



Kerala is a beautiful state in South India, home to about 34 million people, many of whom share my pride as a Keralite . Of all the states in India, Kerala scores the highest on the human development index, has one of the highest literacy rates in India (around 95%), a low Infant Mortality Rate, gender ratio in favour of the female population, stunning landscapes (highlands, mid-lands, low-lands), and a booming tourism industry. It is God's own country, as the promoters of tourism industry has named it.



PRESENT FSM

❖ ***AS PER CPCB DOMESTIC SEWAGE IS RESPONSIBLE FOR ABOUT 80 % OF WATER POLLUTION IN INDIA.***

❖ ***LACKS OF LITTER BEEN COLLECTED AND DRAINED IN STREAMS AND PADDY***



WATER POLLUTION

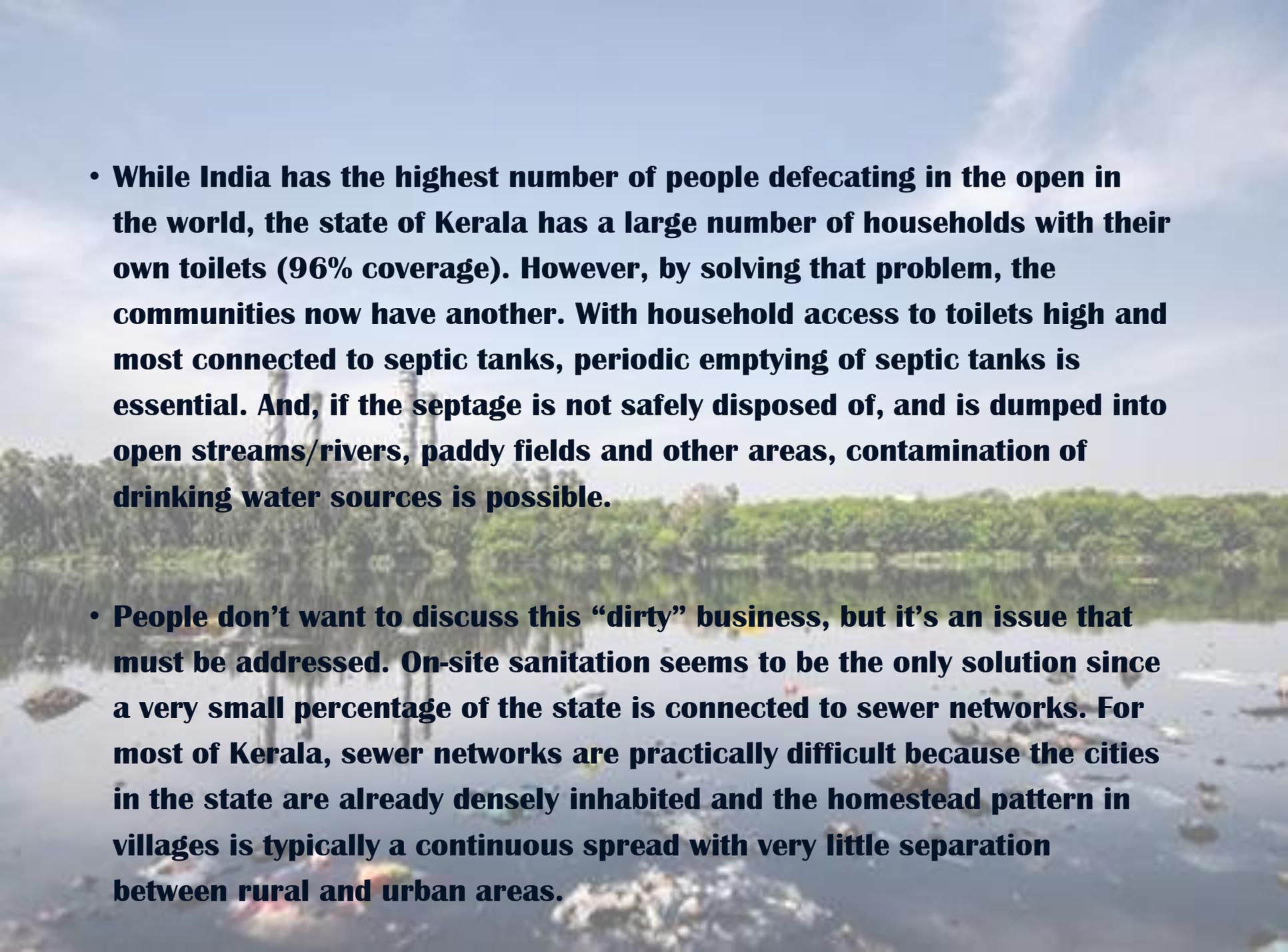
POLLUTION OF FAECAL MATTER WITH DRINKING WATER LEADS TO CONTAMINATION OF FOOD, FRUITS & VEGETABLES, ANIMALS (DIRECT CONTACT, FLIES & RODENTS)

