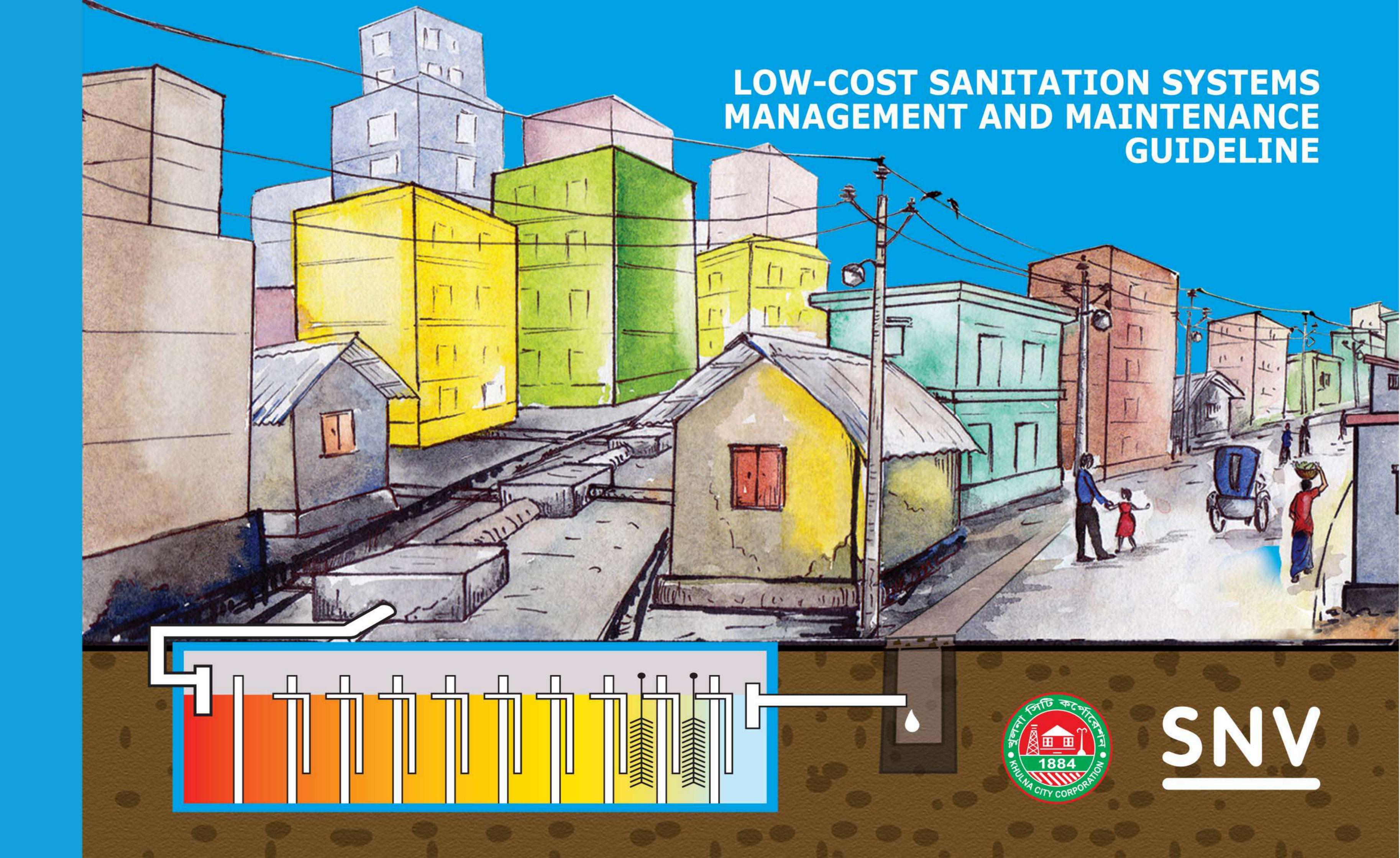
LOW-COST SANITATION SYSTEMS MANAGEMENT AND MAINTENANCE GUIDELINE

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Introduction

A safe and clean environment is essential for every human being to live healthy. Improved sanitation is an integral part of a clean environment. Sanitation refers to the management and drainage of people and animals discharge in a healthy way, the use of safe water, the care and maintenance of the surrounding environment.

In the UN's Sustainable Development Goal 6.2, importance is given to ensure accessibility and access of safe sanitation systems to everyone by 2030.

Safe management of sanitation emphasizes not only having one toilet in each house but also ensuring proper management of human waste. If it can be confirmed, then the rate of risk creation on human health or the surrounding environment will be reduced.

Healthy sanitation is recognized as a basic human right in most developing countries of the world. Because improved sanitation system not only ensures the development of the overall public health system, it also directly impacts poverty alleviation. Implementation of sanitation system for all is not possible for the government alone. The active and effective participation of civil society and community-based organizations can lead us to this success. Therefore, the activities that are

most important for the development of the sanitation system are to bring about a change in people's bad habits and behavior by creating public awareness.

Baseline survey done under (KCC) FSM project in 2015 shows that the total sanitation situation of ward 10, 11, 12 is worse.

In the continuation of this, collaboration with SNV Khulna City Corporation is playing a role in piloting projects and management of three different technologies in three different location To manage the human waste the city corporation is using some low cost sanitation technologies at the ward no. 10. Local people, elected public representatives and other development partners are also working side by side with the city corporation.

Khulna City Corporation (KCC) feels that having a specific guideline for the management and maintenance of piloted technology or projects is essential to bring about the sustainability of piloted technologies or projects. To this end, KCC along with local people, elected public representatives and other development partners have taken initiatives to create a guideline. This guideline will be helpful in the management and maintenance of piloted technologies or projects by local people, elected public representatives and other development partners.

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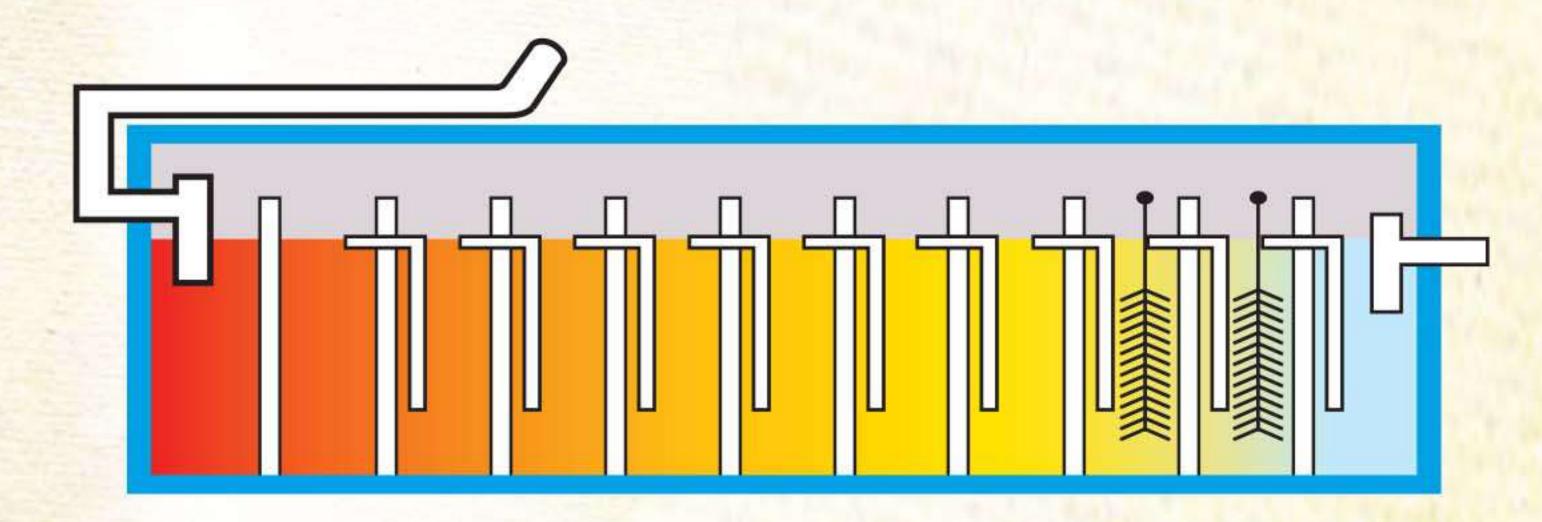
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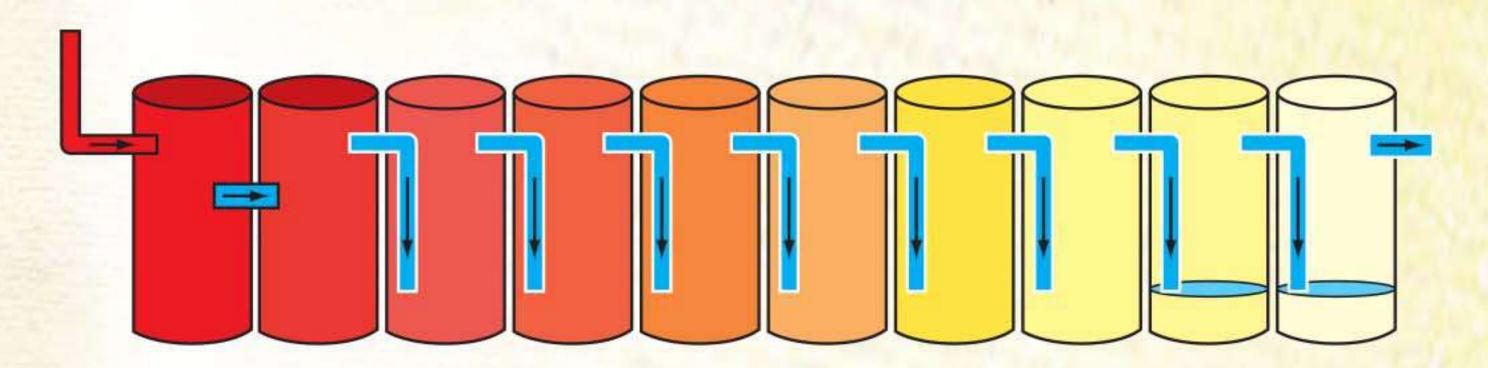
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Conventional / more popular or used technology (Figure- 01)



