique perspectives of the rural poor, helping to unlock their ideas not only on the nature and causes of the issues that affect them, but also on realistic solutions. It enables local people to share their perceptions and identify, prioritise and appraise issues from their knowledge of local conditions. More traditional, extractive research tends to 'consult' communities and then take away the findings for analysis, with no assurance that they will be acted on. In contrast, PLA tools combine the sharing of insights with analysis and, as such, provide a catalyst for the community themselves to act on what is uncovered.

Sanitation committee meeting, Vietnam

By utilising visual methods and analytical tools, PLA enables all community members to participate, regardless of their age, ethnicity or literacy capabilities.

How is it Conducted?

The repertoire of PLA tools is large and ever-growing and practitioners of the approach are constantly adapting and adding to the toolkit to meet their needs. What follows therefore are merely descriptions and examples of some of the more commonly used tools intended to give a flavour of the approach.

Mapping

Mapping activities are often used as introductory activities. They allow the community to show and talk about how they see the area where they live, the resources/facilities available and what is important to them in their environment. They enable 'outsiders' to begin to see a community through the eyes of the local people.

[97] Text of this chapter adapted from "What is Participatory Learning and Action (PLA): An Introduction, Sarah Thomas", University of Wolverhampton, Centre for International Development and Training

Time lines

Time lines are a type of diagram that help to record changes in a community/ household/life of a community member over time. They are a way of noting the important historical markers and milestones of a community or individual, giving a wider historical context to issues being discussed. They can also enable participants to draw out trends.

Transect Walks

Transect Walks are a type of mapping activity, but they involve actually walking across an area with a community member/ group of community members, observing, asking questions and listening as you go. This information is then represented visually in a transect sketch/diagram.

Problem Trees

A 'Problem Tree' or 'issue tree' is a type of diagram which enables community members to analyse the causes and effects of a particular problem, and how they relate to one another.

Constructed around a focal problem/ issue, the causes of that problem are traced down below, and the effects above. not recognised

Ranking/scoring activities provide a way for community members to weigh up/rate/ prioritise items or issues either relative to one another or according to criteria.

Venn / Chapati Diagrams

These are two similar types of diagrams that can be used to explore the roles and relationships of individuals, groups and individuals and the links between them.

These are just some of the tools that are used as part of the PLA approach. These are just some of the tools that are used as part of the PLA approach. The approach itself is dynamic and flexible but is underpinned by some key principles:

- Roles are reversed such that local people are seen as the 'experts'
- 'Handing over the pen' – the community members themselves do the drawing, mapping, modelling, diagramming; the facilitators build rapport, listen, question and learn.

KAP[98]

The Knowledge, Attitude and Practice (KAP) approach has its roots in human health and management sciences. Especially in the health sector, KAP has been used with patients on various long-term therapies where a long-term interaction is needed.

Participatory planning session in Vietnam

Village consulation meeting, Myanmar

The approach is used in many MI programmes to get information on the knowledge base of the community one wishes to work with, so that appropriate intervention strategies can be worked out that address identified issues.

Within the KAP approach, and particularly when used for WASH interventions, survey is the primary method used to collect data and information about beliefs, practices and perceptions, by asking a structured and predetermined set of questions which produces quantitative information and analysis from a large number (sample) of randomly selected individuals. Survey data is generally collected by trained enumerators who speak the local language and use a standardised questionnaire to collect information from respondents at the household level.

In planned WASH projects which are to be delivered over several years, these surveys are carried out at various stages of the project, to ultimately understand the final impact of the interaction. The key differences between using KAP as an approach versus KAP surveys as in WASH projects are in the process of interaction with the respondents, the duration of that interaction, the use of feedbacks, the nature of the intervention and the purpose of the analysis. Although KAP surveys are often packaged together with water, sanitation and hygiene interventions, their application is far more relevant in hygiene education as we can "measure" behavioral change over time, as compared to operation and maintenance of centralised physical infrastructure.

Baseline surveys, intermediate evaluations and final impact assessment studies are necessary parts of all WASH programmes. The purpose of baseline surveys is to establish a baseline figure on various indicators, which will be addressed

[98] Adapted from "KAP surveys in the context of WASH projects", DFID

and changed with the WASH project interventions. If we undertake impact assessments at the final stages of the project, these indicators could be monitored and verified.

If the project only has a small set of indicators, it is possible to accurately measure the changes between the baseline surveys and the final impact assessment. Structured surveys that use questionnaires are also criticised for not promoting enough interaction, being professionally controlled and not a good tool to promote true consultation between different groups.

The MdM Guide[99] onKAP surveys is a very useful document to guide the use of this survey method in the field.

Project Planning, Sri Lanka

B WASH SPECIFIC SOFTWARE

"WASH-IDD"

The WASH-IDD[100] approach was developed prior to the Community Based Disaster Risk Reduction Project in Sittwe and Rathidaung townships in Myanmar in 2006 and has been designed using several PLA tools and approaches. However, it is more than data gathering. WASH-IDD final aim is to have a concrete agreement between the community and the project, by signing the Deal. Therefore it is more practical and action oriented and once both parties keep their promise, the Sanitation Project can be successful and possibly sustainable. WASH-IDD also emphasises the community ownership of the project package or input strongly. Community contribution is also an essential part of it and therefore thorough discussion and identification of their felt needs is very crucial to make the project successful. The PHAST method, that is described later, is relatively more time-consuming.

