DEWATS - DECENTRALISED SUSTAINABLE APPROACH TO SEWAGE AND WASTE WATER TREATMENT FOR URBAN INDIA

Prepared by:
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Water – the most important factor which brings beauty to any place – the small ponds, the lakes, the rivers flowing into backwaters, the sea, the wells catching the abundant rain water enabling such vegetation and greenery all around……

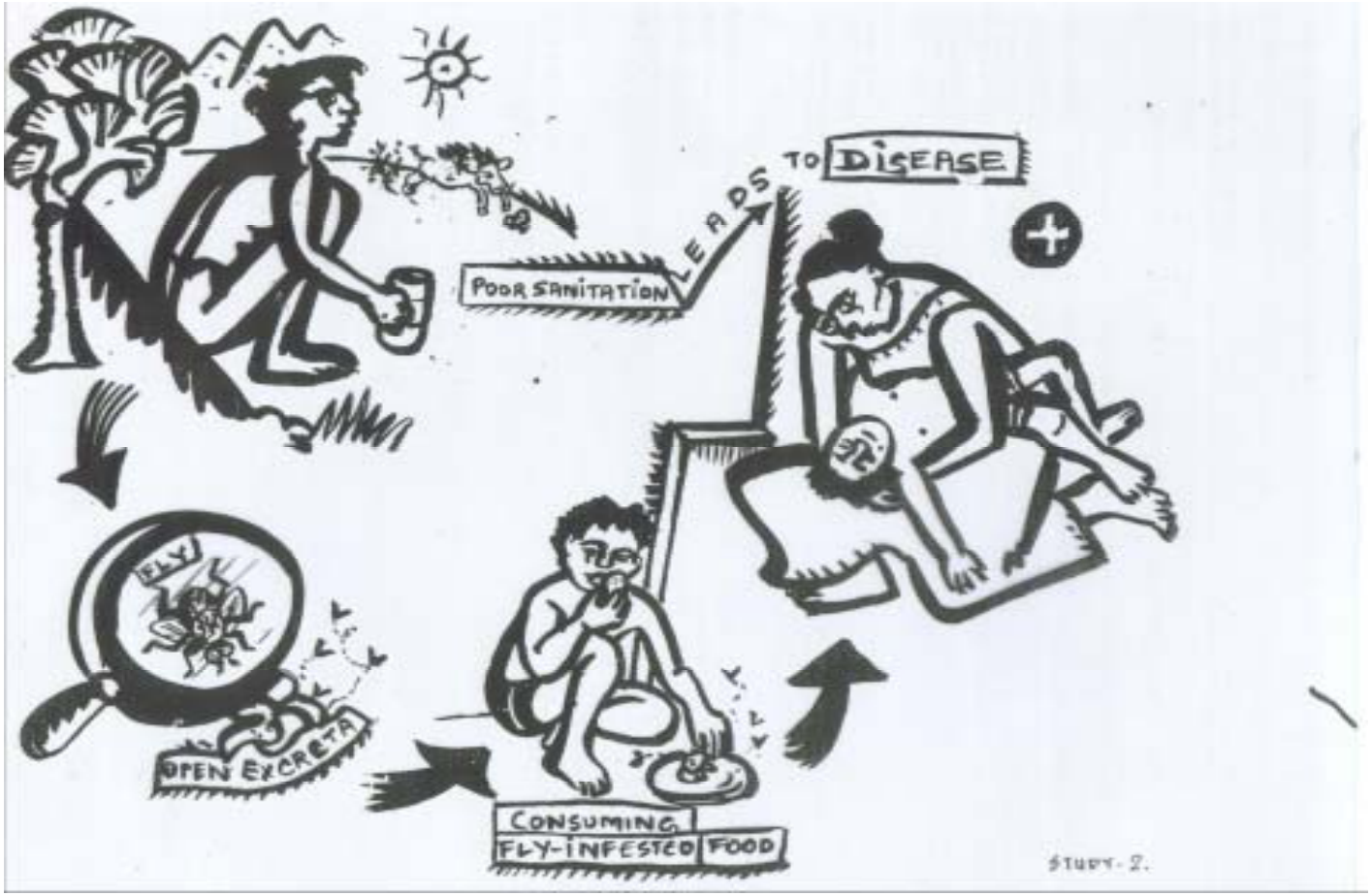
Water – also the factor which brings the biggest of problems to urban life –

- **mosquitoes,**
- **bad stench from clogged dirty canals,**
- **floods and water logging especially in the monsoons,**
- **roads breaking up because of poor drainage,**
- **drinking water scarcity in many parts of the city,**
- **water borne diseases and health problems,**