- ❑ **WATER BORNE DISEASES**
 - VIRAL GASTROENTERITIS**
 - TYPHOID**
 - CHOLERA EPIDEMICS**
 - DIARRHOEA (ANNUALLY KILLS 5 LAKHS CHILDREN)**
 - VIRAL HEPATITIS (100 CASES PER 100,000 PEOPLE)**

❑ **ORGANIC**

❑ **POLLUTION AESTHETIC NUISANCE**



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- **While India has the highest number of people defecating in the open in the world, the state of Kerala has a large number of households with their own toilets (96% coverage). However, by solving that problem, the communities now have another. With household access to toilets high and most connected to septic tanks, periodic emptying of septic tanks is essential. And, if the septage is not safely disposed of, and is dumped into open streams/rivers, paddy fields and other areas, contamination of drinking water sources is possible.**
 - **People don't want to discuss this "dirty" business, but it's an issue that must be addressed. On-site sanitation seems to be the only solution since a very small percentage of the state is connected to sewer networks. For most of Kerala, sewer networks are practically difficult because the cities in the state are already densely inhabited and the homestead pattern in villages is typically a continuous spread with very little separation between rural and urban areas.**

- **The work of emptying septic tanks is mainly done in the middle of the night from 10 p.m. – 5 a.m. This is because it is essentially a clandestine activity as they have to dump the collected sludge in any available open space, a practice that is done under the cover of darkness. The State has no facility for treatment and disposal of sewage collected from the septic tanks. Though open dumping of sewage is illegal, in the absence of facilities to receive septage from the private operators and treat it for safe disposal, the law enforcement agencies are finding it difficult to regulate and control open dumping. There are more than 25 private operators with more than 60 vehicles (each with a capacity of 5,000 liters) working daily in and around Kochi. Rough estimates indicate that they collect about 600, 000 litres of sludge daily, all of which is getting discharged in the open environment without any treatment.**



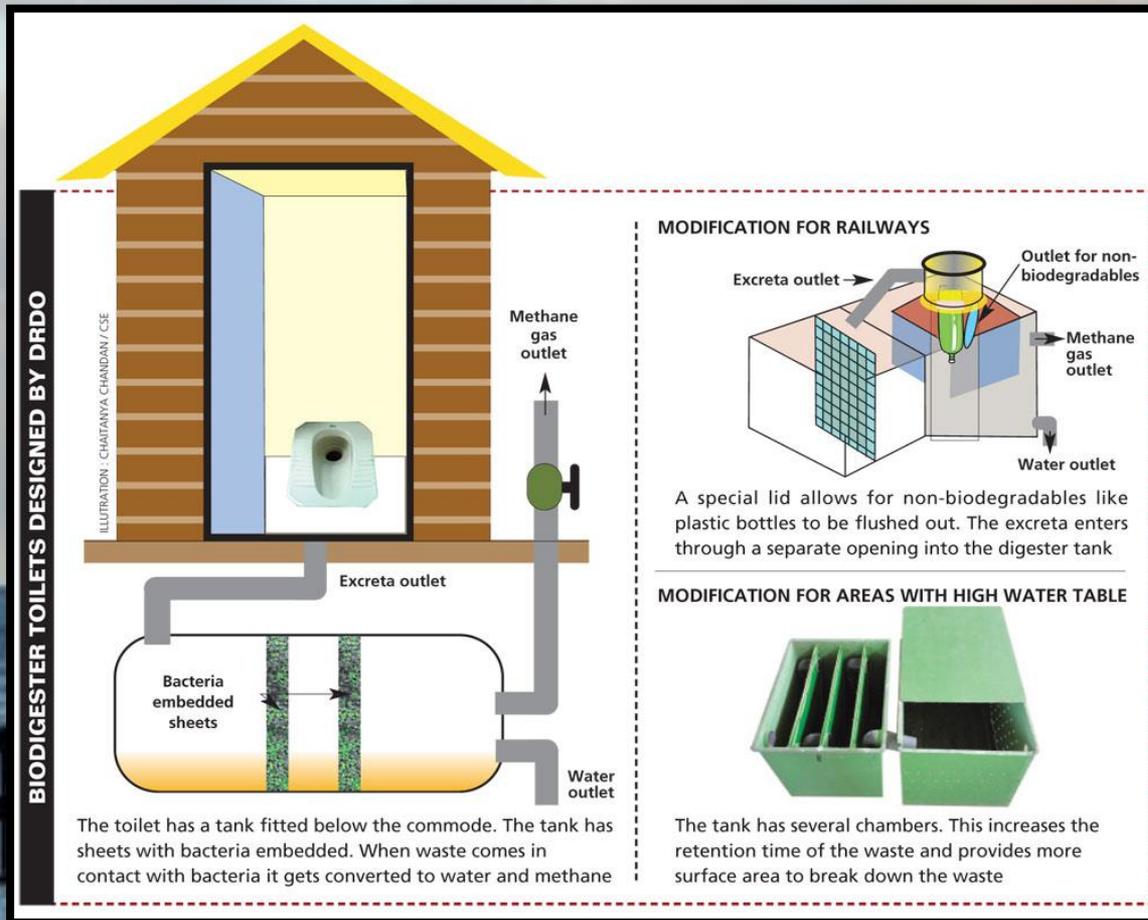
- **The open dumping of sewage has become a major issue for Kerala and a threat to its progress. While open defecation means faecal matter is spread around in smaller quantities, sewage dumping means discharge of highly concentrated pathogens with potential to cause significant health and environmental damages. Local newspapers are frequently reporting on incidences of sewage dumped in water bodies and paddy fields and villagers agitating against illegal dumping, even sometimes beating up the workers of the operators, citing the plight of villages where sewage brought from cities is contaminating their drinking water sources.**



