

A5 - Latrines. General points. How to choose them

12 March 2012



1) What is involved ?

These are **toilet facilities most often operated without running water** (dry toilets), designed to collect human excreta (faeces and urine) and prevent pollution of the soil and ground water and the spreading of serious diseases.

2.6 billion people worldwide currently do not even have proper means of sanitation, **1.2 billion have to defecate in the open air**, with all the significant risks of disease involved and **1.8 million deaths are caused each year** through lack of hygiene and proper sanitation.

2) Who chiefly use this means and since when ?

Although they have been used for quite a long time (it should be remembered, however, that the largest royal residences did not have them even in the 18th century), latrines are not, however, always available in a large number of areas since **some 1.2 billion people still defecate in the open air**, not only through lack of facilities but also due to the fact that they have not been made aware of the associated hygiene and health problems ;

This latter point is particularly important, since experience has shown that merely subsidising latrines, as has been done for a long time, has not had tangible results because major programmes have not been implemented beforehand to convince people of their need and get village communities to accept and support their use. Specific **CLTS** (Community-Led Total Sanitation) programmes, the first of which was in Bangladesh in 1999, have thus emerged since the 2000s.

A whole range of products, from simple, easy to dig, inexpensive pits, to ecological Ecosan latrines and even modern flushing toilets, **are currently available and mean that it is not always easy to make the right choice, which is what this fact sheet sets out to do.**

Most latrines provided in developing countries are **dry latrines** because of their low cost and the **lack of any significant source of water** in many regions where the daily consumption of water is sometimes not even **20 litres/day/person**, and considering that just flushing a toilet once already uses about ten litres of water.

3) Why ?

Because, apart from their convenience and providing a way of preserving personal dignity, latrines help prevent contamination of soils and ground water and the formation of breeding grounds for infection by attracting flies or mosquitoes which then spread serious diseases.

While excreta begin to decompose as soon as deposited, they nevertheless take quite a long time to fully decompose and thereby become odourless and harmless

However, **just a single gram of human faeces can contain up to 10 million viruses, a million bacteria and a thousand parasites...**

Good hygiene is essential everywhere. Indeed, the London School of Hygiene made an astonishing revelation in October 2011 : 1 cell phone in 6 in the United Kingdom has traces of fecal matter on it !

(*Drawing and drawings below provided by WEDC, University of Loughborough, UK*)

Let's not forget that **a person spends on average three years of their life in a toilet or a WC**



4) Who is primarily concerned ?

First and foremost, and quite obviously, the huge number of people who do not yet have them or who only use archaic means, as well as all those who would like to have a more comfortable, safe or effective model.

5) What are the main components and characteristics of a latrine ?

Before even considering whether they are a good technical choice or not, **latrines must be well suited to the** desires, habits, behaviours and financial possibilities of their users. If not, they are likely to be quickly abandoned or misused. Their implementation must thus be preceded by information and hygiene and health awareness raising campaigns (*see fact sheets C1 to C4*).

The various types of models, which are briefly described in this fact sheet and more specifically described in the **following fact sheets A6 A13**, are essentially differentiated by their operating mode (with or without water), their construction type (1 or 2 pits, below or above the ground), their superstructure (temporary or permanent), their ventilation system (with or without), whether they use by-products or not (ecological latrines or otherwise), their durability and their cost.

The main components common to all dry latrines are as follows, which all have the following characteristics with the minor exceptions specified in the fact sheets specific to each type :

a) Pit

Can be circular, square or rectangular. The shallowest pits are generally square or rectangular whereas pits more than 2 metres deep (which are found in the highest numbers and which are the preferred solution, preferably being dug to a depth of at least 3 m) are generally circular. Their diameter (or width)

is usually between 1 m and 1.50 m to facilitate terracing.

A waterproof lining should be provided if the ground is unstable or permeable and likely to contaminate ground water within 30 m.

Size

Its volume **V in m³** can be calculated by the following formula : **$V = T_a \times C_u \times N \times D : 1000$**

where T_a is the accumulation rate, or normal volume, of excrement sludge, which is often, unless more accurate local information is available, between 40 and 50 litres/user/year, where C_u , is the use factor for one year which is generally considered to be equal to 0.4 (e.g. for a school latrine) and 1 (for a latrine in a dwelling), where N is the number of users and D is the latrine's anticipated service life in years. A pit volume of 30 cm should be added to take account of the fact that the pit should not be filled to the brim.

b) Slab



Is **fairly simple to make** (concrete, reinforced moulded plastic, sturdy planks or logs, or if not, other materials such as bamboo covered with gravel, old frames, etc.) and **to install**.

