



एक कदम स्वच्छता की ओर

# INNOVATIONS AND SUSTAINABLE SANITATION TECHNOLOGIES IN RURAL INDIA



- ❖ Of the 85 million toilets built under SBM-G, approximately 50 million are the twin-leach pit model type
- ❖ Households are informed of various technological options, like twin pit toilets, septic tank with soakpit, ecosan, biodigester toilets etc.
- ❖ Households then choose the technology and the construction materials

Achieving and sustaining open defecation free communities is the essence of the SBM-G\*. This means that households, communities and public institutions must all use safe technologies for disposal of faeces.

A duly completed household sanitary latrine as recommended under SBM-G comprises:

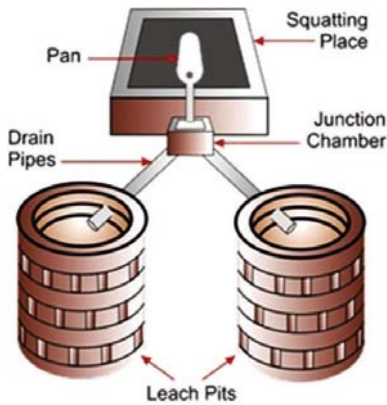
- ❖ A sub-structure that safely confines human faeces and eliminates the need for handling by humans before it is fully decomposed
- ❖ A superstructure, with provision for water storage, flushing and handwashing

Sustainable sanitation requires technology that is safe, affordable, geographically viable, easy to maintain, and treats waste on site.

The SBM-G promotes **twin-leach pit, pour-flush, water-seal toilets**, where possible. (When the ground water level is below 3 m deep, and the soil condition is normal/sandy/permeable /hard beyond 1.2 m depth.)

\*SBM-G stands for Swachh Bharat Mission – Grameen, the part of the Clean India Mission being implemented by the Ministry of Drinking Water and Sanitation in rural India

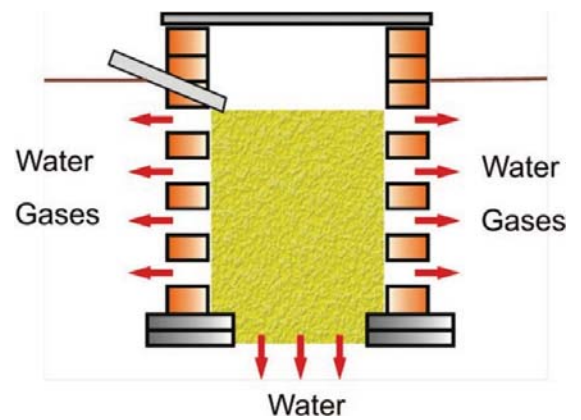
## How does a Twin Pit Toilet Function?



Twin pit toilets consist of a squatting pan with two pits connected by a junction chamber. The excreta deposited in the toilet pan reaches the junction chamber through the water seal trap. The opening of one of the pipes is sealed with a brick plug. This facilitates the flow of excreta to the active leach pit and only one pit is filled at a time.

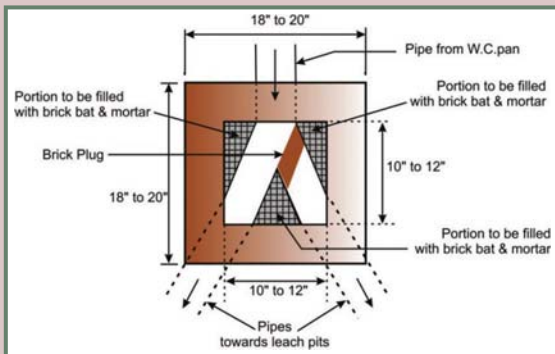
The bottom of the leach pit is not cemented and the pit is lined with bricks in honeycomb fashion. The liquids from excreta and flushed water leach into the soil through the bottom and through the holes in the pit lining. The solid part of the excreta remains in the pit – undergoing bacterial decomposition that converts it into good quality manure in about 1 year.

Ideally, the pit should be of 1 m X 1 m in size and the distance between pits should be at least 1 m.



## Unique Features of Twin Pit Toilets

### 1. Junction Chamber – for diverting excreta



### 2. Water seal trap – to trap smell and flies



### 3. Honeycomb Pit Lining – for water to leach out



### 4. Rural Pan with gradient of 25° to 30°

## Emptying compost from a Twin Pit Toilet: Harvesting Golden Manure



After 3–5 years, when one pit is filled, the brick plug in the junction chamber is changed to divert the flow of excreta to fill the other pit. The second pit also takes 3–5 years to fill. The solids accumulated in the pit undergo decomposition and are converted to manure. This can be removed after a rest period of 1–2 years and used as manure in fields.

**Parameswaran Iyer, Secretary, Ministry of Drinking Water and Sanitation, Government of India, emptying a pit showing that two-pit toilets are a complete solution for on-site excreta management**

## Precious Manure – Aptly Called Sona Khaad\*



- ❖ Removal of manure from pits is easy
- ❖ This organic manure contains almost all nutrients needed for plants including nitrogen (1.5%), phosphorus (1.1%), and potassium (0.5%).
- ❖ It can be used as fertiliser for any crop and even in domestic gardens.

\*Golden Manure

### Merits of a Twin Pit Toilet

#### AFFORDABLE

A twin pit is cheap (~USD 166), costing less than septic tanks, which are more popular in urban areas.

#### WATER EFFICIENT

The pan and trap are designed to operate with just 1.5 to 2 liters of water per flush. Bacterial decomposition in leach pits does not require much water.

#### ODOURLESS

This model does not release gas from the pits. Hence there is no foul smell.

#### SPACE EFFICIENT

After properly covering the leach pits, the space above the pits can be used.

#### EASE OF O & M

Operation and maintenance can be carried out by the owners themselves. Emptying is required only after about 6–10 years.

#### SUSTAINABLE

The twin pit model allows repeated switching between pits and hence use can continue for a long period.

## Innovations in the Rural Sector

In addition to the twin pit technology, there are other appropriate technologies which the Mission recommends households to adopt, based on climatic and geographic conditions. These include aerobic bio-digesters, anaerobic bio-digesters, EcoSan toilets, tiger toilets and anaerobic baffled reactor technologies.

### Initiatives under the Swachh Bharat Mission for promoting innovation and sustainable technologies



INDOSAN, a national event, promoted for exhibiting sanitation technologies for dissemination of awareness to States and districts



SBM-G organized a Swachhathon to crowd source innovations for rural areas



A high level technical committee comprising Indian scientists and technocrats for identifying and certifying technologies appropriate for different locations and conditions



The Ministry of Drinking Water and Sanitation has carried out research and development to design technological solutions for disaster-prone areas



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