Modular technology (Figure- 02)

Two technologies have been used in the Sanitation System Improvement Project, constructed in ward no. 10 of Khulna City Corporation. One is the convectional technology where the RCC chamber is used as a septic tank and baffle reactor (Figure- 01) and the other is the modular technology where ring slab is used as a septic tank and baffle reactor (Figure 02). Although the structural aspects of these technologies are different, they have the same functionality.

For the future sustainability of this technology, it is important to know the method of conducting and maintaining the piloted technology as well as to identify the various parts of the technology and how they work. For that purpose, the identification and maintenance of various parts of the technology are discussed in detail below.

The operation and maintenance of low cost sanitation systems is divided into two parts:

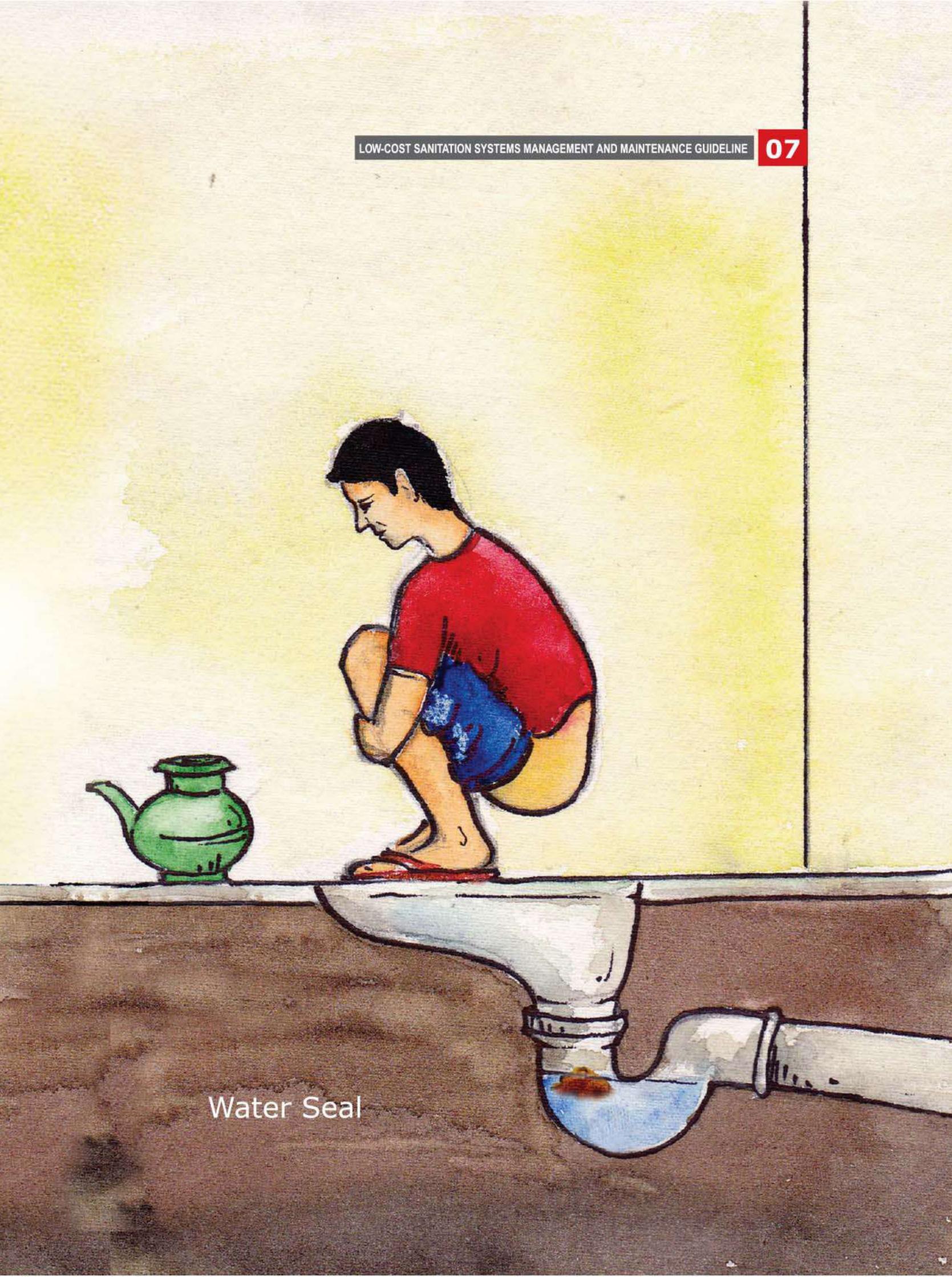
- 1. The first section includes toilets, inspection chambers and pipeline networks; and
- 2. The second part includes septic tanks or settlers, baffle reactors and anaerobic baffle reactors.

THE FIRST PART

FIRST PART

Toilet

Toilet Maintenance Inspection Chamber Inspection Chamber Maintenance Pipe Network Pipe Network Maintenance