It should preferably be located between 10 and 15 cm above ground level so that surface water does not run into the pit (if not, a drainage channel for water runoff should be dug around the latrine)

Make sure that the edges of the slab overlap the soil surface slightly (for example, by about ten cm for a pit one metre in diameter) to ensure proper support.



c) Superstructure - stall

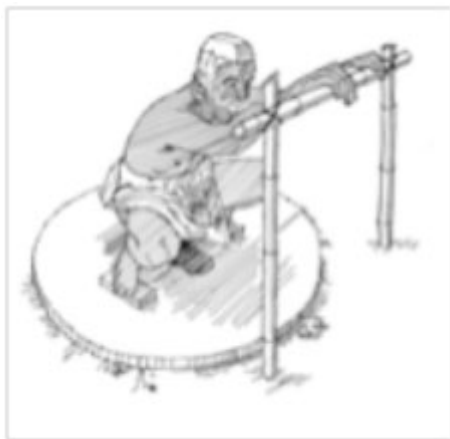
It is important because it is what makes the toilet more discreet, comfortable and pleasant to use. **The choice and cost** of the model and its materials (bricks, concrete blocks, planks, poles and fabrics, bamboo etc.) **will depend on the desires, habits region and income** of users.

The door can be made of wood, corrugated iron or even strips of bamboo or local plants that can be attached to old wooden boards or frames, or even with simple curtains.

The door must open outwards for safety reasons and to provide more room.

The roof must be sealed. Is **often made of fibre cement, metal sheet** (although often at a high price

and with a risk of heat) or **local materials**, which often also look better (stubble, leaves, reeds, bamboos, etc.) provided they are covered with a waterproof material or a plastic sheet.



The interior layout can be improved by **providing a seat** above the hole in the slab, a wooden support bar, or **a seat** which may be **removable for disabled or elderly people**, and a small bucket of sawdust, leaves or water for anal cleaning.



If the pit is not very deep and is not planned to be used for long and is movable, it is better to build a fairly simple stall

d) Ventilation

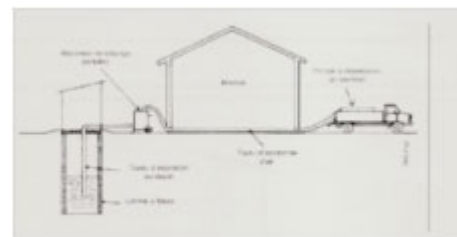
To allow air to enter the latrine and avoid excessive odours, **openings should be made** above the door and at the bottom of a wall. The flow of air will be more effective if the door is facing the prevailing wind. The most effective system to prevent odours is, however, the so-called **VIP (Ventilated Improved Pit) latrine** : *See fact sheet A8 "Ventilated improved pit latrines"*

e) Service life

If well built and well maintained, a latrine will usual provide a service life of from **15 to 20 years**, or even longer.

If the latrine is of the single-pit type with a service life, given the type of land, of less than 10 years, it is preferable to build a twin-pit latrine used alternately every 2 years. *See fact sheet A7 "Variants of single-pit latrines"*

f) Emptying the pit



Emptying can pose significant risks if not done carefully.

In a rural or mountain area, it is often possible and cheaper to close the pit, cover the ground before it is full and not touch it again for one to two years, to allow time for any health issues to be eliminated, and to dig a second pit and then, several years later, a third pit or return to the first pit which can then be safely emptied and even used as fertilizer. Lightweight, removable superstructures should then be provided.

In a town, where land is scarcer, the pit should be periodically emptied as the faeces in it contain a very large number of pathogens and the cost of the pit and its superstructure is generally higher. **Manual removal should be avoided**. When streets are not too narrow and the cost is affordable, a pit is best emptied with a vacuum tanker truck or if not, connect the tanker truck by a vacuum pipe to a portable tank brought close to the latrine. In **many slums, however**, the manual means most often used (carts,

rickshaws, etc.) are much more basic.

6) What are the main types of latrines ? Cost ? Main advantages and drawbacks ?

a) Dry, underground pit latrines

1) Single-pit latrines (see the corresponding detailed fact sheet : A 6)



Particularity : The simplest and most common latrine

Main advantages (over with other types)

Easy to build and maintain, and inexpensive.

Main drawbacks (compared with other types)

Fills up faster, risk of odours.

Cost (order of magnitude as varies according to country, materials and labour costs) : Construction : €60 to 90 Maintenance : €5 to 10/year

2) Twin-pit latrines (see fact sheet A7)



Particularity : Allows the alternating use of two pits

Main advantages (over other types)

Requires less digging when the ground is hard and avoids having to re-dig a pit when the 1st one is full.

Fairly inexpensive.

Main drawbacks (compared with other types)

Takes somewhat longer to make and involves some risk of odours.