Latrine construction, Myanmar

Analysing weaknesses, planning improvements

Drawing on a collective analysis of the situation, and after intensive health and hygiene campaigns, the teams design concrete action plans with the villages and come up with solutions for problems related to drinking water, sewage, sanitation and hygiene in the area. One aim of this work is to guarantee a basic supply for everyday needs as part of the WASH initiative, and a second aim is to guarantee a basic supply for use the next time a disaster occurs. The measures cover a variety of areas: securing the water sources in the village and the access to these, transporting drinking water safely, treating it and storing it suitably for use by households, building latrines for families and at public buildings such as schools and health care facilities

Setting priorities, seeing results

Once the problem is analysed in full, the villagers choose specific measures which are most important to them and prioritise them ahead of the collective implementation process. Finally, the villagers and Malteser International staff sign an agreement identifying the tasks required of the local community and the services Malteser

[99] MdM Guide on KAP surveys, 2011
[100] Malteser International, Annual report 2010, p 21

International needs to deliver. This means that, from the very beginning, the success of the measures and the continuous follow-up after implementation will be based on close cooperation between the partners. This will help the villagers identify with the improvement process and increase motivation for the long-term transfer of the responsibility for the activities.

Participation and personal responsibility

While the community's sense of ownership of the project ensures that it will be maintained long-term, the participation of the population will be key to finding suitable solutions and to improving the living conditions on a sustainable basis – the population knows its own needs better than anyone else. The women, usually responsible for managing the home and the health of the family, now have more of a say thanks to the WASH-IDD methodology.

Their participation may help to avoid mistakes in the planning process and reveal what is still missing. Greater personal responsibility and involvement of the population are vital to secure a sustainable and decentralised supply of water and sanitation for all.

Malteser International developed a WASH-IDD implementation manual[101] that clearly explains the use of this method.

The implementation manual is structured in 3 parts. The first part contains advice on facilitation skills, ways to staff the implementation and also presents an overview of the approach. The second section provides step by step lesson plans for implementing the approach while the third and final section contains all the IEC materials and assessment forms.

The WASH-IDD approach was successfully field tested in Malteser WASH intervention areas in Myanmar.

"Before we started building the latrines, we asked all the families in the village what they needed most urgently. Every family had a say. As it turned out, every family wanted their own latrine", explains village chief Tha Yet Chaung.

"There were only five latrines for 128 families before. Now there is one for every family."

With guidance from the Malteser International staff, the village residents build latrines for their families as well as for schools and other public facilities.

PHAST[102]

PHAST is a participatory technique that develops people's understanding of the linkages between sanitation, hygiene and health. The aim is to encourage the community to plan their own sanitation and hygiene initiatives, both at household and community level. The technique uses a number of graphical tools such as the sanitation ladder showing different type of defecation eg. from open defecation, open pit, to fly proof, ventilated improved pit, four-flush latrines.

PHAST is primarily a decision-support tool that uses a 'seven step' participatory approach to facilitate community planning and action. The seven steps are:

- problem identification
- problem analysis
- planning for solutions
- selecting options
- planning for new facilities and behaviour change
- planning for monitoring and evaluation and
- participatory evaluation.

PHAST works on the basis that as communities gain awareness of their WASH situation through participatory activities, they are empowered to develop and carry out their own plans to improve this situation. The planning method uses specifically designed tools, consisting of a series of pictures showing local situations. Community groups are then asked to say how these relate to the local situation and what they would need to do to solve the problems that they have identified.

When individual knowledge is required a process called pocket chart voting is used which allows the participants to vote in secret. The findings are then discussed by the group as a whole, but an individual never has to reveal their choice.

Strengths:
Extremely rewarding for both the community members and community workers, by involving the communities in their project planning and implementation through participatory techniques. Communities gain confidence and responsibility for their own projects and have a clear say in what they want and do not want.

Effective involvement of the community in monitoring and evaluation ensures that the services put in place respond to the needs of the community and that essential direct feedback provided can serve to change activities as necessary.

Trained community workers in participatory techniques, with proper guidance and management, can become a lasting asset to the programme and the community (World Bank, 2008).

The use of pictures and working in the third person enables communities to share information and plan in a manner which does not disadvantage illiterate people and allows people to express their feelings without exposing themselves.

The participatory planning, implementing and monitoring is creating strong feeling of ownership and responsibility to take care of their facilities by their own.