- **Not only is there a public health risk due to the open dumping of sewage, but there are also significant economic costs. Kerala has a high morbidity rate and a high incidence of water borne diseases. Costs to families include expenditure on boiling water (a very common practice even in restaurants, where you will be offered boiled water), time lost due to illness and medical expenses, among others.**



NEW GEN TOILET BY DRDO



DRDO TECHNOLOGY - BIOTOILET

BACTERIA (INOCULUM)



Anaerobic microbial consortium developed by acclimatization / enrichment of microbes at low temperature and bio-augmentation with critical group of bacteria

BIO-DIGESTER



Fermentation container made of mild steel / SS / FRP / bricks.

The dimensions and internal design varies with no. Of users, water availability and geo-climatic conditions

DRDO BIO DIGESTER - KEY BENEFITS



- Zero maintenance
- No need to evacuate the digester tank at all as **NO SLUDGE** is formed
- All fecal matter completely digested and converted into water, methane (bio gas) and CO₂
- Bio digester tank sealed tank construction - no mixing with ground water
- When implemented in **SATURATION MODE** and at every household, saves huge cost to Govt s in design of city/municipal drainage systems (small drain pipes, less labor)
- Rivers, lakes and water bodies will become clean on its own in a short period - as raw sewage do not enter
- Huge cost saving for govt on health care especially towards BPL families that depend on open source water
- No need for STP as effluent from **BIO DIGESTER** is "safe"

BIO DIGESTER (DRDO)

A DRDO (DEFENCE REASERCH DEVELOPMENT ORGNISATION)

- ❖ DOESN'T REQUIRE A SEPTIC TANK
- ❖ DISPOSE HUMAN WASTE IN A 100% ECO FRIENDLY MANNER
- ❖ GENERATES COLORLESS , ODORLESS WATER
- ❖ COMPLETE ELEMINATION OF PATHOGENS
- ❖ ECONOMICALLY VIABLE
- ❖ INOCULAM CHARGING IS ONLY ONCE IN THE ENTIRE LIF
- ❖ CLEANING CHEMICALS DO NOT HARM SYSTEM
- ❖ EASY TO FIX
- ❖ AVAILABLE IN DIFFERENT SIZES
- ❖ BEST FOR HOSES, SCHOOLS, HOSPITALS, AND ALL OTHER INSTITUTIONS

**❖ GOVT.INDIA MINISTRY
OF DRINKING WATER AND
SANITATION NBA W.
11044/1/2012 CRSP VOL 11**



BIODIGESTER/BIOTANK : WATER QUALITY

	Septic Tank	Biodigester Biotank	Biotank + Reed bed treatment
pH	6.7-7.5	7.0-7.2	7.0-7.5
Turbidity (NTU)	500-800	70-90	2-5
Total Suspended Solids (mg/L)	150-300	90-120	50-80
TDS(mg/L)	500-850	350-450	100-300
VS (mg/100ml)	50-60	20-30	5-12
COD (mg/L)	1200-2000	250-300	15-25
BOD 5 (mg/L)	350-500	70-120	2-4
Coliforms (MPN/ml)	>3000	300-350	0-12

THANK YOU