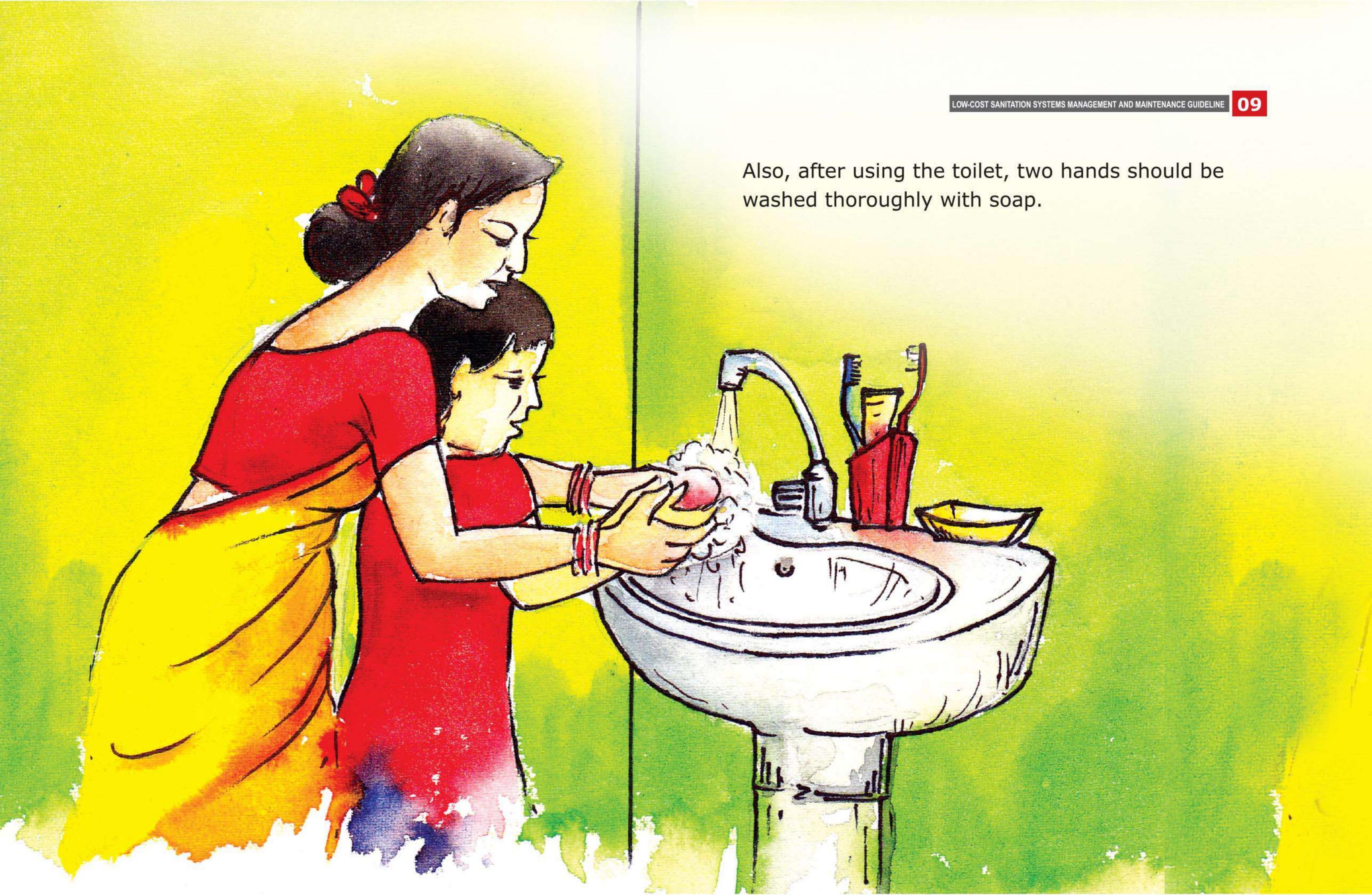
THE FIRST PART

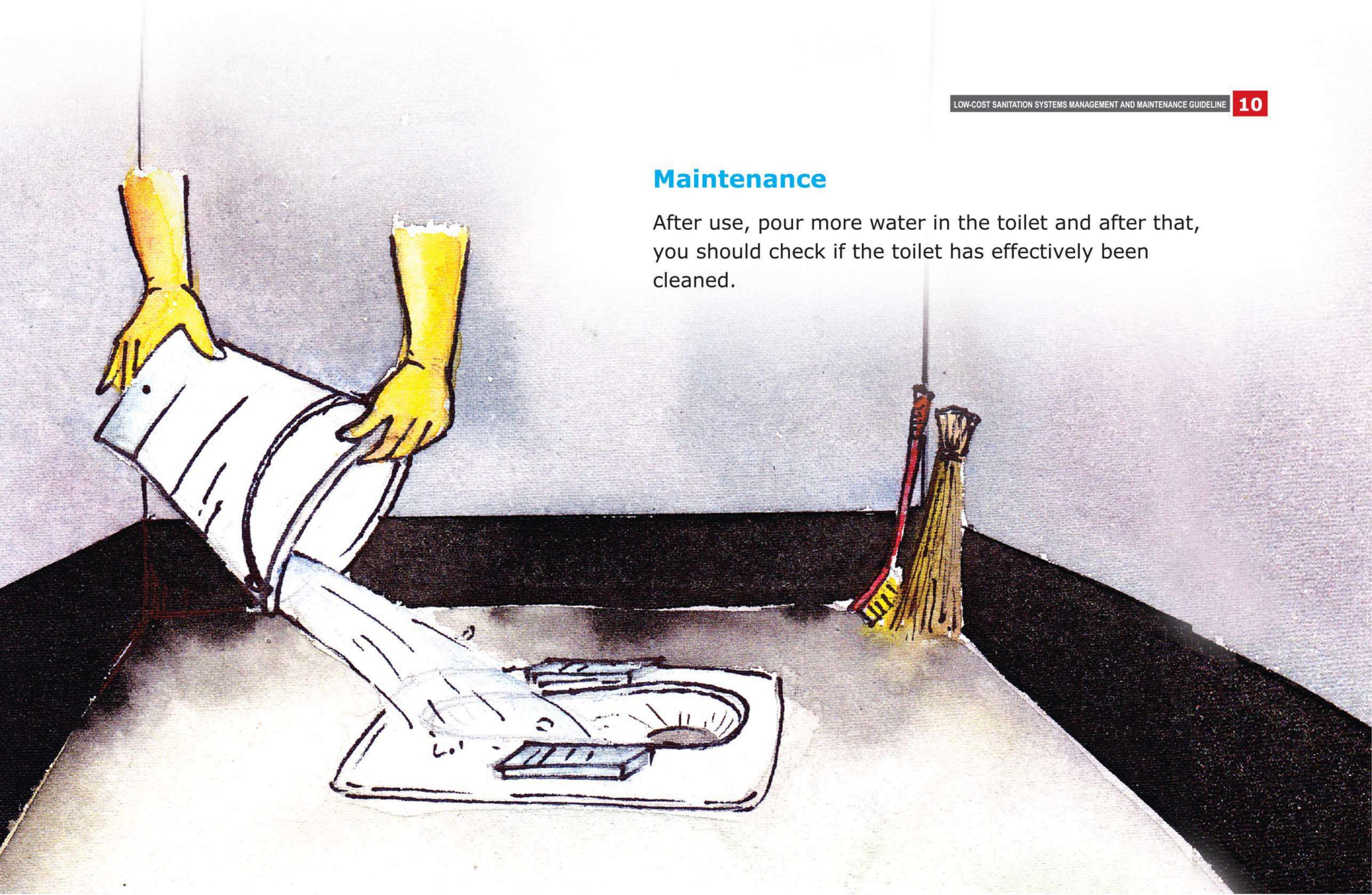
Toilet

A specific place where there is a pan or a commode for excretory excretion. These pans or commodities are attached to septic tanks, pit or sewerage lines so that the sewage can be stored in a safe place without polluting the environment.