Weaknesses:

- Requires in-depth training of community workers in participatory techniques. On average two weeks are needed for this training to be completed, to be followed up by regular refresher courses.
- The identification and selection of the community workers is crucial. It is generally necessary to select experienced community workers to take part in the training, leading to several potential problems.
- Experienced community workers may not adapt to participatory approaches easily.
- The PHAST approach requires that community workers have certain character traits: e.g. they must be outgoing, with a good sense of how the community responds to the participatory tools so that immediate adaptations can be made during implementation.
- Requires an intensive management structure. Feasible in smaller "grass-roots" projects but problematic when going to scale.
- PHAST tools are relatively time intensive in their use, requiring that the beneficiary communities are

[101] WASH IDD Manual, Malteser International, Myanmar team, Yangon (internal document)
[102] Adapted from "Hygiene and Sanitation Software: A Overview of Approaches", WSSCC, Eawag, 2008, Elizabeth Tilley, p 46-49

available to go through the participatory exercises; this may be seen as a burden if not properly discussed with the community beforehand. (World Bank, 2008).

These weaknesses can lead to PHAST being used incorrectly and so being largely ineffective. Moreover, evidence suggest that the scope for scaling up the use of the PHAST approach is limited.

WHO has developed a step-by-step guide[103] for the use of PHAST.

Red Point Method

Red Point is an innovative tool created to increase self-help capacities in communities. The tool was initially developed by Malteser staff of Cambodia in March 2004. It was recognised as a new way of doing community based Health Promotion and a way of initiation of self help activity among the rural villages.

The design highlights that many people have knowledge, beliefs, and motivation but with no supportive environment, their behaviors do not change.

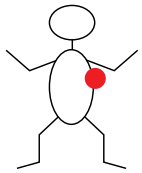
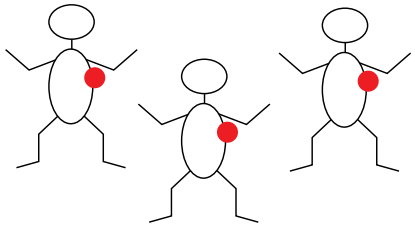
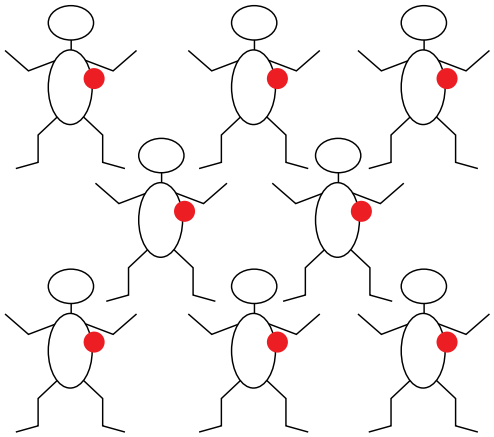
Red Point is a new way of doing Health promotion. It works with people who are motivated and links them to a supportive environment and supportive people by making Action Plans. The design assumes that people have the motivation to address the health outcomes that are important to them as individuals, family, and /or community. The design highlights to the community that Health Education tries to prevent health problems by changing health behaviors with the supportive environment.

It results into ownership, empowerment, behavior change and sustainability by developing the self-help potential of communities. Motivation can be described as a source of energy or their particular RED POINT.

Red Point activities are facilitated by Health Promoters. The method involves 6 different steps:

Step 1 : Introduction to the Community
Step 2 : Identify Red Points
Step 3 : Bring Together People with the Same Red Points
Step 4 : Identify the Causes of the Red Point
Step 5 : Make Health Action Plans
Step 6 : Follow Up the Action Plans

The method is described in detail in the Red Point Handbook[104].

An Individual with a Red Point 	Example An individual woman who has two children with tuberculosis.
Group of people with the same Red Point 	Example A group of families living side by side with lots of solid waste collecting in the ditch at the front of their houses.
Entire village with the same Red Point 	Example Many village members are concerned about the quality of the services at their local health centre.

Step	Objectives	Method
1. Introduction to the community	Build good relationships Explain the purpose	Group discussions Individual family visits
2. Identify Red Points	Find people that are motivated about specific health issues	Group discussions Individual family visits
3. Bring together people with the same Red Points	Link people with red points to people with the same red points	Set meeting times and locations
4. Identify root causes of the health problems	Understand all of the reasons why the problem happens Make it easier to make an action plan	Group and individual brainstorming Writing problem trees
5. Make health action plans	Write health action plans	Group and individual brainstorming Write health action plan
6. Follow up action plans	Make sure people follow the plans Identify new problems and make new plans	Visit people who wrote the action plan Evaluate impact of action plan

[103] WHO guide, step-by-step, PHAST
[104] Red Point Handbook, CHHRA and Malteser International, 2005

ANNEX 3

Accessibility Audit: Latrine

The purpose is to examine a sanitation facility, and

a) Find out if a physically vulnerable person[105] is able to use the facility independently.
b) Identify which features make it easy to use, and which features make it difficult to use by a physically vulnerable person.
c) Make suggestions for changes/improvements.

A. Allocation of tasks

Appoint a co-ordinator (if you haven't already). Assign or ask for volunteers for relevant recording tasks: note-taker, measuring dimensions, drawing diagrams, taking photographs, etc. (Team members may do more than one task).