Mosquitoes

Clogged canals waste water problems

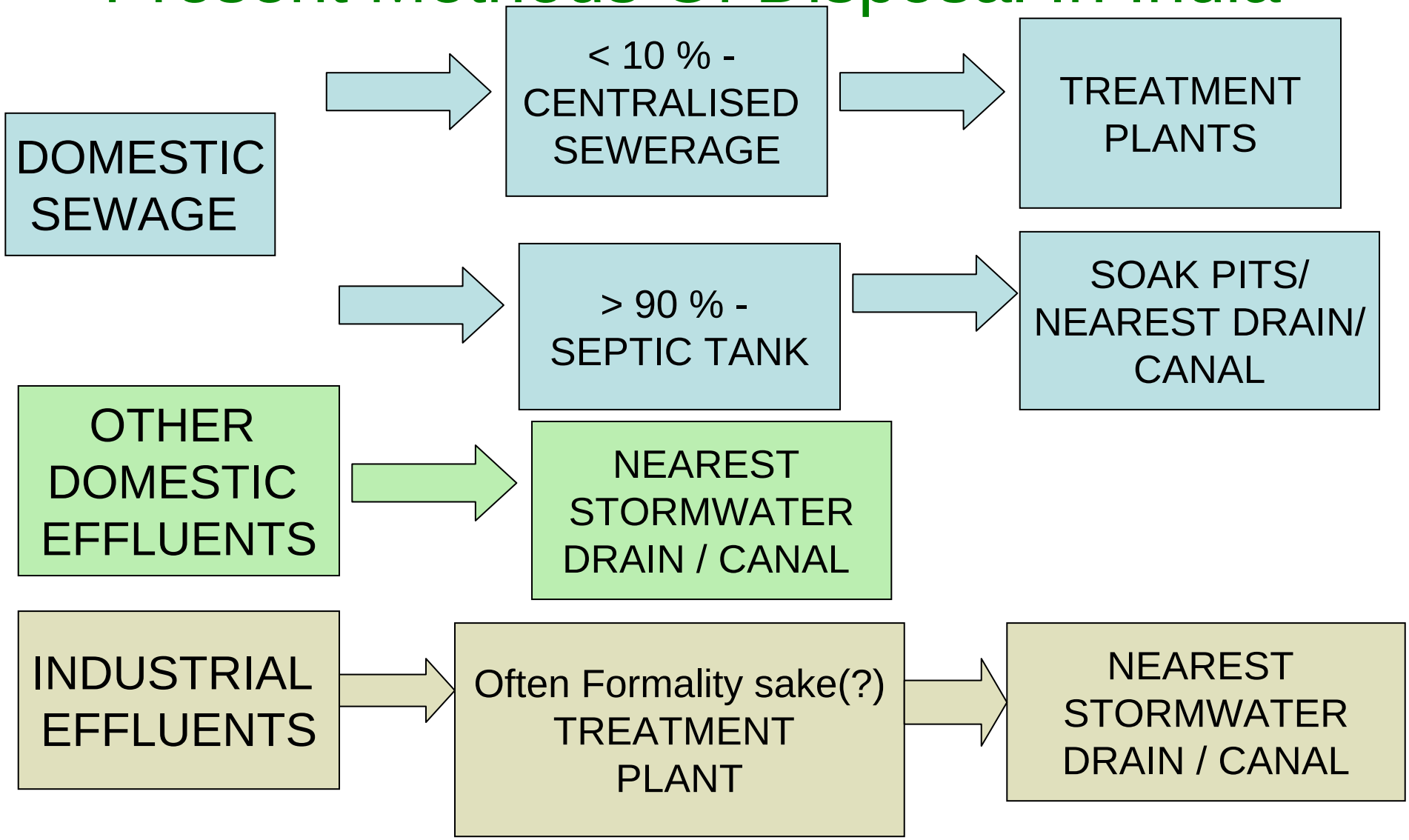
Health hazards and Diseases

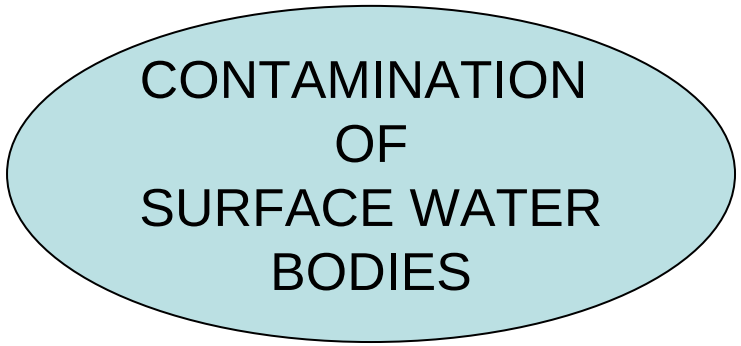


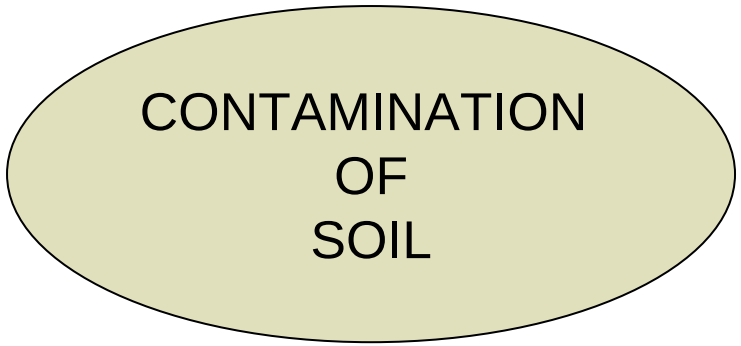
Sources of Waste water

- Domestic Sewage - Waste Water From Kitchens of Houses,Hotels, Hospitals, Canteens, Schools Etc.
- Wastes from Butcheries and Market Places
- Wastes from Bus Stands, Railway Station Etc.
- Waste Water From Garages, Service Stations Etc.
- Waste Water From Peeling Yards & Other Processing Units.
- Effluents From Industries – Large & Small.