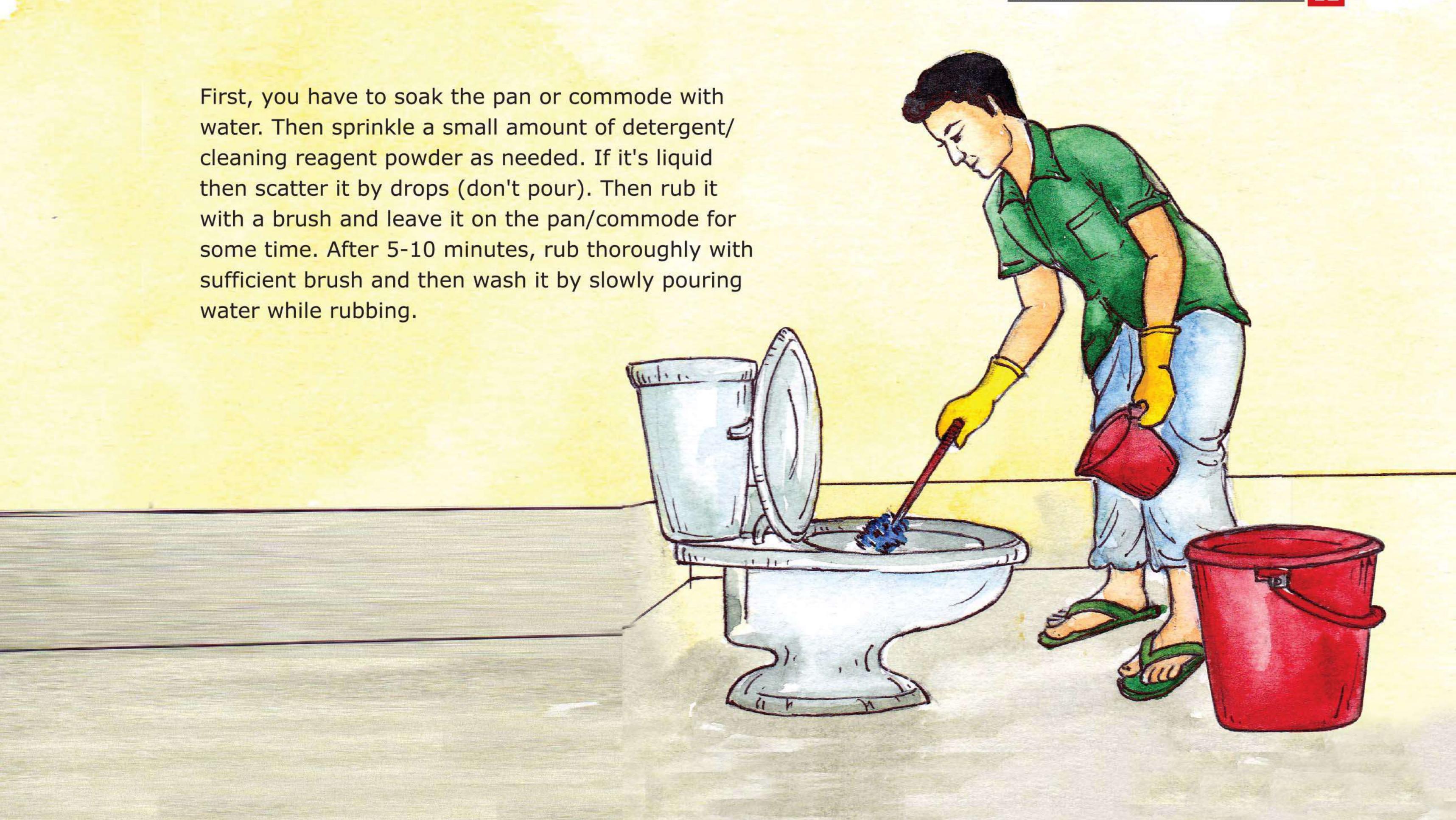


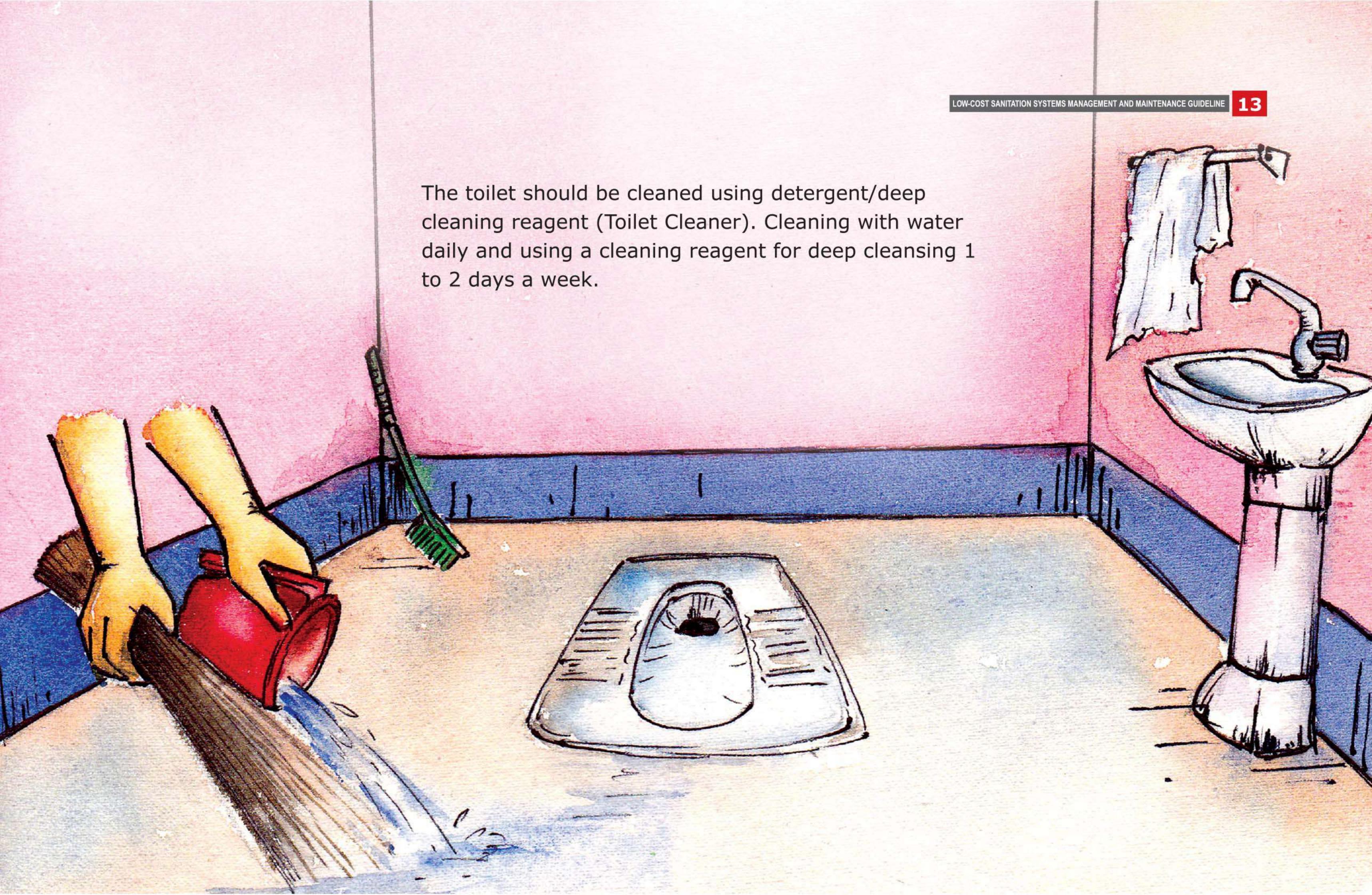
An ideal toilet should have adequate lighting and air entering system. As well as there should be water, soap and separate sandals for using in the toilet.













In addition to the cleanliness, have to be aware that no unwanted material is left in the toilet pan or the commode, as it can result in the closing of latrine pipes or pits jam at any time, thereby disrupting the entire household waste disposal system. Intentionally disposing menstrual cloth/condoms or children's pants /handkerchiefs/hats/underpants/bras/blouse/soaps/ watches/mobile phones left in the pan/commode by mistake, while pouring hot or cold water in a bucket, can make the toilet unusable.



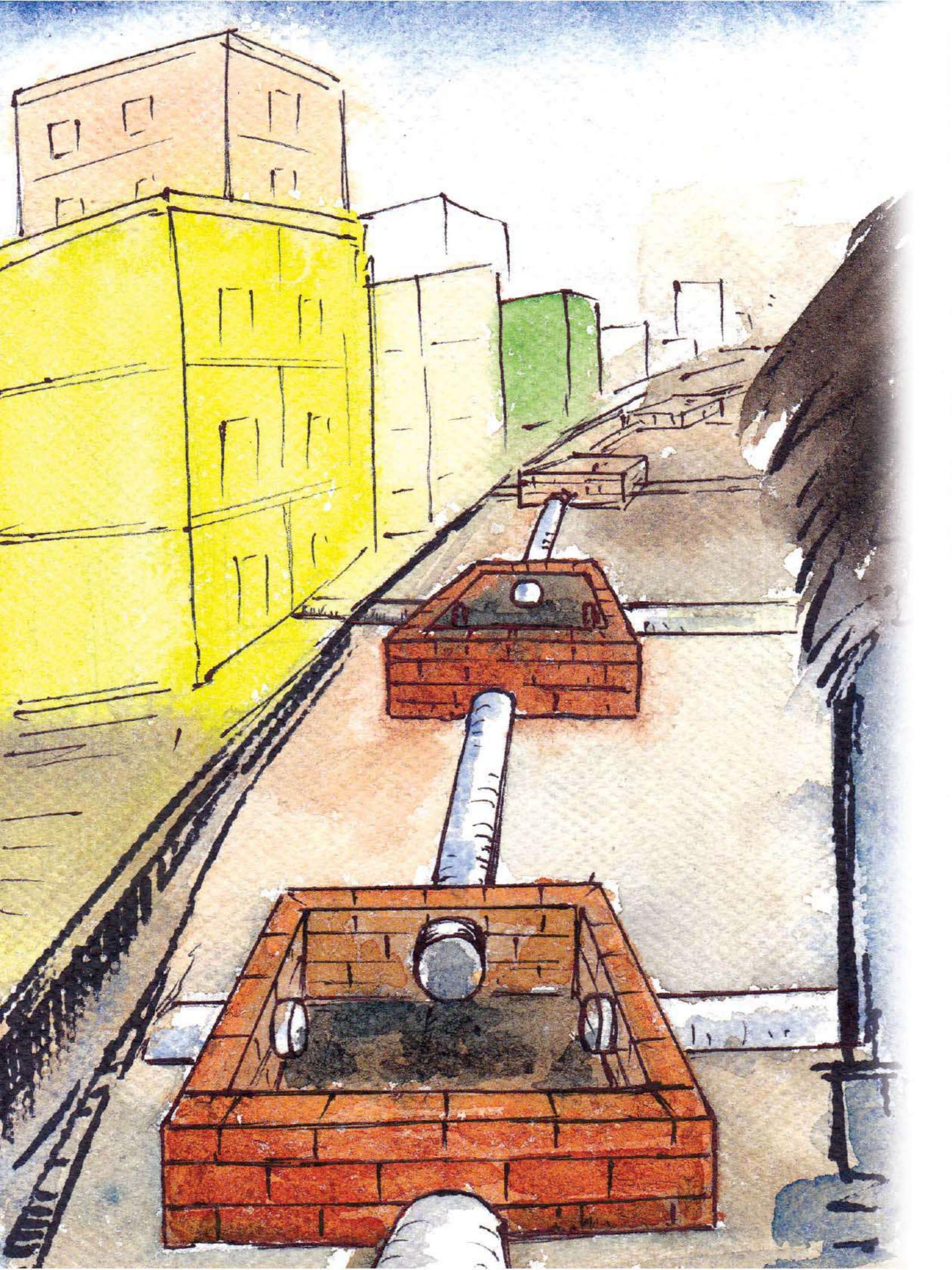


If there is anything unwanted in the pan or commode:

it is necessary to remove it from the pan or commode by cleaning it with human waste cleaners or by hand wearing polythene or rubber hand grips. Otherwise, after soaking or shallowing water they swell and jam/block the pipe. Also, hand gloves should be used when cleaning the toilet. As well as for other household chores during the winter, to protect hands.