Cost (order of magnitude as varies according to country, materials and labour costs) :

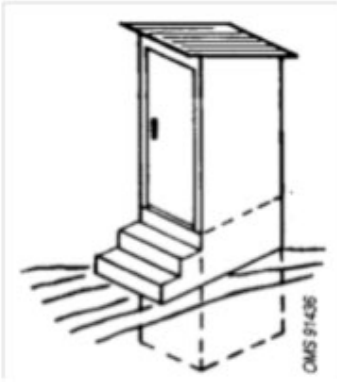
Construction : €100 to 160. Maintenance : €5 to 10/year

3) The variants of these first two types of latrines (see fact sheet A7)

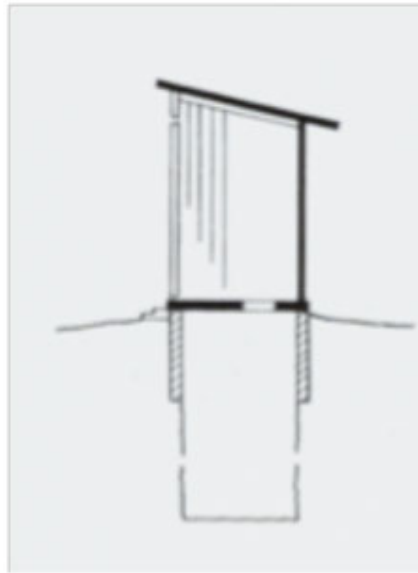
Elevated latrines

Bored latrines

Suspended latrines



For hard ground - Diagram by OMS



Boring if ground very hard



Marshy or floodable land - Charcoal drawing by WEDC

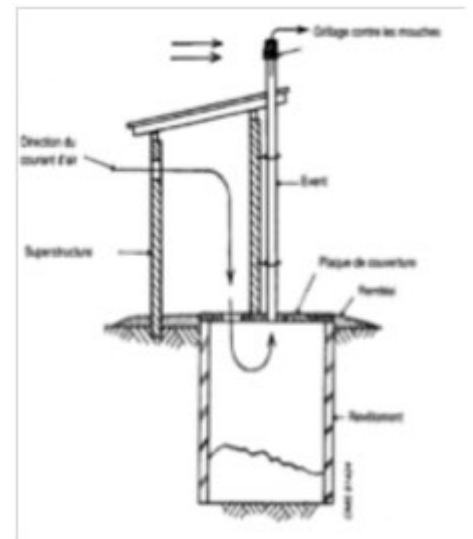
4) VIP (ventilated improved) latrines (see fact sheet A8)



Particularity : Self-ventilation

Main advantage (over other types)

Odours removed or substantially reduced



Main drawbacks (compared with other types)

Not easy to build without the help of an experienced person. Effectiveness dependent on the direction is pointing in relative to the prevailing wind.

Cost (order of magnitude as varies according to country, materials and labour costs) : Construction : €130 to 240 for a single pit and €180 to 350 for a twin pit. Maintenance : €5 to 10/year

b) Ecological type dry latrines with pits above the ground

1) Ecological composting latrines (see fact sheet A9)



Particularity : Pits replaced by compartments above the ground and used to make compost used as fertilizer.

Main advantages (over other types)

Ecological process allowing some of the investment to be offset by the sale of compost and saving on fertilizer. Waste recycled rather than being discharged

Main drawbacks (compared with other types)

Such latrines need more care than a conventional toilet and specific motivation of the population (risk of rejection or taboo). As they are raised, they are less accessible to the elderly and disabled.

Cost (order of magnitude as varies according to country, materials and labour costs)

Construction : €130 to 250 for one compartment and €190 to 350 for 2 compartments. Maintenance : €5 to 15/year

2) ECOSAN composting latrines with urine separation (see fact sheet A10)

Particularity : Separate collection of faeces and urine

Main advantage (over other types)

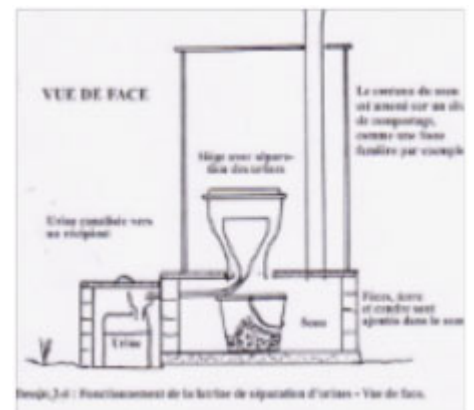
More ecological, odour-free latrine allowing the reuse of excreta.

Main drawbacks (compared with other types)

Also involves a risk of rejection (taboos) by populations. More handling involved.

