

ADB's WORK ON SEPTAGE MANAGENT
ADB's TA 7947-IND

Successful Implementation of
Septage Treatment Options

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TA-7947 Introducing Best Practices for Septage Management

- NUSP 2008 recognized the importance of onsite sanitation and septage management for safe sanitation
- GOI requested ADB for a TA for septage management in CPM 2010
- Included in COBP in 2011-2013
- Fact Finding Mission in Jun-Jul 2011
- \$700,000 TA approved in Dec 2011, signed in Mar 2012
- Partnership Program with Japan Sanitation Consortium represented by Japan Environmental Sanitation Centre

TA 7947-IND

- TA aimed to assist local government in establishing an appropriate implementation scheme for septage mgmt through provisions of:
- City Sanitation Plans
- Septage Management Plans
- Provision for designing of pilot implementation
- Manual of Practice for Septage Management
- Four ULBs selected identified in HP and Mizoram (Mandi and Parwanoo; and Aizawl and Lunglei)
- Expose ULBs to prevalent septage management technologies and international best practices
- National workshop in October 2014

Septage Treatment Options

- Land treatment (land spreading, spray irrigation, ridge and furrow irrigation, over land flow)
- Sub surface treatment (Plow furrow cover, sub surface injection, burial methods using lagoons or trenches or sanitary landfill)
- Co-treatment with STPs
- Independent Facilities for treatment (lagoon, composting, biological treatment, aerobic digestion, anaerobic digestion, lime stabilization, chlorine oxidation)
- Supplementary treatment (conditioning, dewatering, sludge thickening, bio solids disinfection, thermal process, odor control)
- Waste to energy Systems
- Integrated System

BIO-DIGESTER

- Fecal matter decomposed in the digester tank using a specific high graded bacteria further converting them into methane and water, discharged further to the desired surface.
- Bio-digester technology is based on anaerobic biodegradation of organic waste by unique microbial consortium (Developed by DRDO Govt. of India) and works at a wide temperature range.
- Patented anaerobic microbial consortium made by acclimatization, enrichment and bio augmentation with cold-active bacteria collected from Antarctica and low temperature areas.

Bio-digester with Soak-pit for domestic use



Biodigester

A Low cost Eco-friendly alternative of Septic Tank

- ✓ Size: 1/3rd to 1/5th
- ✓ Less space requirement
- ✓ Low material/ construction cost
- ✓ Can treat bathroom/ kitchen wastewater also
- ✓ No foul smell
- ✓ Maintenance free



Biodigester



Bio-digester cum Reed Bed

Steps in Anaerobic Digestion in Bio-digester

Large polymers are converted into simpler monomers



Simple monomers are converted into volatile fatty acids



Volatile fatty acids are converted into acetic acid, CO_2 & H_2



Acetate & H_2 are converted into CH_4 & CO_2

Hydrolysis

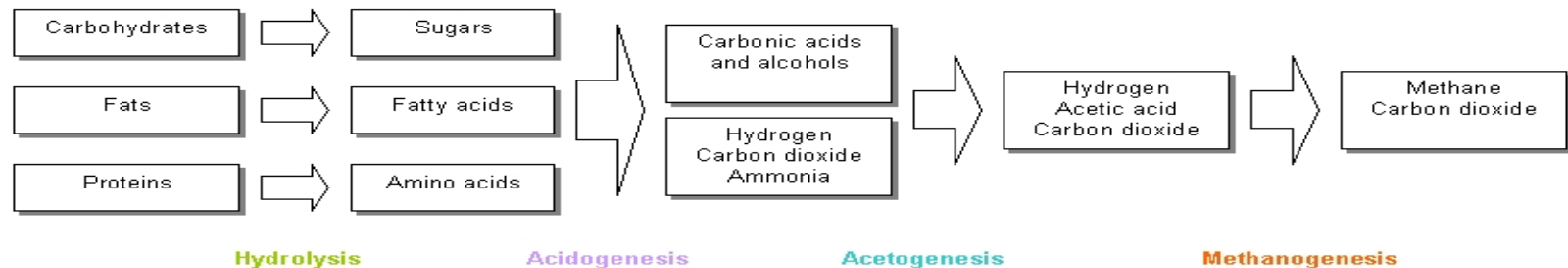
Acidogenesis

Robust

Acetogenesis

Methanogenesis

Sensitive



Advantages of DRDO's Bio-digester

- **Eco-friendly & cost-effective**
- **Wide applicability under different climatic conditions**
- **Customized & easily adaptable**
- **Maintenance free**
- **Minimizes water consumption**
- **Recycling of effluent water**
- **Reduction in organic waste by more than 90%**
- **More than 99% pathogens reduction**
- **Generation of odourless and inflammable biogas**