Present Methods Of Disposal In India







- CONTAMINATION OF PIPED WATER SUPPLY
- MOSQUITO MENACE
- DREADED DISEASES
- UNHEALTHY LIVING CONDITIONS

Conventional System Of Sewage / Waste Water Treatment And Disposal

CENTRALISED COLLECTION THROUGH UNDERGROUND SEWERS

Gravity Flow/ Pumps

TREATMENT PLANTS

- PRIMARY SETTLING
- SECONDARY AEROBIC TREATMENT
  : FILTRATION
  : ACTIVATED SLUDGE PROCESS
- TERTIARY
  : DISINFECTION
  : SLUDGE DISPOSAL

Why Are Such Systems Often Impractical?

- Expense Involved In Laying Lines To Great Depths Often In Densely Populated Areas.

- Need For Heavy Pumping Machinery

- Very High Energy Costs For Aerobic Treatment – Aeration.

- Need For Skilled Manpower To Operate And Maintain.

Is an alternative approach possible?

In centralized treatment, all the waste water/ effluents generated from various sources such as houses, hotels, schools, markets, hospitals, industries etc are all collected and taken via open or covered drains to a centralized treatment plant.

Developed and designed by Western countries, such systems are mostly based on Aerobic treatment. Aerobic treatment procedures include stabilization ponds, trickling filters, activated sludge process, extended aeration ponds, rotating contact beds etc.

Centralized sewage networks needs high infra-structure investment. They require high maintenance cost, needs skilled technical man power and are highly energy consuming.

RESEARCH AND DEVELOPMENT OVER THE LAST 15-20 YEARS IN DECENTRALISED ANAEROBIC WASTE WATER TREATMENT SYSTEMS

- It can be decentralized even to single household levels
- Water can be treated to CPCB discharge standards and recycled for irrigation
- Operable with semi skilled/ unskilled labour
- No mechanical parts
- Requires little space
- No smell
- Less expensive than comparable conventional treatment systems and
- Very low maintenance costs

DEWATS is based on four treatment systems:

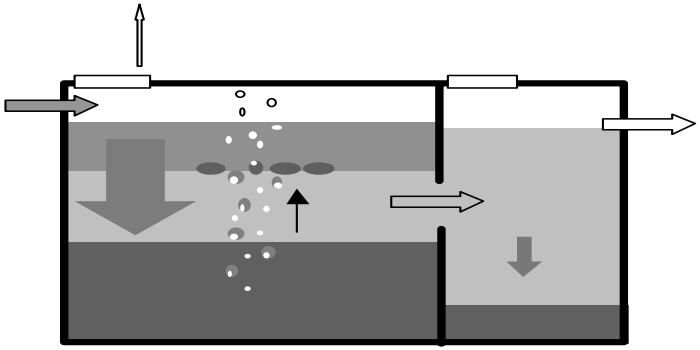
Sedimentation and primary treatment in settlers, septic tanks or Imhoff tanks.

Secondary Anaerobic Treatment in fixed bed filters or Baffled Reactors.

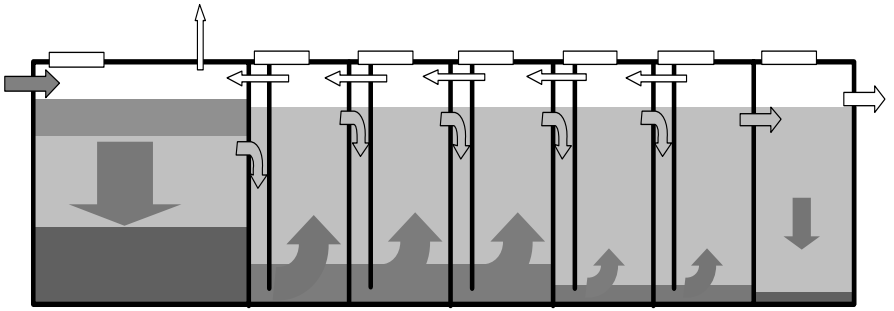
Secondary and tertiary aerobic/anaerobic treatment in Planted Gravel Filters.

Secondary and tertiary anaerobic /aerobic treatment in ponds.