Cost (order of magnitude as varies according to country, materials and labour costs)

Construction : €200 to 400 depending on the model and number of compartments. Maintenance : €10 to 15/year



c) Flush- and siphon-type latrines or toilets (see detailed fact sheet A12)



Particularity : Requires manual (bucket) or mechanical flushing (water flush)

Main advantages (over other types)

Better comfort. Odours almost completely eliminated. Investment cost moderate

Main disadvantage (compared with other types)

Requires lots of water and regular emptying or sewer connection.

Cost (order of magnitude as varies according to country, materials and labour costs)

Construction : €120 to 250. Maintenance : €10 to 15/year

d) School or community washroom units or latrines (see fact sheet A13)

Particularity : Public equipment (schools, towns, villages, etc.)

Main advantage (over other types)

Provides public hygiene and allows girls to continue education in schools.

Main disadvantage (compared with other types)

Relatively higher cost and requires more work to keep clean

Cost (order of magnitude as varies according to country, materials and labour costs) varies according to the size and type of latrine and unit, but is often at least €2500 to 3000.



7) What type of latrine should be selected ?



Lao latrine in Xieng Ngeun

This choice **will depend on the latrine's type of use** - personal, family, school or community - the anticipated number of users, **the available means and resources, the soil characteristics** and sometimes **local customs**.

It is best to choose a type of **latrine that is pleasant to use, durable or movable, easy to build, maintain and reproduce, as odour free as possible**, does not allow the entry of flies, mosquitoes or rats, or contaminate nearby **ground water** and, if conditions are favourable, of an ecological type (making of compost and fertilizer, or even biogas, for overall cost-effectiveness while protecting the environment).

Also keep in mind the **elderly or disabled** by avoiding, if possible, the choice of a raised latrine or adapting it appropriately, and more generally, **women and children** by making certain specific adjustments.

Do not forget to provide **simple washing facilities, either inside or outside**.

Note on their cost : The cost of latrines **is often high compared to the standard of living of many people**, which makes it more difficult to build them on a widespread scale without outside help or through the use of local materials and labour provided by those directly concerned with the advice of specialists. It should be recalled that according to UN figures, **more than 1.5 billion people worldwide have an income of less than one euro/day...**

8) Where to obtain further information ?

a) Websites

- **EAWAG** (Swiss research institute located near Zurich) : "**Compendium of sanitation systems and technologies**", very comprehensive, illustrated and informative 158-page book, pages 16 to 22 and 35 to

65 of which are devoted to the main types of latrines.
http://www.eawag.ch/forschung/sandec/publikationen/compendium_e/version_francaise
 - **AKVO, a dynamic Dutch NGO**, has posted on its website a very well documented and illustrated Wiki containing about fifty very concise fact sheets, in **French and English**, on about fifty **topics related to sanitation**, including **latrines**. Downloadable from : [http://www.akvo.org/wiki/index.php/...](http://www.akvo.org/wiki/index.php/)
 - **PSEau** : Online publication of the 117-page book by **CREPA** (Peter Morgan) : "**Composting latrines**", which is an **excellent, illustrated and handy book** on composting latrines and other types of latrines. [http://www.pseau.org/outils/biblio/...](http://www.pseau.org/outils/biblio/)
 - **Global Water Initiative** (West Africa) has published a 25-page, amply illustrated and easy to understand and use "**Practical guide for the construction of single-pit latrines**". <http://www.crsprogramquality.org/st...>
 - **OIE (Office international de l'eau)**_ RéFEA network_ Practical fact sheets on various types of latrines and their components and how they are made : <http://www.oieau.fr/ReFEA/module3b...>
 - **WEDC** (Water Engineering and Development Center, University of Loughborough - UK) has recently published an interesting and illustrated guide highlighting the design, manufacture and maintenance of various types of latrines. Downloadable from : http://wedc.lboro.ac.uk/resources/booklets/BK005_LTS_A4_Pages.pdf

b) VIDEOS

- **Encyclopedia** : 7' video entitled "**Double vault latrine construction**" without any voice commentary but providing a very good illustration of how to make, here in Asia, a twin-pit latrine. Available, on line at : <http://www.encyclopedia.com/video/p...>
 - **YouTube** Short 3' video entitled "**Construction of a latrine in the DRC**" showing how to build a single-pit latrine and its superstructure with simple local materials. Downloadable by clicking on : <http://www.youtube.com/watch?v=ZneX...>
 - **YouTube** : 10' video shot in Niger entitled "**Building latrines**" during a demonstration of the building of an ecological latrine in eight villages, available online at : <http://www.ecosanres.org/aguie/film...>
 - **YouTube** : interesting animated video lasting 3' produced by UNICEF and entitled "**Constructing an ECOSAN toilet**" <http://www.youtube.com/watch?v=YV-1...>

- Emplacement : Accueil > en > Wikiwater > Technical sheet > Sanitation and preservation > Collecting effluents >
- Adresse de cet article : <https://wikiwater.fr/a5-latrines-general-points-how-to>