Who will do: Users, house owners or their designated representative.

When to do: In case of toilet cleaning, if the number of users in the toilet is high, then every day. But two to three times a week when the user is low.

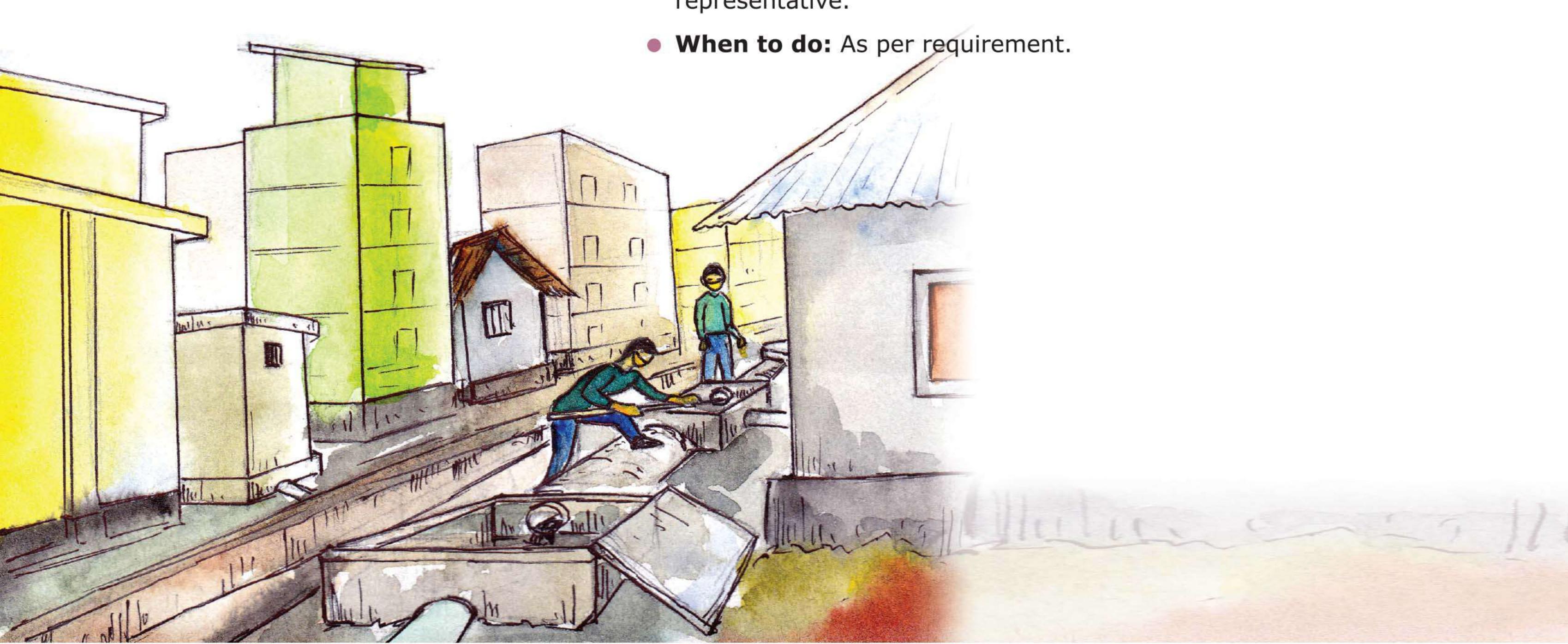


Inspection Chamber

This is an observation chamber. This is used on the vertical and horizontal pipes connecting the ground to the bottom, horizontal pipe joints or pipes at greater distances. Particularly toilet stools and in some cases household waste water flows into the septic tank through the pipeline into this chamber. Often waste water is mixed with ash, sand, soil, etc., which accumulates in the inspection chamber. At the same time, unwanted things first deposited in the chamber that is thrown away intentionally or carelessly. If not cleaned regularly, the observation chamber and pipe can be blocked.

Maintenance

- The chamber should be regularly monitored and cleaned so that there is no obstruction of water or sewage flow throughout the monitoring chamber
- Who will do: Management Committee or their designated representative.



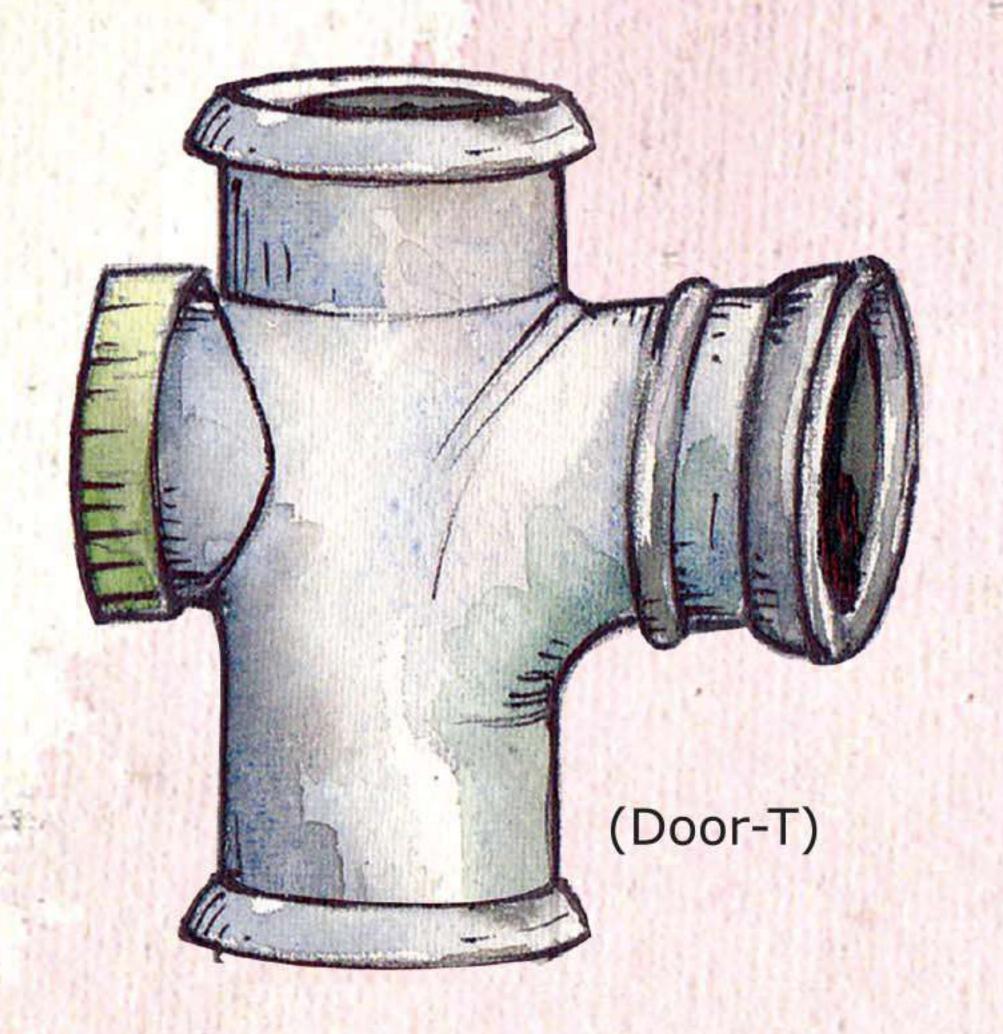


Pipe Network

Pipe networks are an important part of this process or system because the waste of homes from different distances come to the toilet through the pipe network to the septic tank. If an inspection chamber obstructs the flow of water and water flows from its previous or next chamber, then water or sewage flow may be obstructed due to any unwanted dirt being stuck in the pipeline between these two chambers.

Maintenance

If dirt is stuck in a pipe at a certain part and create obstruction of the flow of water and sewage, then it should be cleaned by a smooth bamboo or pipe from the inspection chamber on either side.