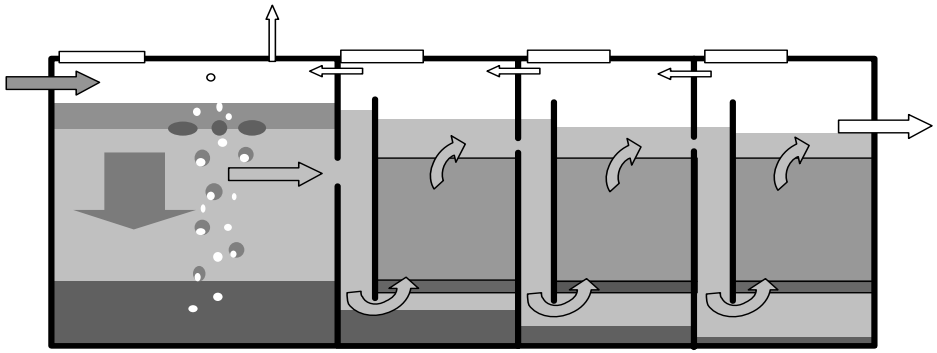
DEWATS Modules



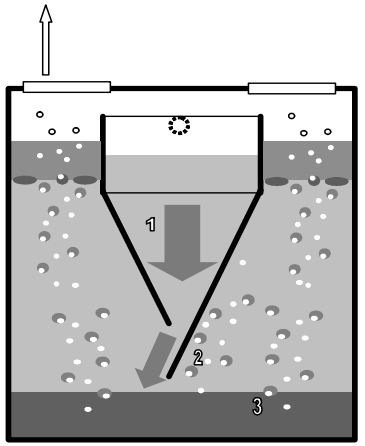
Septic-Tank



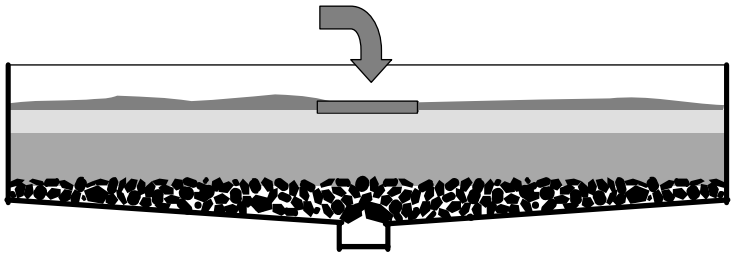
Baffled-Reactor



Anaerobic- Filter

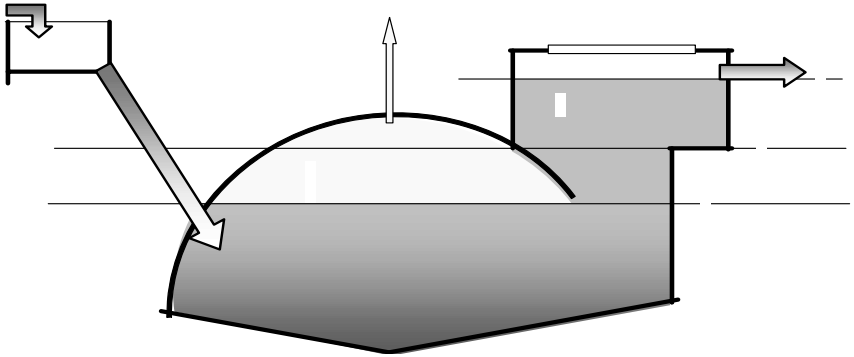


Imhoff Tank

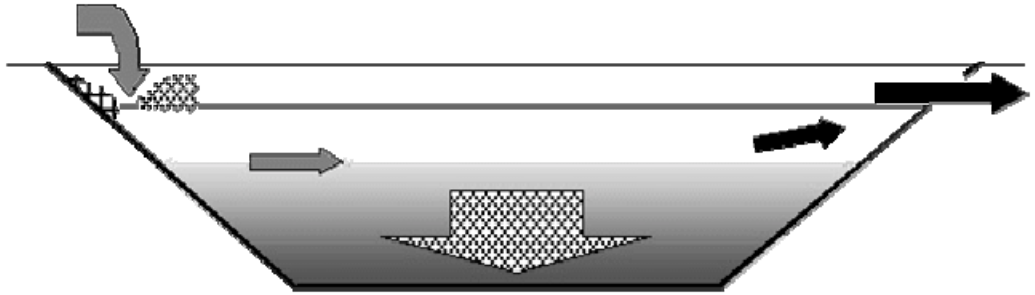


Sludge Drying Bed

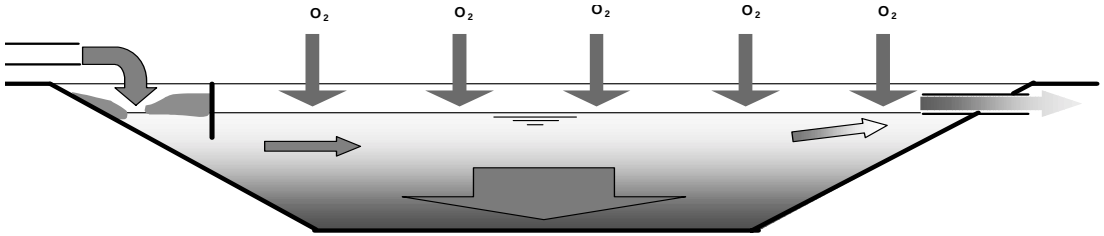
DEWATS Modules



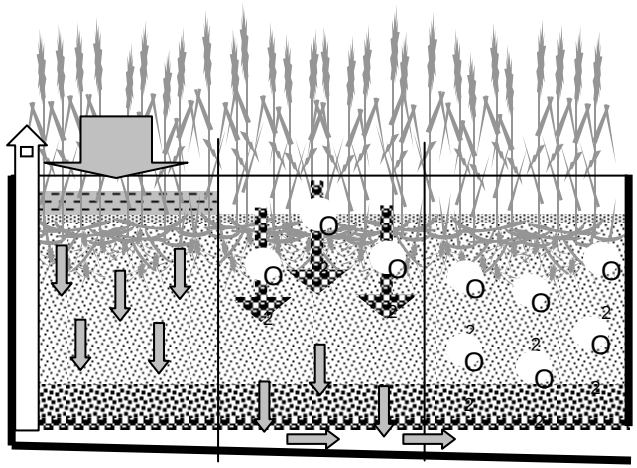
Biogas Plant



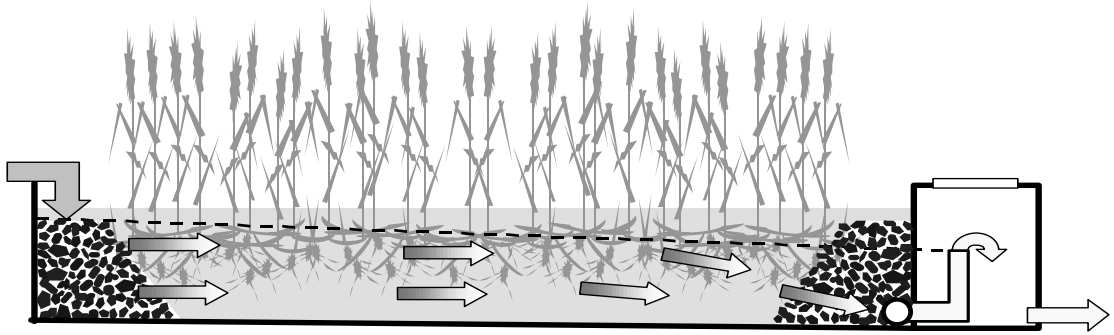
Facultative-Lagoon



Oxidation Pond



Vertical Planted Filter



Horizontal Planted Filter

Apartments can opt for DEWATS

- **Minimum space requirement – does not eat up precious ground space**
