Rural Grey Water Management: Magnitude, Principles and Practices

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Grey Water is only a part of Liquid Waste

Liquid Waste / Waste Water

- Greywater
  - Waste Water from Kitchen, bathroom, cloth wash, Vessel wash

- Black Water
  - Waste Water from toilets / contaminated with faecal matter

- Yellow Water
  - Human Urine

Commercial Waste Water

- Waste Water from
  1. Dhabas / restaurants
  2. Hospitals
  3. Laundries
  4. Slaughter houses
  5. Small scale industries
Some Important Grey Water Facts

1. Greywater is nothing but SOILED fresh water
2. Fresh water problem & Greywater Problem are interdependent
3. Greywater is not a liability but an asset
4. Management of Greywater is not a problem but an opportunity
5. Wise management of Greywater (e.g. reuse & groundwater recharge) is dire need of the hour.

Key Message
CONSEQUENCES OF MISHANDLING OF GREY WATER

1. Unpleasant & dirty surroundings
2. Health Implications
   a. Mosquitoes / Vector breeding : Spread of diseases
3. Pollution of water bodies
4. Loss of precious natural resource i.e. WATER
How much Greywater (Sullage) is generated?

- Fresh Water: 100 Lit
- Grey Water: 80 lit
- Village with 1000 population

Calculations:

- 1000 x 55 lit = 55000 lit per day
- 44000 lit per day
• India = The largest user of groundwater in the world.
• Uses 25 percent of the world’s ground water (230 km3 per year)
Recharge potential of GWM

- Ground water recharge Potential per village
  - 30000 to 100000 lit per day

Key Message

NO Pollution of River / water bodies
Fresh water problem & Greywater problem are interdependent

Judicious use of Fresh Water → Minimum Greywater Produced

Alleviation of Fresh Water Problem ← Wise management of Greywater

Key Message
Grey Water: Current Practices

- Indiscriminate disposal in the open
- Kitchen garden
- Soakage pits
- Open or Surface drainage system
PRINCIPLES
OF
GREYWATER MANAGEMENT
PRINCIPLES OF GREYWATER MANAGEMENT: 3R

• **Reduce**: Judicious use of fresh water which will result in generation of minimum quantity of Greywater

• **Reuse**: Using Greywater for purposes such as kitchen garden, vehicle washing, toilet flushing etc.

• **Recharge**: Recharge of ground water with Greywater by adopting technologies such as soakage pit, leach pit etc.
Technologies for Greywater Management
## Decentralized v/s Centralized Systems

<table>
<thead>
<tr>
<th>Decentralized Systems</th>
<th>Centralized Systems</th>
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</thead>
<tbody>
<tr>
<td>1. Low capital cost</td>
<td>1. High capital cost</td>
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<tr>
<td>2. Low maintenance cost</td>
<td>2. High maintenance cost</td>
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<tr>
<td>3. Maintenance also decentralized : by the HH owner</td>
<td>3. Maintenance centralized : needs to be done by GP</td>
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<td>4. No centralized space required</td>
<td>4. Centralized space required for treatment unit</td>
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**Key Message**
Decentralized (Household Scale) Technologies

1. Kitchen Garden
2. Soakage pit
3. Leach pit

1. Local skills
2. Local material
3. Low cost / Low tech
4. Easy O & M
5. High Impact
1. Kitchen Garden / Nutri-Garden

**Merits**

1. Saving on fresh water
2. Linkage with Family nutrition & food safety
3. Green cover = Alleviation of global warming

**Limitations**

1. Availability of space around house
2. Willingness to utilize waste water & gardening
2. Soakage Pit

**Merits**
1. No cost to low cost solution
2. Low tech technology: Local skills are enough
3. Requires local resources
4. Recharge of ground water

**Limitations**
1. Cannot accommodate higher volumes of greywater / occasional higher influent
2. Availability of stones not universal
3. Not suitable in hard rock
4. Not suitable in permanent water logged / high water table areas
Case Studies

Soakage Pit

Dist Malda, West Bengal
Soakage Pit

Test Pits to find out the impact of pond water on soak pits & Vice versa

Pond with water

Test Pits 1, 2, 3, 4
3. Leach Pit

Merits
1. Does not require filling
2. Can accommodate higher volumes of water
3. Less maintenance
4. Lasts longer

Limitations
1. Not suitable in hard rock
2. Not suitable in permanent water logged / high water table areas
Case Studies: Leach Pit

Household Leach Pit
Case Studies : Leach Pit

- Village Bhasada, Panipat, Haryana
- No. of HH = 215
- All HH covered with Leach Pits
- Daily Recharge : 59000 lit
- Drains are dry
- Village became Mosquito Free
2 Semi-Centralized (Community Scale) Technologies

*Household Technologies modified & adopted on a community scale*

*Utility*

1. For a group of houses where individual management is not possible
2. At community water points (Hand pumps, Stand posts, wells)
3. Economic activity for SHGs / small entrepreneurs
1. Community Plantation (modified K.G.)

- Each house to have a silt chamber
- Common Silt chamber at the plantation site

- Plantation in Open spaces
- Use in existing gardens
- Roadside plantation
2. Community Leach Pit (modified Leach Pit)

- Each house to have a silt chamber
- Common Silt chamber at the plantation site
Community Leach Pits Under the road

District Mahendragarh, Haryana
Community Leach Pit

Key Message
3. Centralized Technologies

Adopt with caution
Centralized (Village Scale) Technologies:
Adopt with caution

1. Waste Stabilization Ponds
2. Duckweed Pond
3. Reed Bed Technology
4. Soil Bio Technology

1. Require Centralized Land
2. High Cost Technology
3. Recurring costs high
4. O & M to be done by GP
5. If O & M is not proper, may result in several menaces
6. Should be adopted in exceptional cases
Implementation of GWM Program
Criteria for selection of Technology

1. Availability of space near houses & housing pattern
2. Geo-Hydrological condition of the village including topography, soil structure & ground water conditions
3. Sources of water & pattern of water supply (individual / public)
4. Availability of common spaces in & around the village
5. Economic status of the GP & human resource available with the GP
Algorithm for Grey water management

1. Decentralized (Household scale Technologies)
2. Semi-centralized (Community scale Technologies)
3. Centralized (Village scale Technologies)
Technology Algorithm for Grey water management

1. Kitchen Garden
2. Soak Pit / Leach Pit
3. Community plantation
4. Community Leach Pit
5. Centralized systems

Key Message
Greywater Management: How do we go?

Key Message

1. Selection of right technology
2. Strict adherence to technological standards
3. Involvement of community from level zero
4. Effective O & M
5. Concurrent Quality monitoring & handholding support
Thank You

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