Modular Bio-digester for Glacier



Temperature Controlled Hybrid Bio-digester

Digester



Solar Panel



Grinder & Toilet



Grinder

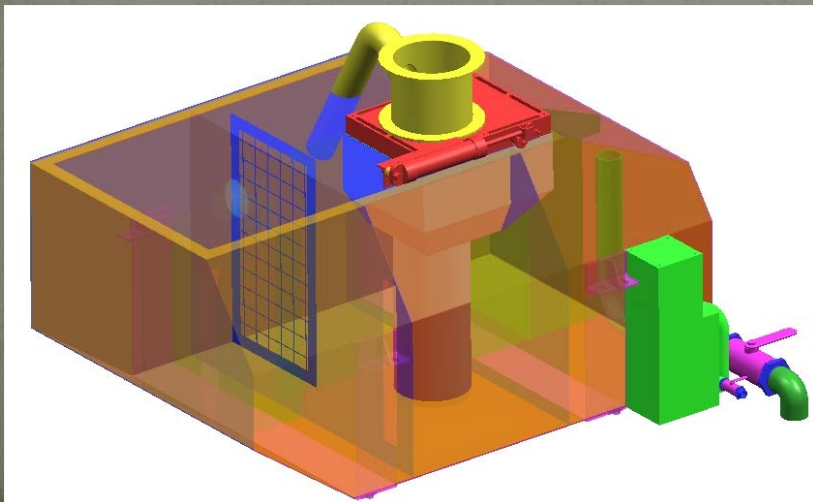


Working at North Pullu (16400ft) since July 2006

➤ Kitchen waste and human waste degradation

Railway Biodigester

- ❖ More than 10000 bio-toilets fitted in passenger coaches
- ❖ 50000 existing coaches to be retro-fitted with bio-digesters by 2017



Bio-digester cum Reed Bed System: Water Quality

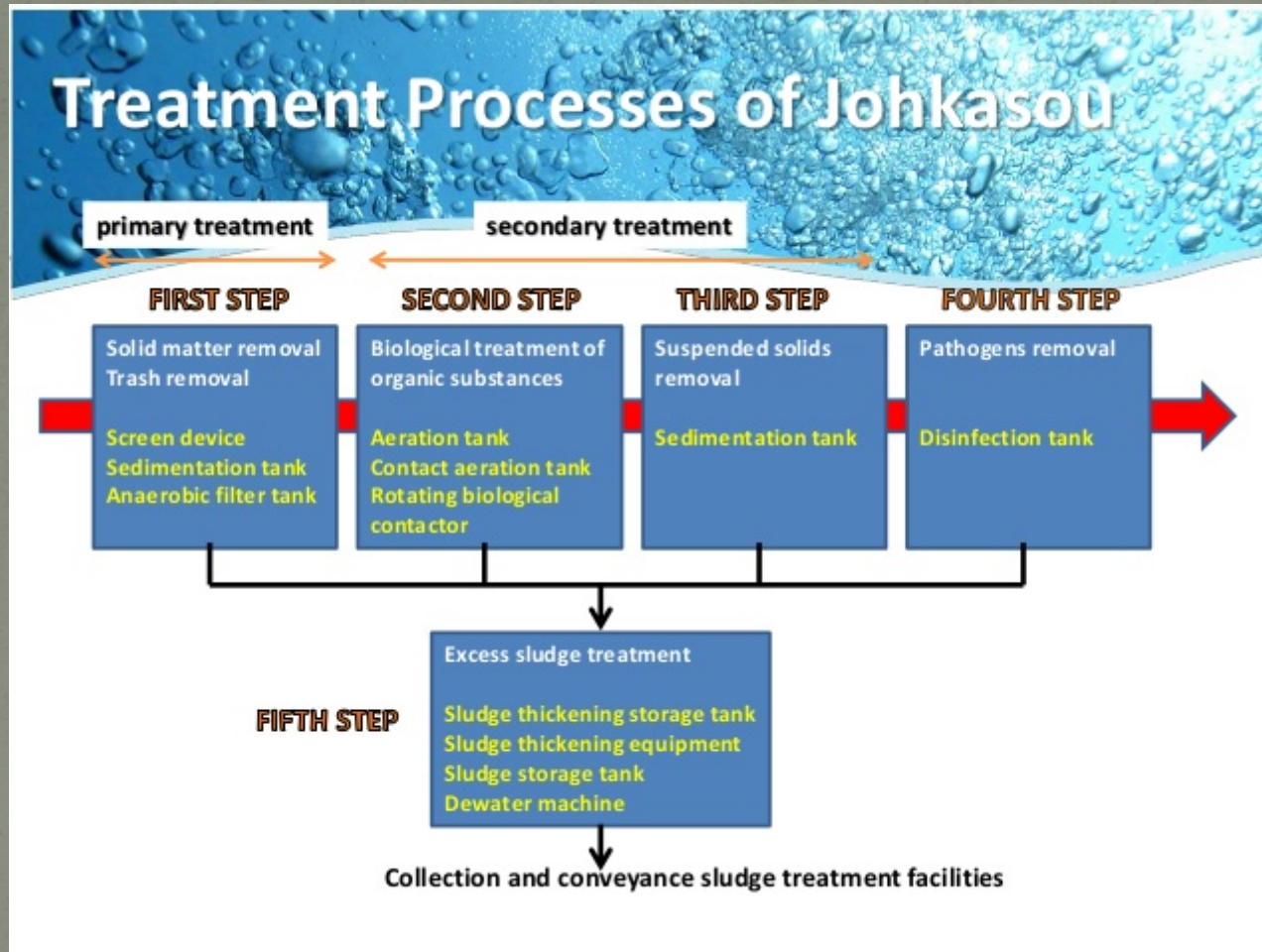
Quality Parameters	Septic Tank	Biodigester	Biodigester with Reed bed
pH	6.7-7.5	7.0-7.2	7.0-7.5
Turbidity (NTU)	500-800	70-90	2-5
TSS (mg/L)	150-300	90-120	50-80
TDS (mg/L)	500-850	350-450	250-300
VS (mg/100ml)	50-60	20-30	5-12
COD (mg/L)	1200-2500	250-300	15-25
BOD ₅ (mg/L)	350-500	70-120	2-4
Fecal Coliforms (MPN/ml)	>3000	300-350	0-12