- **Can be accommodated underground – below paved pathways / parking lots or even under service buildings etc.**
- **No need for skilled maintenance.**
- **Minimum operation costs.**
- **Civic responsibility to prevent soil and ground water contamination.**

Housing Colonies / Townships

- **Can be decentralized thereby reducing plumbing and pumping costs.**
- **Possibility of safe reuse of water for gardening open spaces.**
- **Can be integrated as part of the landscape.**
- **Low energy & operation costs.**
- **Civic Responsibility.**

Chitrakutir Kalagram, Maharashtra

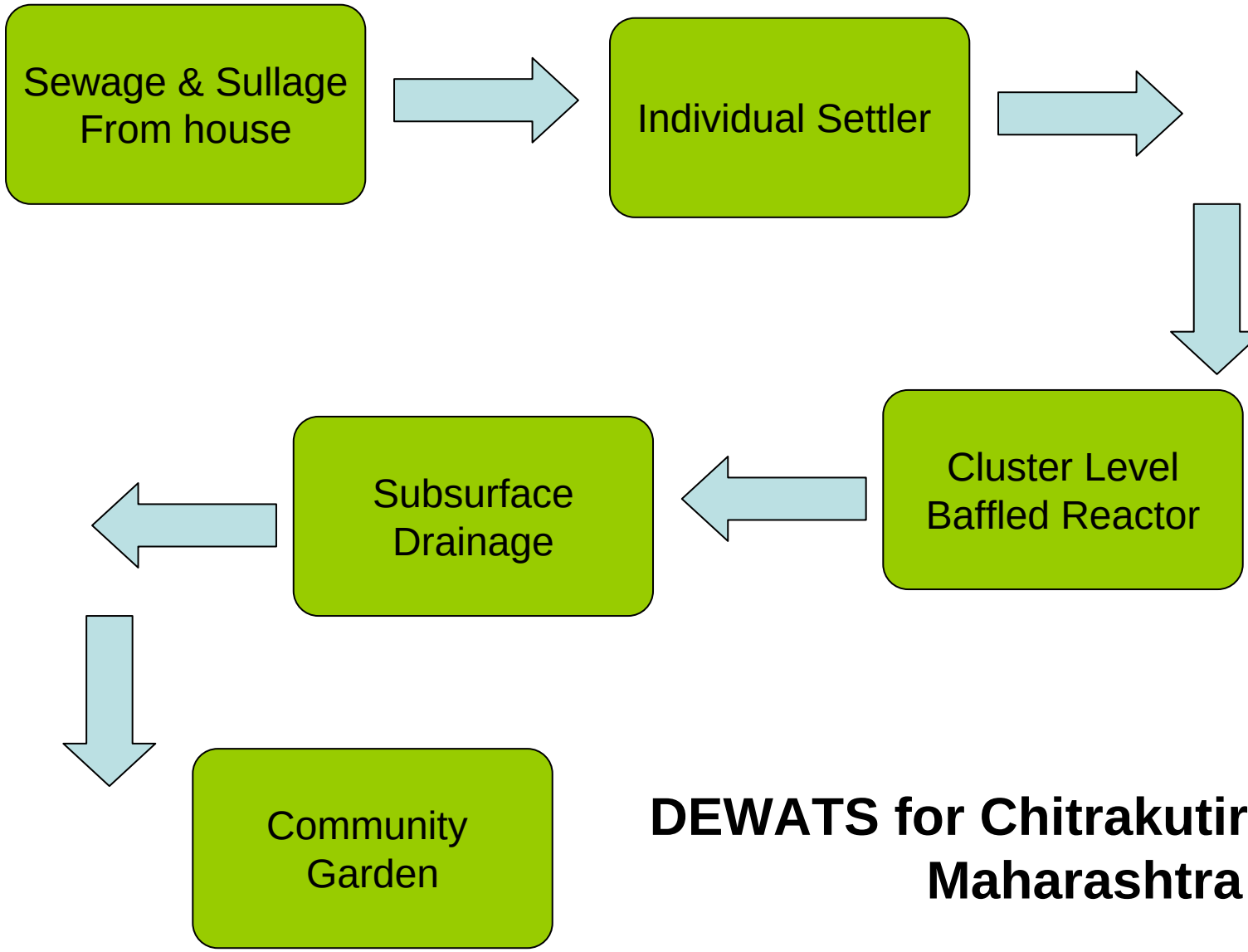
Total Volume Of Water Treated Per Day: 51000 LITERS