Names of team members	*Equipment needed*
Co-ordinator	Note-book & pen
Interviewer	Note-book & pen
Note-taker:	Note-book & pen
Measurer:	Tape measure
Drawer of diagrams:	Note-book & pencil, eraser
Photographer:	Camera

B. Latrine - general details

1. Type of latrine ……..
2. Location /Address …….
……..
3. Name of implementing organisation ……
4. Accommodation: ☐ owned ☐ rented ☐ other (specify)……
5. Geographic location: ☐ rural ☐ urban ☐ peri-urban ☐ village ☐ farm ☐ flat ☐ hilly ☐
(Please describe) ……..
6. **General description** of latrine, focusing on superstructure, including materials

……
……..
……
……

[105] This might be a frail elderly woman or man, a small child, a heavily pregnant woman, a wheelchair user or person who walks with a stick or crutches, someone who is visually impaired, with weak grip, a broken leg, a limb amputation ….

C. Accessibility

Different users now attempt to get into and show how they can/cannot use the toilet. Make a note of who can use it and who cannot, and what features make it difficult to use. Use the attached checklist to remind you of the kind of features to look for, ignore any that are not relevant, and add things that are missing.

7. Getting there: .....

.....

.....

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Suggested changes: .....

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Checklist
Distance from house to latrine. What is the path/ access route made of? Is the path wide enough for all disabled users (recommended min width 90cm)? Is the path level and firm, with nothing to trip up? Is the path surface slippery when either dry or wet? Are there obstacles that block the path, or make it easy to trip? especially for visually impaired people (up to 2m above floor level). Is the path clear of branches of trees and bushes? Can a blind person follow the path? E.g. clear surface texture, landmarks or guide rail? Are slopes too steep? *(recommended max 1 in 10).* Is the surface of the slope slippery or non-slip? If used at night, is the path lit?

8. Getting in/on: .....

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.....

.....

Suggested changes: .....

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.....

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Checklist
Steps: Are they even or uneven, firm or broken, non-slip or slippery? Are they suitable height? (*recommended max 15 – 17 cm each step)* Is there a hand-rail for support?

Entrance: Is there a flat platform in front of the door? Is it wide enough for a wheelchair user to enter? *(recommended min width 80cm)* Is the difference in height between inside and outside level, or a maximum 17cm? Is the door easy to open by someone with weak hands? Does door open inwards or outwards? Can the user close the door easily from inside? Is the door easy to lock and unlock?

9. Inside (draw a plan on a separate page to show dimensions and layout viewed from above)

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Suggested changes/improvements: .....

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Checklist
Space inside: Total internal dimensions (width, length); distance from door to front of toilet pan/hole; width & height of toilet pan; distance on each side of toilet pan to each side wall.
Does the layout of the toilet allow space for a wheelchair/ crutch user, or a user and helper? (Draw the layout on a plan diagram)
Floor: What is it made of? Is it even, or uneven, firm or unstable, slippery or non-slip? Does it appear to be easy to clean?
Light: When the door is closed is there enough light to see the toilet hole and footplates?

10. Support structures .....

.....

.....

.....

Suggested changes/improvements: ……
……
……
……

Checklist
Is it a squatting or sitting latrine? If squatting: is there something to hold onto when squatting?
Describe: rails/ rope etc. materials, finish, position, height, etc. (Draw their position on a plan.)
Seat: (if there is one): describe materials, finish, dimensions, fixed/moveable, size of hole. Is it easy to use, easy to clean? Why? Why not?

11. Water/anal cleansing materials (availability) ……..
……
……
……
Suggested changes/improvements: ……
……
……
……

Checklist
Is there an internal water point? Describe. Can it be reached from squatting/sitting? If not, what is the source and how far is it from the latrine? Are anal cleansing materials easily available? Are there disposal facilities for anal cleansing materials?

12. Handwashing: ……
……
……
……
Suggested changes/improvements: ……
……
……
……

Checklist
Is water available for handwashing? Can it be easily reached by all users?