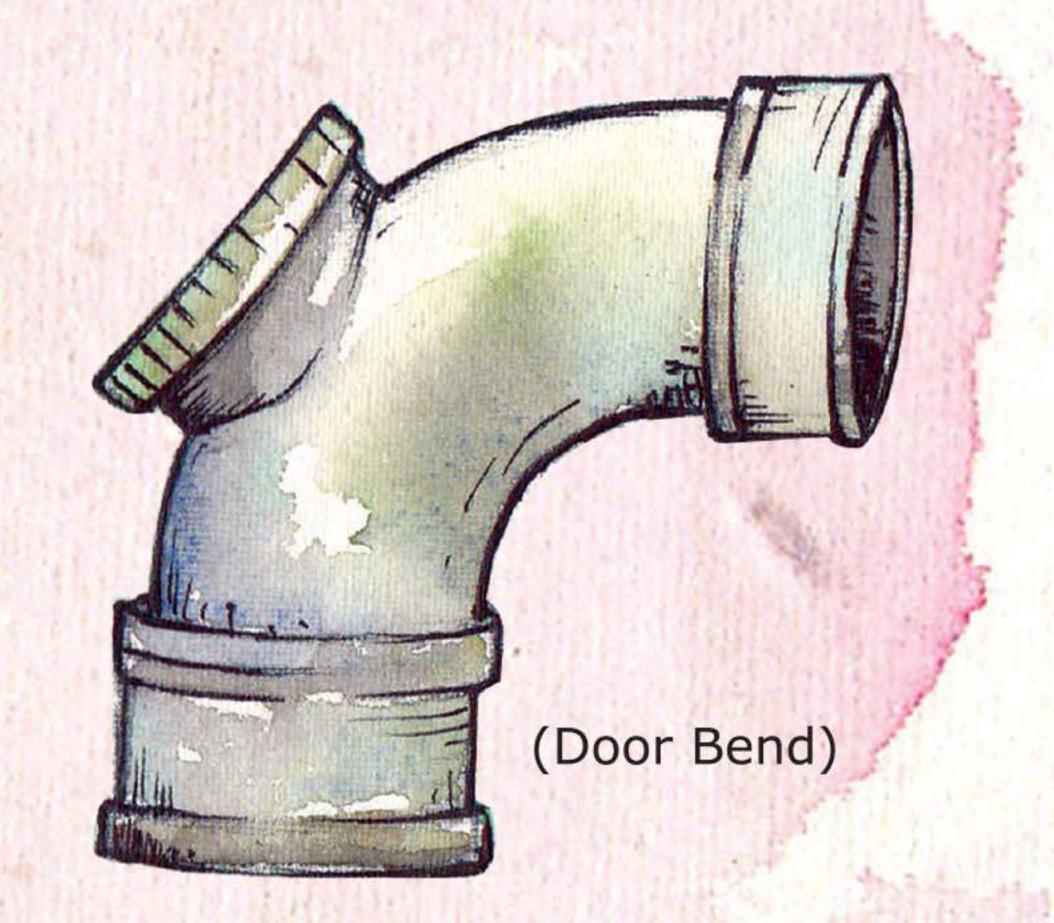
If the pipe is jammed for any unknown reasons and you don't get anything after inspecting the pan, first you need to punch through the pumping bush/pad. After opening the door of the long trap, jute/cloth should be tightened at the nozzle of a raw bamboo piece and tested on both sides and it should be cleaned up to pit. If necessary, the problem should be resolved by opening the pit slab and examining it up to the other pit.

Also, there is a door bend or door-t at the bend and connection point of each pipe. The door of door bend or door-t of should be opened and cleaned if necessary.

If a pipe breaks or burst, it needs to be repaired immediately.

Who will do: Management Committee or their designated representative.

When to do: As per requirement.



THE SECOND PART

SECOND PART

Decentralized Waste Water Treatment Plant System (DEWATS)

Settler or septic tank

Settler or septic tank Maintenance

Information needed to remove a sludge through a vacutug

Baffle reactor

Baffle reactor Maintenance

Anaerobic Filter

Anaerobic Filter Maintenance

Water test

THE SECOND PART

Decentralized Waste Water Treatment Plant System (DEWATS)

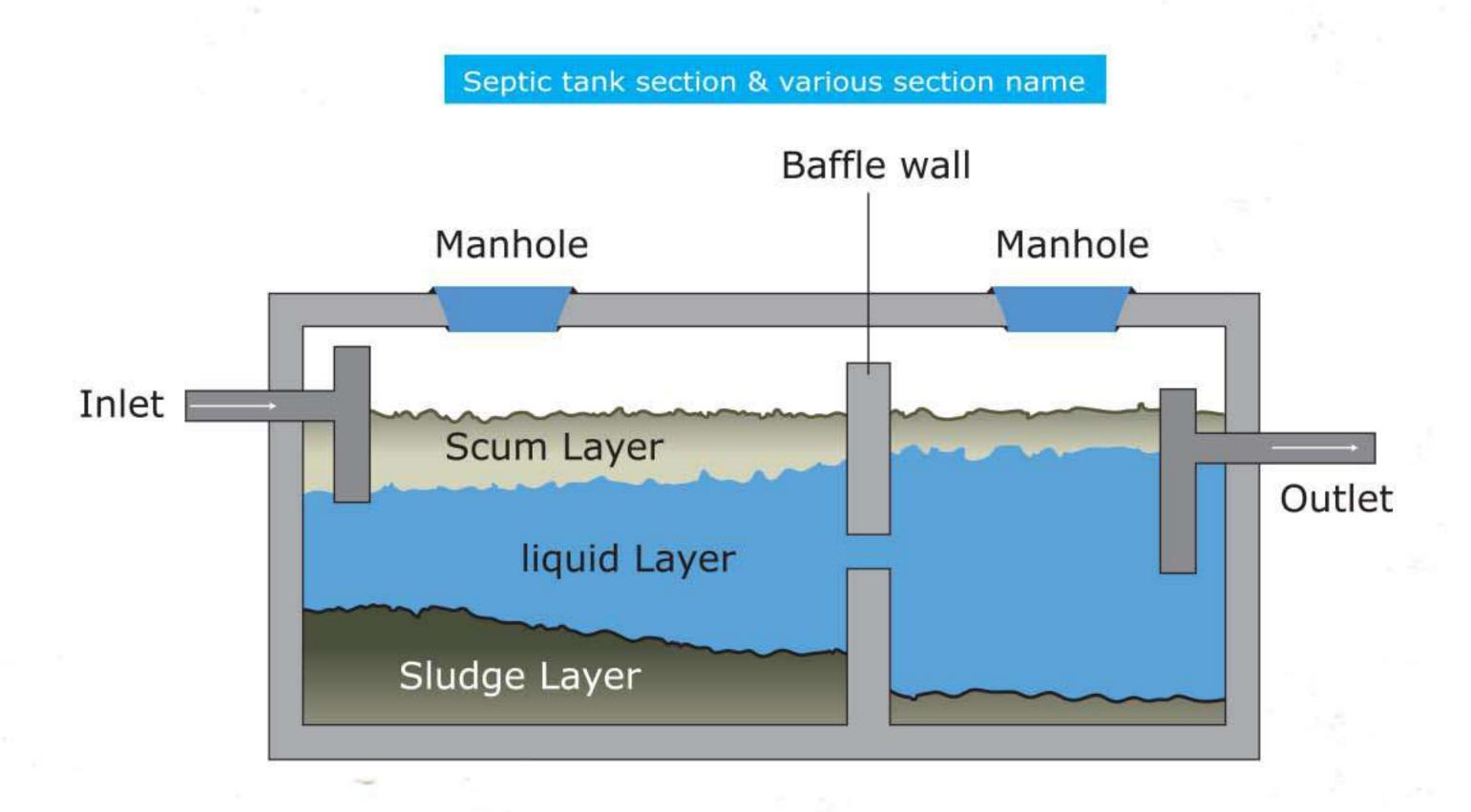
DEWATS is an on-site treatment plant. That is, wherever liquid waste is produced, this water is purified. This is a completely natural approach. It does not require any energy or fuel to operate. In the plant the natural process continues to purify waste water. Regular monitoring needs to be done to ensure that the plant is managed well, which can be determined by the management committee itself or their nominees. The committee or their appointed person will regularly manage or maintain the work.

Maintenance of a treatment plant is usually done in 3 (three) parts.

They are

- 1. Settler or septic tank
- 2. Baffle reactor
- 3. Anaerobic filter

It is important to know the functions of the major body parts of DEWATS. Because there will be no effective result when maintenance is incorrect. Proper operation of the plant can bring effective results. For this, the short-term and long-term maintenance of the plant is necessary. Its detail process is given below:



1. Settler or septic tank

Settler or septic tank is the part where human waste is stored. Septic tanks combine two types of waste due to use. One is the solid part and the other is the liquid. The liquid part is separated from the solid part and the liquid part is released as a wastewater from a settler or septic tank. Depending on the temperature, septic tanks should be cleaned once a year in our country. After cleaning the septic tank should be filled with water before reuse. If the septic tank is not cleaned, the sludge on the bottom will be tightened and the capacity of the tank will be reduced. It basically acts as a primary treatment plant.