System 1 for 10 houses System 2 for 12 houses

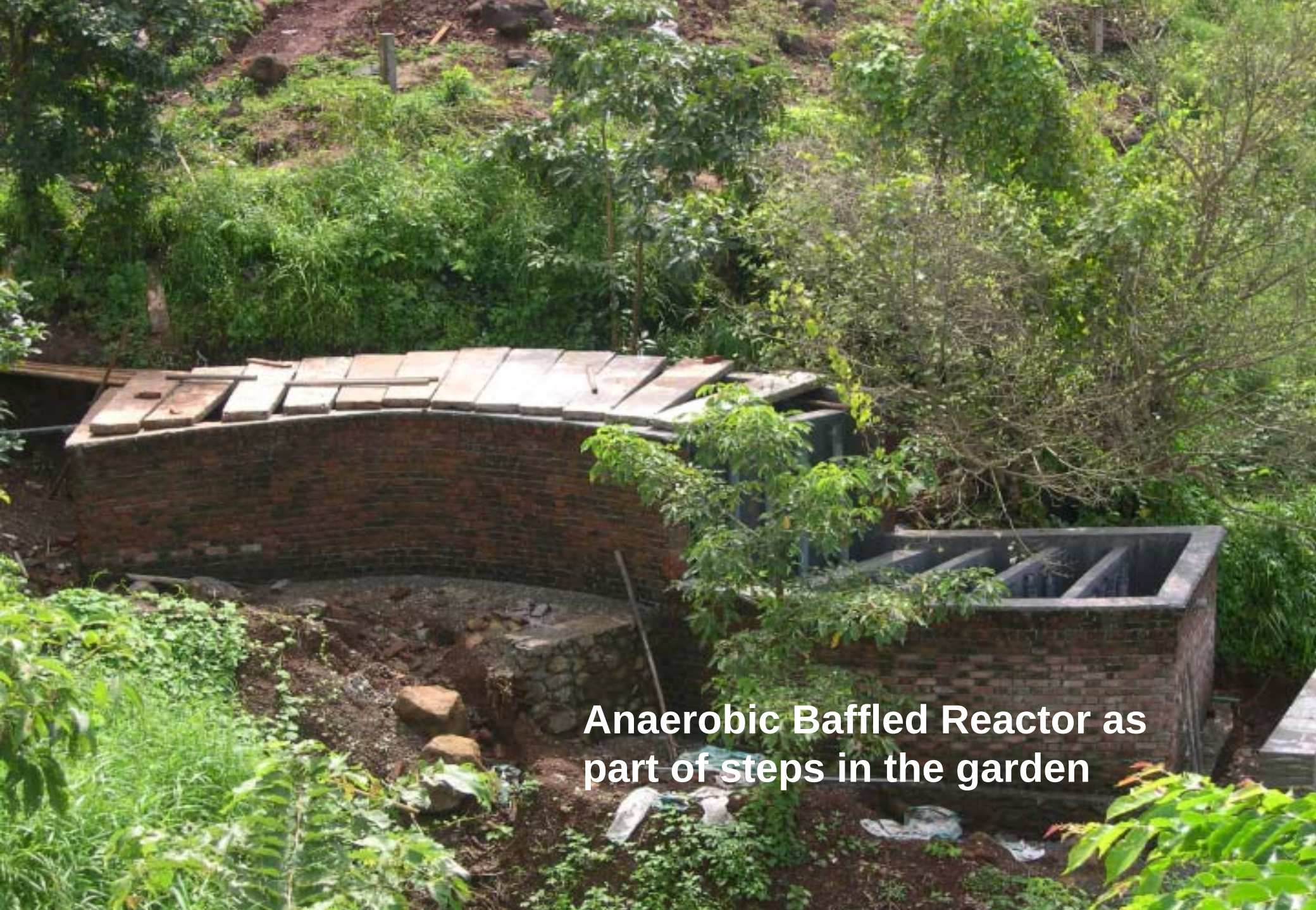
System 3 for 16 houses System 4 for 6 houses