Proposal for Aizawl City

Size of HH	No. of Units	Size of Digester tank per unit (cum)
10 HH	180	3 x 1.5 x 1.5
20 HH	50	4 x 2.5 x 1.5
30 HH	20	4 x 2.5 x 2
50 HH with reed beds	35	4 x 3.2 x 2
Total (24,000 pop)	285	(\$3.66 million)

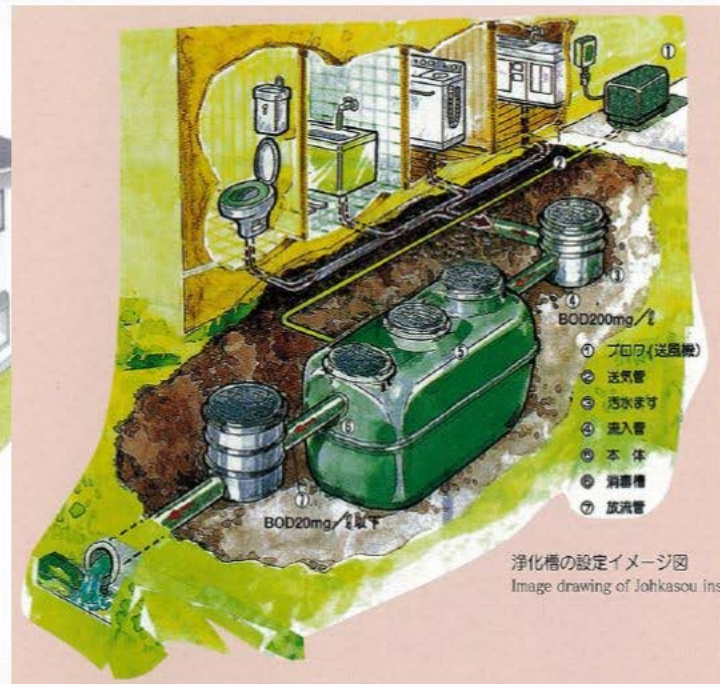
Procurement is under final stage

Introducing Johkasou, Japan Technology (JSC Introduction)



Introducing Johkasou, Japan Technology (JSC Introduction)

Johkasou installation



Introducing Johkasou, Japan Technology (JSC Introduction)



Introducing Johkasou, Japan Technology (JSC Introduction)



Introducing Johkasou, Japan Technology (JSC Introduction)

- ◆ Conveyance and treatment still required.
- ◆ Need un-interrupted power supply and may not be feasible without providing Power-back-up
- ◆ High capital cost (about \$2.00 million)
- ◆ Consultancy cost is very high.

Thank You