13. Other issues (Please add anything further) ……..
……
……
……
……

D. Interviews with local users

14. Persons interviewed: ……
……..

15. Who uses the facility? ……
……..
……..
……..

16. Who can use it easily? ……
……..
……..
……..
……..

17. Are there people who would like to use it but cannot, or have difficulty? ……..
……..
……..
……..
……..

18. Please add any additional information or comments.

ANNEX 4

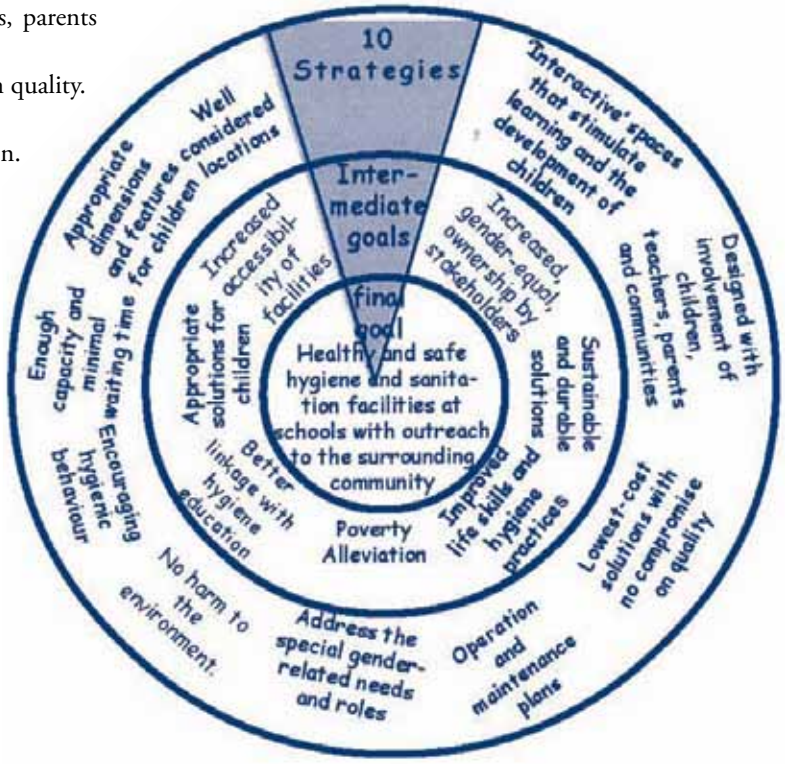
Child-Friendly Hygiene and Sanitation Facilities in Schools (IRC-International Water and Sanitation Centre)

Selection of some relevant pages for design of child friendly school sanitation facilities*

Ten points towards child-friendly hygiene and sanitation facilities in schools

Child-friendly hygiene and sanitation facilities in schools…

1. Are 'interactive' spaces that stimulate children's learning and development.
2. Are designed with involvement of children, teachers, parents and communities.
3. Provide lowest-cost solutions with no compromise on quality.
4. Have operation and maintenance plans.
5. Have appropriate dimensions and features for children.
6. Address the special gender-related needs and roles.
7. Do not harm the environment.
8. Encourage hygienic behaviour.
9. Offer enough capacity and minimal waiting time.
10. Have well-considered locations.



* For full text refer to "Child-Friendly Hygiene and Sanitation Facilities in Schools: Indispensable to effective hygiene education" Jaap Zomerplaag, Annemarieke Mooijman, IRC 2005.

Are designed with involvement of children, teachers, parents and communities.

Active involvement of the users is essential in all phases of the design process. In general, when properly coached and guided, potential users are perfectly able to assess their existing practices and find solutions for their own needs. Their involvement during the design stage of hygiene and sanitation facilities will lead to better solutions and increased acceptance of these solutions.

Designing as a participatory learning experience

The chance that people will adopt appropriate hygiene practices is much greater when they understand the importance of sanitation improvements and are allowed to find their own solutions. The process of designing hygiene and sanitation facilities can be seen as a participatory learning experience: facilitating a group of people in the analysis of their existing situation and guiding them to develop skills and obtain knowledge that enables them to set their own priorities and design appropriate solutions. Project staff involved in the development of facilities should see themselves as trainers and facilitators who guide the people through the design process and bring in background support with technical expertise and organisational and planning skills. The participatory design of facilities (the 'hardware') can be integrated as a powerful tool into the hygiene education programme (the 'software'). A dynamic design process gives the opportunity to put new knowledge and skills directly into practice, increasing the feeling of empowerment and ownership.

Some useful considerations for participatory design processes:

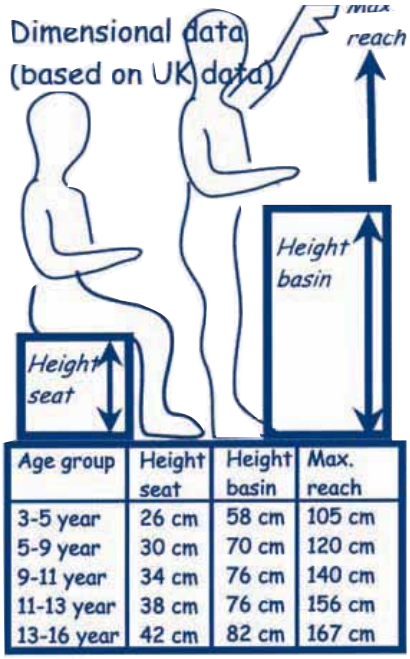
- It is impossible for the entire community to directly participate in the design process. An elected committee could be put together in which not only teachers and students, but also parents and possibly other stakeholders such as the community leaders and primary health care staff are represented. It is important that the committee is equally balanced as regards sex, race, ethnic group and social class. To obtain commitment and consensus from the entire (school) community, this committee should report on their findings at the end of each design phase.
- It is important to assess the readiness of the stakeholders. Do they see their water, hygiene and sanitation conditions as problematic? Are they interested in changing them? All stages of readiness require their own appropriate messages and learning strategies.
- Inform the stakeholders about the sequence of the design process. Progress can be ensured by structuring the entire process in clear phases and by informing stakeholders of the expected outcome of each phase. Technical information is best provided in response to needs identified by the stakeholders. Providing external intervention with technical information and support too early can have a negative effect on the process.
- In most countries standardised designs are used for hygiene and sanitation facilities in schools to reduce costs and control quality. This can be a good solution, but applying a standard design too rigidly can lead to ignoring specific local pre-conditions and needs. To avoid this, a package of various standardised options can be offered.