System 5 individual systems for 7 houses

(system commissioned in October 2003).



DEWATS for Chitrakutir Kalagram, Maharashtra

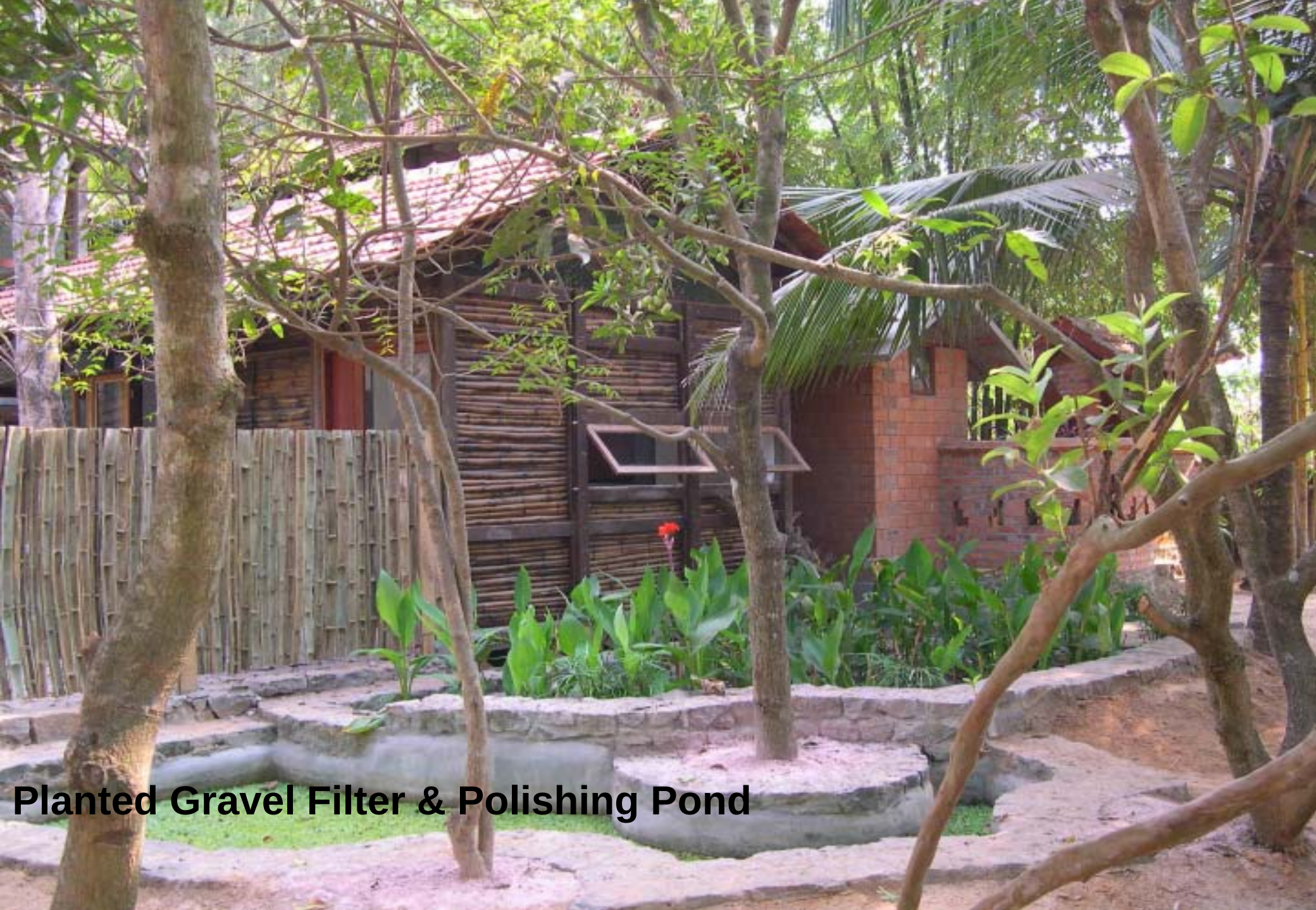


Anaerobic Baffled Reactor as part of steps in the garden

III. DEWATS for Commercial Establishments – Offices, Shops, Hotels, Resorts etc.

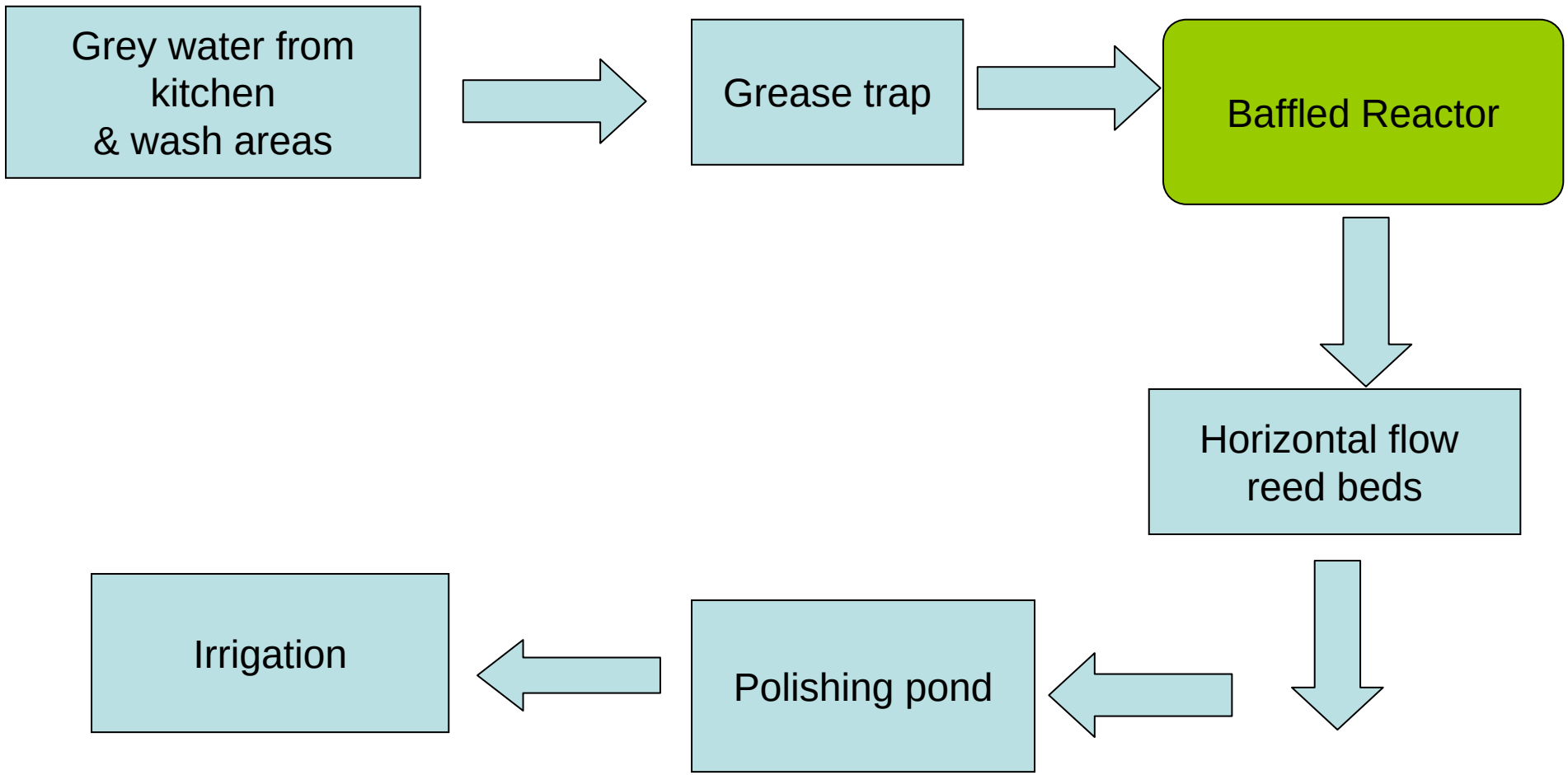
- **Can be scaled to any size.**
- **Adaptability to varying load conditions.**
- **Adaptability to varying climatic conditions.**
- **Can treat waste water with high fat, suspended solids and BOD.**
- **Safe reuse of water for non potable end uses.**
- **System cannot be switched off – so ensures efficient working irrespective of external factors.**

Anaerobic Baffled Reactor



Planted Gravel Filter & Polishing Pond

BTH Sarovaram, Cochin



Flow Chart Of DEWATS System at BTH Sarovaram

Horizontal Flow Planted Gravel Filters

Ayurveda Resort for cgh earth at Kollenkode
System for 35000 liters per day

Planted Gravel Filter and Polishing Pond


AQUAFINA
AQUAFINA

Expertise available:

Several such anaerobic treatment systems have been tried and tested successfully in various parts of India, China, Germany, Indonesia, Srilanka and Philippines among others. These include treatment systems ranging from individual houses to Hotels, Hospitals, small industries and small townships.

A national consortium (CDD) for dissemination of Decentralised Waste water Treatment Systems (DEWATS) has been formed with partners including BORDA (Bremen Overseas Research and Development Agency), Auroville, CES - Anna University, Exnora International, Sulabh International etc along with 'Inspiration' in Kochi to disseminate such treatment systems.