

Grey Water Management in Rural Areas of District Bijnore

Greywater is defined as wastewater without any contributions from toilet water. It is considered high volume, low strength wastewater with high potential for reuse and application. The composition of greywater is varied and depends on the lifestyle, fixtures and climatic conditions. Reuse of greywater has been an old practice, and it is still being done in areas that are water stressed. This practice if given the needed attention can help reduce the over-reliance on freshwater resources and reduce the pollution caused by discharge of untreated greywater into freshwater resources. It can also be a supplementary source to existing water sources in areas where there is acute water crisis or in arid climatic regions. Recycled greywater can be used for different water-demanding activities including potable and non-potable uses such as toilet flushing and agriculture.

Waste Water Characterization-

Category of Waste	Type of Waste	Description / Examples
1. Liquid Waste	Grey Water	<ul style="list-style-type: none">- Wastewater from kitchen- Wastewater from washing cloths- Wastewater from bathing- Animal wash water
	Black Water	<ul style="list-style-type: none">- Wastewater from toilets (flushing, ablution and hand wash)
	Yellow Water	<ul style="list-style-type: none">- Human / Animal urine

Institution Mapping, Waste Characterization and Quantification

With the help of GP a mapping exercise was undertaken to list all households, educational, institutions (government / private), commercial and public spaces to ensure that all the institutions are included in the survey.

Waste Water Quantification

Quantification of waste is a matter of traditional challenge. The best and most scientific way to quantify the waste is to weight it after proper segregation depending on the category and type. Considering all practical purposes, the variation between actual quantification of the waste derived after weighing and the same computed based on the norms is not significant to impact selection of technology for management. Therefore, the following norms have been used for quantification of various types of waste while preparing this DPR. The used norms are either in reference with government reports or contemporary research on solid and liquid waste management:

Norm for Quantification of Household Waste		
1	Grey Water	- 44 Liter per capita per day
2	Black Water	- 10 Liter per capita per day if the toilet has cistern flush and the toilet type is septic tank with outlet left in the open or drain - 5 Liter per capita per day if the toilet has pour flush and the toilet type is septic tank with outlet left in the open or drain
3	Yellow Water – Human Urine	- 0.5 Liter per capita per day

Rationale and Approach to Waste Management

While the discourse and focus of India's rural sanitation effort is on household sanitation, an overarching objective of SBMG is to create clean environment in the villages. Achieving ODF is only halfway to achieving a safe and livable environment for the people in rural areas. Collection, treatment and management of all solid and liquid waste will help in not only meeting the objectives of SBMG, but also in creating clean and healthy villages.

However, the current solid and liquid waste disposal practices is far from desirable and needs a rethink and an innovative approach with emphasis on conservation and reuse to meet the goals of clean, healthy and livable villages. Indiscriminate and uncontrolled abstraction has resulted in significant fall of ground water. Compounding the falling ground water table is the contamination of groundwater from untreated wastewater from households. Recharge of groundwater with treated wastewater from households (cooking, bathing and washing) is an option to reverse this trend. The present practice at most households is to discharge the wastewater in the open which finds its way to low lying areas and / or water bodies, contaminating surface and / or ground water.

Household waste water could also be discharged to drains which if blocked with animal / solid waste could result in stagnant / overflowing drains and the ensuing mosquito menace and unsightly conditions.

Hence, the need to improve the solid and liquid collection, treatment and disposal practices to improve cleanliness and make the village healthy and livable. As recommended by the Ministry of Drinking Water Supply and Sanitation preference would be for household level intervention and community / village level intervention only when space or hydro geological constraints restricts household level interventions.

Grey water

(A) Rather than letting the grey water to flow to the drains and contaminating surface water, effort is made to:

- Reuse in household kitchen garden, and

- Recharge ground water through individual and / community leach pits.
- (B) Black water (effluent from septic tanks)**
- Provision of leach pit for management of effluent otherwise flowing into open or drains
- (C) Yellow water (Human Urine)**
- Promoting simple, cost effective urine utilization systems in schools and public places.
- (D) Cattle Urine** - Urine with sufficient dilution is a rich source of nutrients and could be used for gardening / agriculture. Encourage and promote simple systems to collect and reuses the urine

Technology for Management of Liquid Waste

The following technologies have been proposed to manage the liquid waste:

Grey Water

➤ **At household**

Kitchen garden

Individual leach pit (bricks / Cement concrete rings)

➤ **At community**

- Community leach pit
- Washing platform with Nhani trap to prevent mosquito breeding and water seal to prevent foul odor.
- Silt Chamber (connected to washing platform) for separating the sludge and scum from water to re-use in kitchen garden.
- Community plantation if land is available and there is excess water to re-use
- Community Leach Pit (for a group of houses when space is a constraint)

❖ **Black Water**

- Leach pit (individual or community level)