Participatory design with children

Involvement of the principal users, the children, is essential during the design and rehabilitation of hygiene and sanitation facilities in schools. Children have a different view of the world than adults and therefore experience the use of facilities differently. Children can be frightened in situations that adults consider to be safe. When, for example, faeces are scattered on the floor around the toilet instead of ending up in the squatting hole, it should not immediately be interpreted as an act of misbehaviour. In many cases it indicates that children were afraid to squat above the hole.

Generally children are good designers: They are curious and interested in the world around them and they like to use their imagination. Moreover, they are good at finding solutions for problems that directly affect them. Some considerations when involving children in the design process:

- In most cultures, hygiene, and more particularly sanitation, is a sensitive subject. It is therefore recommended to create an environment that allows an open dialogue in which children feel free to talk about issues such as urinating, defecating and menstruation. Better results can be expected from an informal group session than from a traditional classroom set-up. To enable the open discussions it will often be necessary to separate girls and boys and the children by age group, and to keep teachers and other adults that are 'close' to them away from the group. Preferably, the facilitation of the group sessions should be done by neutral adults who, in order to build up trust, speak the local dialect or language; have in-depth knowledge of local customs and habits related to hygiene, water and sanitation; and are of the same sex, social class and ethnic group as the participants.
- The technical drawings normally used for design and construction purposes can be confusing because they do not properly illustrate how the facilities are going to look. Presentations that are more realistic should be used, such as perspective drawings and scale models. The latter can be easily adapted and could be made by the older children.
- When an innovative solution is proposed, it is better to make a full-scale pilot model. Maybe similar solutions have been implemented at other schools or a temporary 'testing facility' can be used to see how it works. Experimenting and trying out often results in the best solutions.



Age group	Height seat	Height basin	Max. reach
3-5 year	26 cm	58 cm	105 cm
5-9 year	30 cm	70 cm	120 cm
9-11 year	34 cm	76 cm	140 cm
11-13 year	38 cm	76 cm	156 cm
13-16 year	42 cm	82 cm	167 cm

Have appropriate dimensions and features for children.

Facilities for children require different dimensions than those for adults. Nevertheless, 'adult-size' designs are all too often used for schools, and if adapted, the adaptations are minimal. Important details are overlooked and the fact that children have different physical abilities than adults is ignored. This results in uncomfortable facilities with many unforeseen obstacles for children, and in turn leads to children using them in the wrong way or refusing to use them at all.

Making facilities comfortable and accessible for all children

It is impossible to set international standards for dimensions of hygiene and sanitation facilities in schools because the length and size of children vary per region. Standard dimensions are not necessary because at every school, children of all ages are available for measuring and trials. If a nice maths exercise is made out of this, they will often be very willing to assist.

The following dimensions should be determined:

- Height of seats (if seats are being used)
- Height of urinals
- Height of hand washing facilities (and can taps, ladles, soap, etc. be reached?)
- Distance between the footrests of squatting platforms
- Distance from the squatting platform to the wall (women and girls need more space to squat comfortably than men and boys)

In addition to the obvious differences in length, children of different ages also have different levels of physical strength and motor skills, requiring different solutions. The following aspects have to be considered and measured:

- Height of doorknobs and locks
- Height of steps and handrails of stairs
- Weight of the doors and hole covers
- needed to open taps, fetch water, etc.
- of the squatting hole (also consider children's fear of falling in)

In larger schools with a large age spread it is recommended to build separate facilities for the younger children, the older children and teachers. When the same facilities are used by different age groups, special provisions can be made to allow smaller children to make use of the facilities, such as a step in front of the seat or an additional seat cover with a smaller hole. Other special provisions for small children are handles for support while squatting, gently inclining paths and handrails for steep stairs to improve access to facilities. These provisions must not make cleaning more difficult and can sometimes have unexpected effects, therefore they can best be tried out first. It is best to monitor use of sanitary facilities periodically and try out and experiment with new ideas.

As many as one in five of the world's poorest are disabled, for whom access to basic services is a daily struggle. Exclusion from basic services and facilities, such as sanitation and safe water, can result in reduced opportunities, isolation, poor health and poverty. All too often special adaptations for disabled school children are not incorporated into design of sanitation and water facilities. Also, if currently no disabled children attend school, such adaptations should be included to allow for the incorporation of disabled children in the community to attend school.

The three main types of disabled children for which adaptations in facilities have to be made are:

- Blind or poor-sighted children: special grips and guiding systems as well as proper lighting for the poor-sighted children
- Children in wheelchairs or with crutches: no entrance steps, wider doors, special grips or foldable seats
- Children with missing arm(s) or paralysed arms: lids, taps and knobs that can be opened with one hand, are not heavy or can be operated with the feet.