Maintenance

Care must be taken not to allow any air or water from the outside to enter in the settler or septic tank to run it effectively.

The sludge produced from it needs to be cleaned regularly.

Care must be taken to ensure that it is environmentally agreeable while removing the contents. For this, it is necessary to remove the sludge by the Vacutag.

Who will do: Management Committee or their designated representative.

When to do: Once in every year.

What is vacutag & and its Importance

The Vacutag is a small vacuum tanker with an engine that also powers the vehicle.

Sludge is transported to a neighbourhood collection / disposal point from where vacuum tankers transfer it to city treatment plants.

Environment Friendly

To de-sludge the faecal sludge of the vacutug collected from a pit or septic tank takes few minutes without spreading smell & making nuisance to other.

Require information for sludge emptying by using vacutag

Vacutag service in Khulna

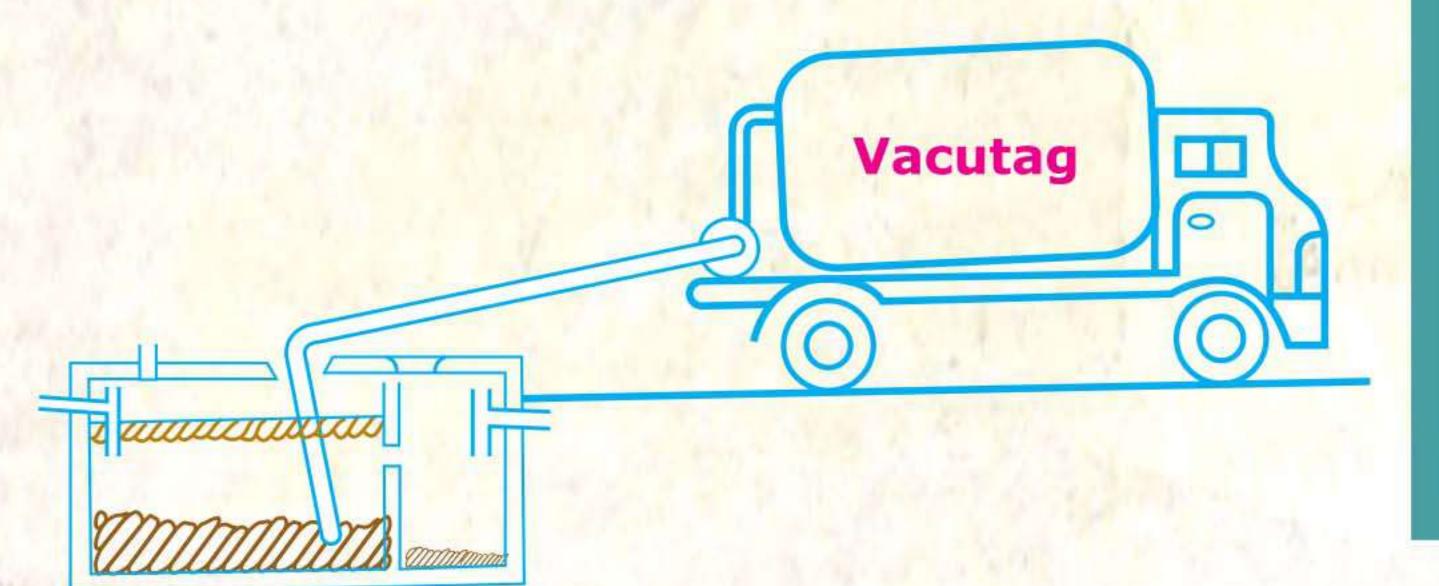
There are 7 small and large vacutag is under operation in Khulna city

7000 Liter -1piece

5000 Liter -1piece

2000 Liter -2pieces

1000 Liter -3pieces



For vacutug service

To avail vacutag service of KCC & CDC, please dial the following hotline numbers;



01701-688653

01701-688654 01701-688655

2. Baffle reactor

The position of the Baffle reactor is just after the settler. It consists of a series of continuous chambers and water flows upstream through it. The water that comes out of the settler has some sludge mixed in it. These chambers reduce the levels of BOD and pathogen, in addition to subside sludge. Two of these chambers are commonly used as anaerobic filters. The filter media used in this anaerobic filter can be blocked after a long period of operation. However, it should be noted here, that the duration of the time of becoming block depends on the type of filter media that is used in the anaerobic chamber.

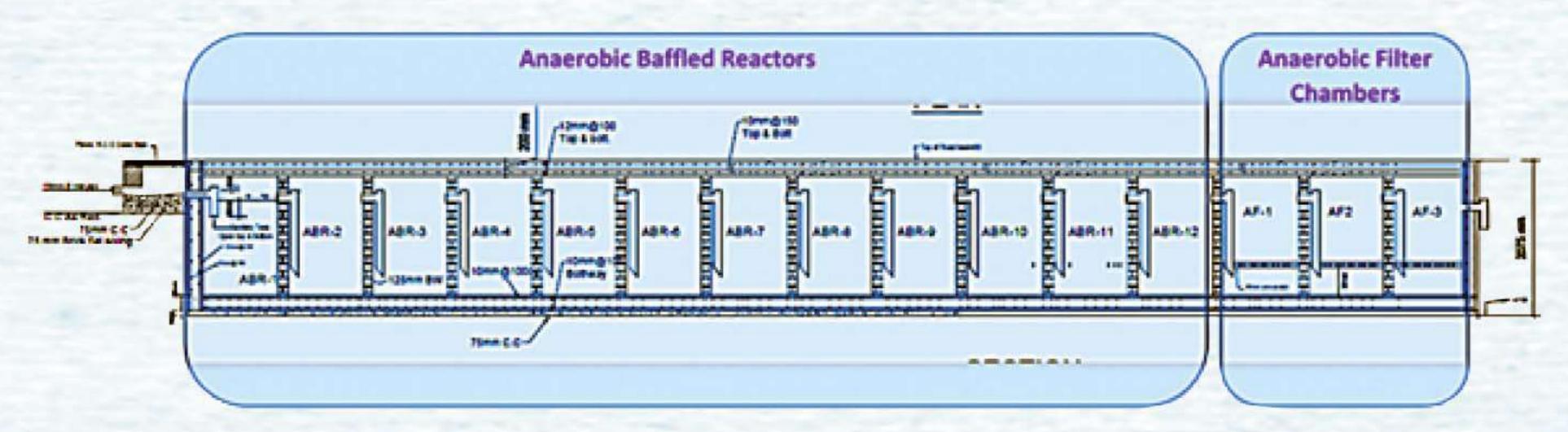
Maintenance

After a long period of operation, the floor of its chambers gradually becomes full of sludge and the water holding capacity decreases. For this, it is to be noted that the chambers should be cleaned before it's completed with sludge.

In order to prevent contaminated water from entering the tank, it is important to keep the water flow clear by monitoring the path of contaminated water around the tank.

Who will: Management Committee or their designated representative.

When to do: As required by observation but not for long and it is best to clean after two years' interval.



3. Anaerobic Filter

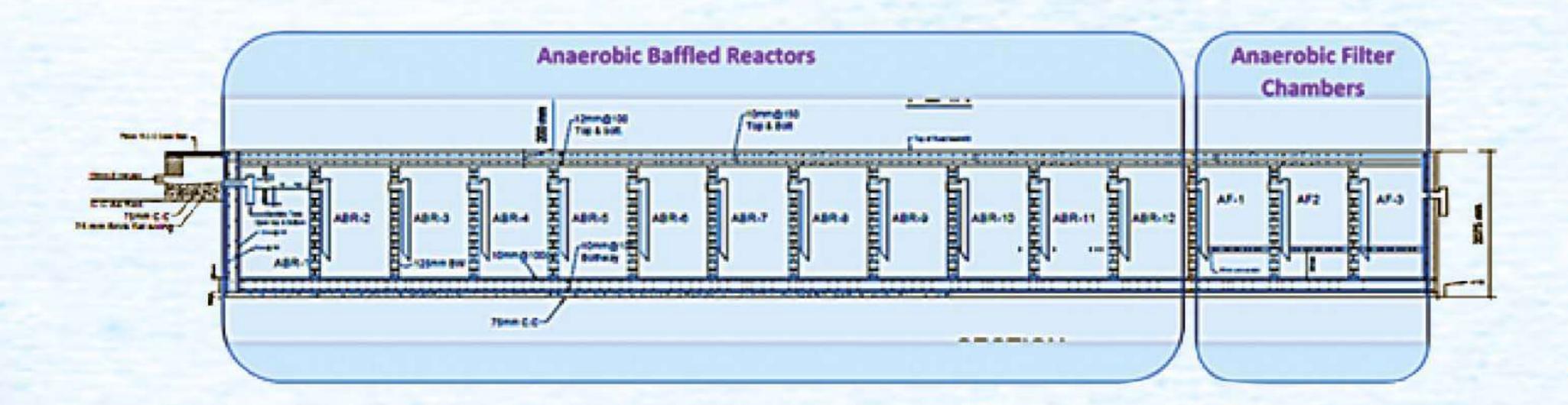
Two to four chambers are usually used as anaerobic filters in the Baffle reactor chambers. The filter media used in this anaerobic filter can be blocked after a long period of operation. However, it should be noted here, that the duration of the time of becoming block depends on the type of filter media that is used in the anaerobic chamber

Maintenance

If it is operated for a long period, it should be monitored regularly to see if its water flow is obstructed. If it is obstructed, then filter media from the anaerobic chamber should be restored after necessary cleaning.