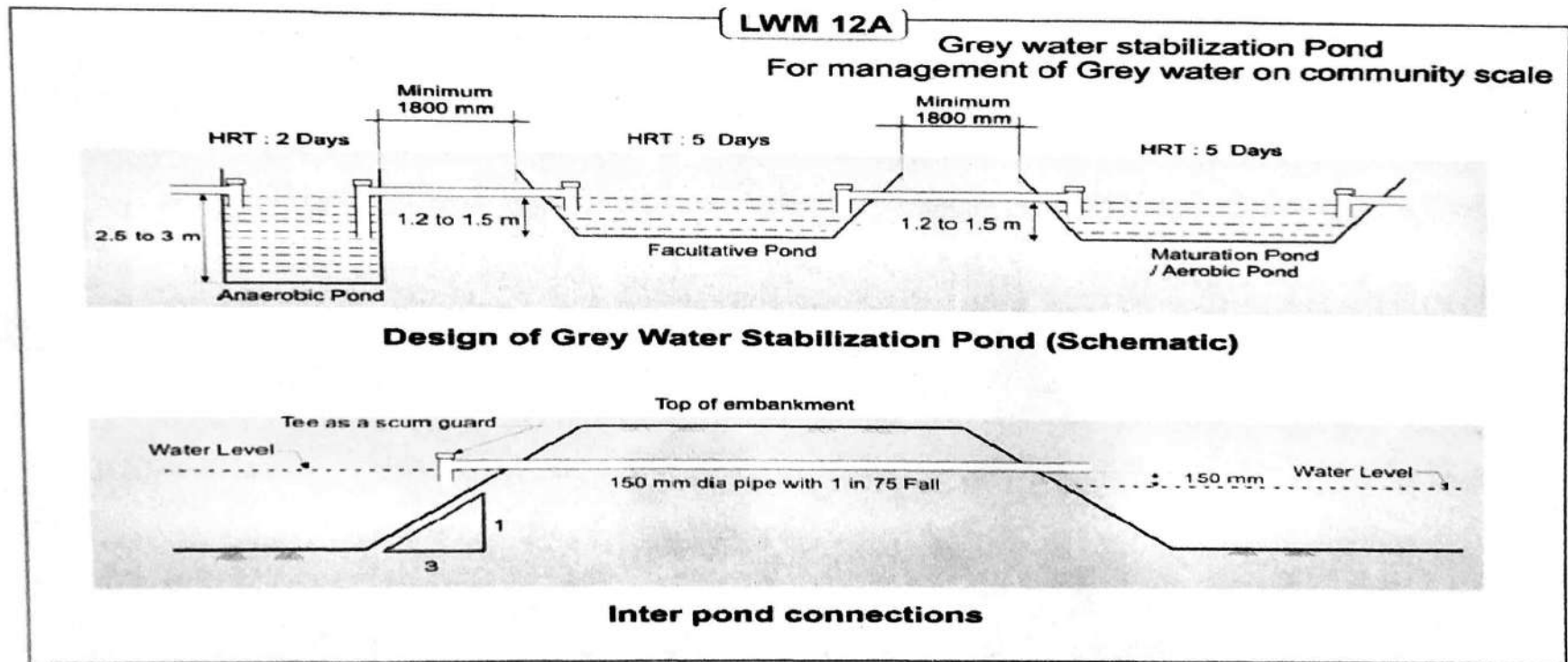
❖ **Yellow Water urine**

- Leach pit
- Collect, dilute and reuse in garden / agriculture

TECHNICAL OPTIONS FOR GREYWATER MANAGEMENT e

1. Soak pit, Leach pit, Magic pit, Kitchen garden, Community Soak pit, Community Leach pit, Community level wet land, Community Kitchen garden, Small Bore System (Conveyance system), Waste Stabilisation Ponds, Duck Weed Pond System, Constructed Wetland, Soil Bio Technology (SBT), Phytoid Technology, Anaerobic Baffled Reactor (ABR), Moving Bed Bio-Film Reactor (MBBR)

Waste Stabilization Ponds- Wastewater stabilization pond technology is one of the most important natural methods for wastewater treatment. Waste stabilization ponds are mainly shallow man-made basins comprising a single or several series of anaerobic, facultative, or maturation ponds. The primary treatment takes place in the anaerobic pond, which is mainly designed to remove suspended solids, and some of the soluble elements of organic matter (BOD). During the secondary stage in the facultative pond most of the remaining BOD is removed through the coordinated activity of algae and heterotrophic bacteria. The main function of the tertiary treatment in the maturation pond is the removal of pathogens and nutrients (especially nitrogen). Waste stabilization pond technology is the most cost-effective wastewater treatment technology for the removal of pathogenic microorganisms. The treatment is achieved through natural disinfection mechanisms. It is particularly well suited for tropical and subtropical countries because the intensity of the sunlight and temperature are key factors in the efficiency of the removal processes.



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- ✓ This will comprise of systematic waste collection system in residential area, shops, composting of organic waste, recycling of inorganic waste and scientific disposal of non- recyclable waste.
- ✓ Establishing the principal of cost recovery from waste.
- ✓ Spreading the concept and practices of converting waste to wealth.
- ✓ Informed and sensitized civil society who can be motivated and involved in their similar projects and initiative.
- ✓ Creating employment and enterprise opportunities in Green industry especially among Women/ Men Self Help Groups.
- ✓ Education and involvement of youth in general and students in particular in environmental governance.
- ✓ A well designed information system, info-bank and access through internet.
- ✓ Documentation of the activities processes & best practices for future guidance and replication to Gram Panchayat.