When incorporated in the original design, the above adaptations can be made at few additional expenses, using locally available materials while making a big difference in a disabled child's life and access to education.

Address the special gender-related needs and roles.

Hygiene and sanitation needs are very gender specific. Women and girls have different physical needs and culturally determined roles than men and boys and therefore each group demands different solutions. Attention should be given to preventing harassment during toilet use by people of the opposite and same sex. Sometimes women's and girls' needs, knowledge and opinions are ignored because they are not involved in decision-making. Gender-biased division of responsibilities during design, construction, operation and maintenance should be avoided.

Gender needs and roles

Besides having different physical needs than boys and men, women and girls have different roles in society and thus different knowledge and views. When women and girls are not adequately involved in design, construction and operation and maintenance of hygiene and sanitation facilities their opinions and needs may not be identified and included. This is unacceptable; girls and boys, female and male teachers, and mothers and fathers all have to be equally represented during every decisionmaking activity concerning hygiene and sanitation facilities. The school environment functions as an example in the community, and is therefore the place where children should learn about gender roles and cooperation between women and men.

In addition to the above, it is important to realise that harassment and molestation does not only occur between the sexes. It is also something that takes place among children of the same sex. Older children tease younger children, stronger children molest weaker children, groups clash with each other, peer pressure is exerted and even violence is sometimes used. Activities during life skills based hygiene education that raise such issues, e.g. in case histories (stories) and role plays, help to raise discussions and make it easier for children to learn how they can act in such situations.

Special attention for girls

It is recommended to conduct participatory female sessions separately from the boys and men so that the girls and women can speak more freely. Important topics for girls and female teachers are:

- Location of facilities: Girls will not use facilities that are situated in an isolated location because of the risk of rape or harassment. In some cultures it is unacceptable for girls to be seen visiting facilities.
- A proper environment for menstrual hygiene has to be provided for older girls and women. The needs and requirements are culturally determined and could differ between ethnic groups or social classes within the same community.
- Dialogue on sensitive issues related to girls' hygiene should begin during design and continue into operation. In most countries talking about defecation, menstruation or reproductive health is surrounded by a big taboo. If unacceptable things happen when using hygiene and sanitation facilities, children should have access to a confidential school counsellor who could try to solve the problems together with the victim.

Urinals for boys and girls

Most visits to a school toilet are for urinating only. Therefore, the provision of urinals has a lot of advantages. Complete and costly toilets can be partially replaced by cheaper urinals. This can also reduce waiting time which makes it very attractive for children to use. When providing urinals attention has to be paid to the local context. In some cultures boys and men refuse to use 'open' urinals for privacy reasons. Although not yet common everywhere, installation of specially designed urinals for girls deserves serious consideration.

In case toilets with a pit are used, urinals can easily dispose the urine outside the pit which will extent the lifespan of the pit considerably. Instead of discharge in the pit, urine could be disposed in a so called soak pit (see point 7 for more details). In addition, if the urinal is cleaned regularly, unpleasant odours will be reduced.

Online References

Below you find a selection of online sanitation related resources in addition to the references already mentioned in the guidelines.

- IRC (International Water and Sanitation Centre) has an online selection of water and sanitation resources, including blogs; discussion lists; organisations; fact sheets, bibliographic databases; statistics; country profiles; donors and financing; image collections; water portals. You can find it on: http://www.irc.nl/page/7933
- Merlin has an online WASH forum from which you can download many relevant documents and ask questions on WASH to the forum if you are a registered user. Refer to the WaterSanitationHygiene.org website for more information.
- Akvopedia is an open water and sanitation resource, managed by Akvo.org. It provides fact sheets on appropriate technologies and approaches. They have more than 300 articles, including on sanitation. http://www.akvo.org/wiki/index.php/Main_Page
- IRC operates a "Operation & Maintenance Network". The O&M Network web site is intended for water and sanitation sector professionals and other parties with responsibility for O&M practices in developing countries. Registration (free) is required to access and contribute to the web site's toolbox containing reference tools (manuals, guidelines, checklists) and case studies. http://www.source.irc.nl/page/64020
- On IRC's website you can also find "WASH technology information packages : for UNICEF WASH programme and supply personnel". These information packages are a practical set of guidelines and selection tools for WASH programme and supply staff. http://www.source.irc.nl/page/54550
- WaterAid has "Technology Notes" on its website that provide outlines of technologies used by WaterAid on long-term development projects in Africa and Asia. It shows alternatives which might be appropriate in different circumstances. http://www.wateraid.org/uk/what_we_do/sustainable_technologies/default.asp
- Also try the podcast of the "London School of Hygiene and Tropical Medicine", which regularly posts new audio podcasts on relevant WASH and health topics. http://www.lshtm.ac.uk/newsevents/multimedia/podcasts/2012/index.html
- On YouTube you can find a very informative video on a CLTS training in Rajasthan. "The Trigger: A film in CLTS training in India" <http://www.youtube.com/watch?feature=player_embedded&v=xSGkqPiJv3s>
- Sanitation and Hygiene Promotion; Programme Guidance, WSSC and WHO, 2005, http://esa.un.org/iys/docs/san_lib_docs/Sani_Hygiene_Promo.pdf
- CLTS network site http://www.communityledtotalsanitation.org .The CLTS (Community-led Total Sanitation) website aims to be a global hub for CLTS (Community-led Total Sanitation), connecting the network of practitioners, communities, NGOs, agencies, researchers, governments, donors and others involved or interested in CLTS.
- http://www.washnet.de/ The German WASH Network website reflects the WASH related contributions and engagements of eighteen German non-governmental organisations (NGOs) involved in emergency- and transitional aid, and in international development cooperation. Together, these agencies aim to contribute towards solving one of the biggest problems of the 21st Century: Globally 900 million people have no access to clean drinking water and 2,6 billion have to live without basic sanitation. This is unacceptable.Although one of the primary aims of the network is joint advocacy and public relations it is also an effort to further professionalisation through the continuous exchange of knowledge and through improved integration of emergency- and transitional aid and development cooperation.
- http://www.susana.org/ The Sustainable Sanitation Alliance (SuSanA) is an informal network of organisations who share a common vision on sustainable sanitation. SuSanA came into existence in early 2007 and works as a coordination platform, working platform, sounding board, contributor to the policy dialogue on sustainable sanitation and as a "catalyst". At the present time, the secretariat function is carried out by GIZ (German International Cooperation). Participation is open to those who want to join and be active in the promotion of sustainable sanitation systems.
- http://www.communityledtotalsanitation.org/resource/campaigns-total-sanitation-clts-66-practical-things-do Checklist by Robert Chambers with 66 good practice examples for applying CLTS campaigns.