Who will do: Management Committee or their designated representative.

When to do: If the water flow is obstructed or if the need arises during the period but it is best to clean it at two years' intervals without taking too long time.





Water test

Whether these technologies are working properly or not, they need to be monitored regularly, otherwise the polluted water emitted from it can cause environmental damage. For this, check the water emitted from it regularly, so that it can be made sure that it is within the specified criteria in the Environment Department. For this purpose, the quality of water needs to be checked through both water BOD and fecal coliform test.

Who will do: The management committee will examine the water with the help of the advisory committee.

When to do: After three months from the start of the technology it should be conducted in three months' interval for one year. After one year it should be done six months' interval.

THE THIRD PART

THIRD PART Duties and Responsibilities of the Management Committee Financial management

THE THIRD PART

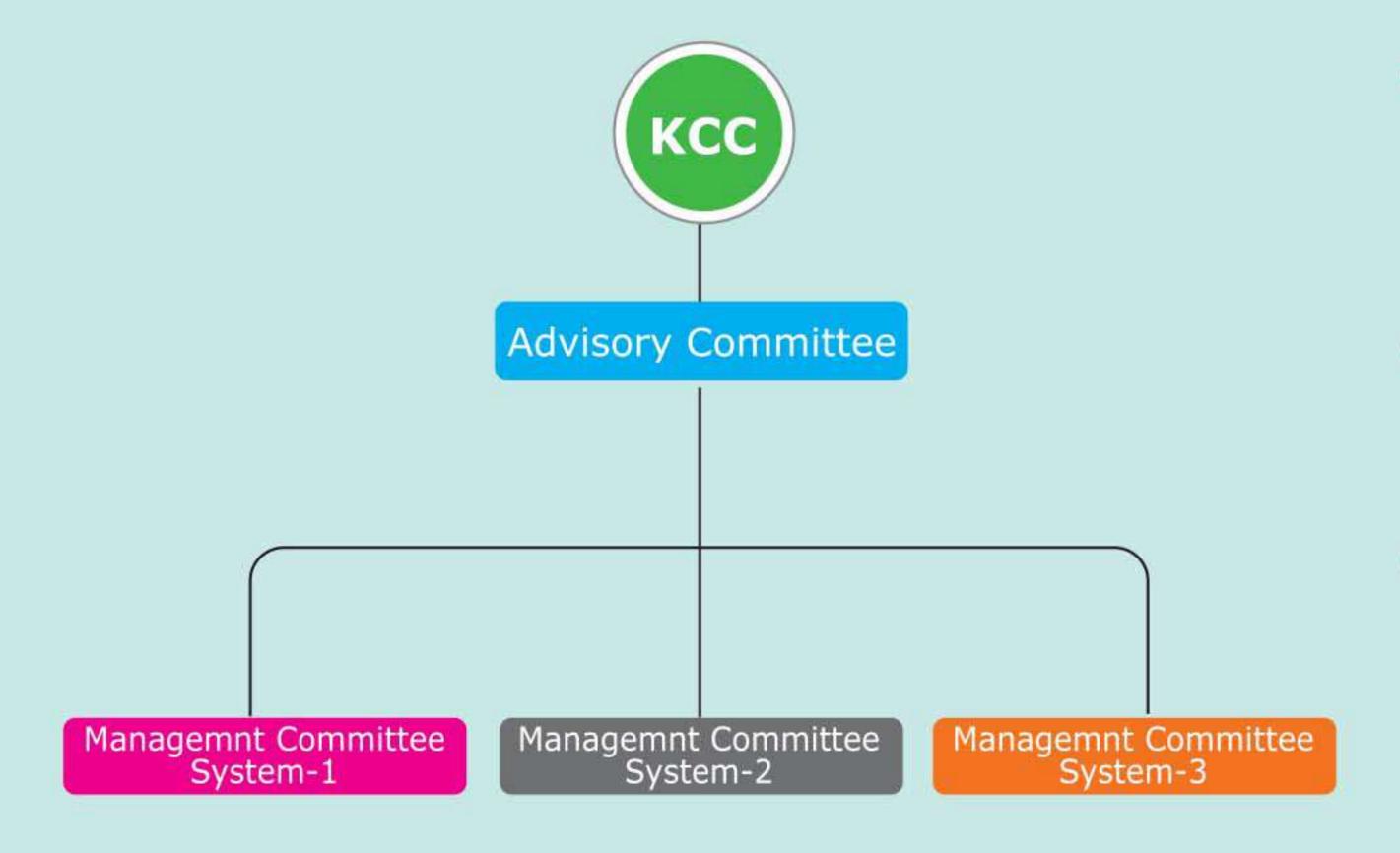
Duties and Responsibilities of the Management Committee

- The Management Committee will hold regular quarterly meetings.
- The Committee will hold meetings with toilet users every six months or once a year.
- To assist in the management and maintenance of the users of toilet sanitation facilities.
- Manage and maintain all types of sanitation systems development technology.

- Cleaning the septic tank every year and monitoring if process is being environment friendly.
- The Committee will contact the councilor if necessary to face any problem.
- Ensuring that the technology area is cleaned regularly and ensuring that the garbage is not thrown on it.
- Have to take the initiative to monitor the quality of water emitted from the baffle reactor and determine the outcome after a discussion on the test results in a meeting.

Financial management

- The management committee will collect the partnership money from the user families.
- The treasurer of the management committee will save the money and account for the management and maintenance fund.
- The bank account will be in the name of the committee and the management committee will manage the account and deposit the money raised there.
- The committee will withdraw money from the bank for emergency maintenance and re-deposit in the bank if there were any money left after the maintenance.
- When the money will be spent from the bank for maintenance, the committee will collect the same amount of money from the user families and deposit it in the bank again.



- When users need their own toilet maintenance or renovation, users will spend the money themselves, so no money can be withdrawn from the committee's bank account.
- The committee will submit their balance report to the users every year, such as maintenance costs and bank deposits.
- The committee will charge a certain amount of money each month for maintenance costs as negotiated with the users and deposit the money regularly at committee's bank account.

THE FOURTH PART

FOURTH PART

LOCAL GOVERNMENT (CITY CORPORATION)AIN, 2009

Offences under the Ain (fifth schedule)

Offence and Punishment (Second Schedule)

THE FOURTH PART

LOCAL GOVERNMENT (CITY CORPORATION) AIN, 2009
REFUSE MANAGEMENT RELATING RESPONSIBILITY, OFFENCE AND PENALTY

Offences under the Ain (fifth schedule)

10. Without the permission of the corporation, causing or knowingly or negligently allowing the contents of any sink, sewer, drain or cess-pool or any other offensive matter to flow, or drain to be put upon any street, or public place or into any irrigation channel or any sewer or drain not set apart for the purpose (Page 6993)

- 12. Connecting any house drain with a drain in the public street without the permission of the corporation (page 6993)
- 13. Throwing or placing any refuse on any street or in any place not provided or appointed for the purpose by the corporation ((Page 6993)
- 15. Doing any act by which water for drinking is rendered unfit for such use (Page 6993)
- 26. Failure to provide, close, remove, alter, repair, clean, disinfect or put in proper order any latrine, urinal, drain, cess-pool or other receptacle for filth, sullage, water or refuse when so required by the corporation (Page 6994)

Offence and Punishment (Second Schedule)

92. Offence: Activities under fifth schedule under this Ain shall be treated as punishable offence (Page 6951)



- 93. Penalty/ Punishment: an offence for which punishment is not specially mentioned, then an offense under this act shall be publishable with fine which may extend to five thousandtaka and if the offence is a continuing one, with a further fine which may extend to five hundred taka for every day after the date of first commission of offence during which the offender has persisted the offence (Page 6951)
- 96. **Duties and responsibilities of police officer:** If any offence is committed under this Ain, it is the duty and responsibility of all police officers to assist the concerned Mayor or Chief Executive Officer under their legal purport. (Page 6951)