Abbreviations

BoQ	Bill of Quantities
CBO	Community Based Organisation
CHHRA	Cambodian Health and Human Rights Alliance
CLTS	Community Led Total Sanitation
HBT	Hygiene Behaviour Transformation
IEC	Information Education Communication
IIED	International Institute for Environment and Development
IRC	International Water and Sanitation Centre
JMP	Joint Monitoring Programme (UNICEF & WHO)
KIP	Key Informant Person
KAP	Knowledge Attitude & Practice
MDG	Millenium Development Goals
MDHP	Mechanical Desludging Handpump
MI	Malteser International
ODF	Open Defecation Free
PHAST	Participatory Hygiene and Sanitation Transformation
PLA	Participatory Learning and Action
PwD	People with Disabilities
RLF	Regional Learning Forum
SuSanA	Sustainable Sanitation Alliance
UN	United Nations
UTI	Urinary Tract Infection
WASH	Water Sanitation and Hygiene
WASH IDD	WASH Improvements, Dialogue and Deal
WHO	World Health Organisation

Glossary*

Ecological Sanitation: sanitation whose design builds on the concept of protecting ecosystems, and which treats excreta as a valuable resource to be recycled.

Enabling Environment: Policies, financial instruments, formal organisations, community organisations and partnerships which together support and promote needed changes in hygiene practices and access to technology.

Excreta: faeces and urine.

Groundwater Table: the level at which the subsoil is saturated.

Hygiene Promotion: a planned approach to preventing diarrhoeal diseases through the widespread adoption of safe hygiene practices. It begins with and is built on what local people know, do and want.

Off-site sanitation: system of sanitation where excreta are removed from the plot occupied by the dwelling and its immediate surroundings.

On-site sanitation: system of sanitation where the means of collection, storage and treatment)where this exists) are contained within the plot occupied by the dwelling and its immediate surroundings.

Pit Latrine: latrine with a pit for collection and decomposition of excreta and from which liquid infiltrates into the surrounding soil.

Pour-flush Latrine: latrine that depends for its operation of small quantities of water, poured from a container by hand, to flush away faeces from the point of defecation.

Sanitation: interventions (usually construction of facilities asuch as latrines) that improve the management of excreta.

Septic Tank: a tank or container, normally with one inlet and one outlet. that retains sewage and reduces its strength by settlement and anaerobic digestion.

Ventilated Improved Pit Latrine: pit latrine with a screened vent pipe and darkened interior to the super structure which is designed to keep flies out and minimise smell.

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* Sanitation and Hygiene Promotion, Programming Guidance, WHO and WSSCC, 2005

The following statements were made at the launch of 'Sustainable Sanitation: Five-Year Drive to 2015' in June 2011.

> People living in hygienic conditions are better preapared to fight off harder diseases. In addition, adequate school sanitation facilities have been shown to encourage school attendance by adolescent girls, contributing to their empowerment and equality. In short, improved sanitaiton can contribute to all our development goals.
>
> **-Secretary General Ban Ki-moon**

> Many communities not only have inadequate access to sanitation. They have no access. So we can make the greatest global progress by focusing our efforts more on reaching these communities. It's common sense.
>
> **-UNICEF Executive Director Anthony Lake**

Malteser International is member of the German WASH Network, which was established in June 2011, and actively participates in activities undertaken by this network.

MI is member of the Household Water Treatment and Safe Storage (HWTS) and sustainable sanitation SuSanA Networks