Filter to a Grey Water for Urban & Rural Area at Surat G+2 Residental Building

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***Abstract*- Sanitation creates a strong need to balance water quality and quantity to meet the water demands. Wastewater generated from various levels, be it domestic or combined with changes in climate and rainfall patterns has created unique watershed management challenges. Combination of water harvesting and water management techniques to recycling and reuse of the waste water for individual community like urban area, rural area and individual house can be effectively used. The study focuses on all patterns and flexible use of water with economically design and advanced step for conservation of water. The designs can be used in various areas where there are needs of ground water recharging and also sufficient water quantity is not available.**

I.INTRODUCTION

Water Management is important since it helps to justify for future Irrigation expectations. Water management is the management of water resources under set policies and regulations. Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. Water management is activity of planning, developing, distribute and nm managing for optimum use of water and water resources.

Water is an essential resource for all life on the planet. The water resource on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers and the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. At present only about 0.08 % of all the world fresh water is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture.

Residential water consumption approximately makes up 10% of overall water consumption, preceded only by agricultural irrigation and industrial water consumption. Previous studies have pointed out that in the face of a limited freshwater supply in the future, grey water recycling and reuse has been identified as one of the methods with extremely high potential and is also considered an important strategy in sustainable water management schemes. Grey water recycling and reuse is done by filtering and recycling miscellaneous drain water from daily use and using it in secondary water applications. Nevertheless, the low water cost in many countries, for example in Taiwan (based on total water cost for 200 m3 of water per year, water cost in Taiwan is 1/5 of Japan, 1/4 of Singapore, 1/2 of Hong Kong, has caused a lack of incentive in the public for saving water and grey water recycling which results in worsening the water problem.

Previous studies on residential grey water reuse are mainly divided into two types of application configuration. The first type is collective centralized grey water processing system design which is used by the entire building. But, due to problems such as bulkiness, complicated installation and high maintenance cost, follow up maintenance is relatively difficult. The second type of grey water reuse design is targeted at single ownership household units.

II. WATER MANAGEMENT

Opportunities to reuse wastewater and regulation of its treatment vary according to where you live. Urban households typically have a connection to a centralized, or reticulated, sewage system, whereas rural households manage their wastewater on site.

Two types of wastewater are created in a home: Grey Water is wastewater from non-toilet plumping fixture such as shown, Basin and taps. Black water is water that has been mixed with waste from the toilet. Because of the potential for contamination by pathogens and grease, water from kitchens and dishwashers should be excluded from grey water and considered as Black water.

Each wastewater type must be treated differently and can be used in various ways. Grey water is ideal for garden watering, with the appropriate precautions, such as using low or no sodium and phosphorus products and applying the water below the surface. Appropriately treated grey water can also be reused indoors for toilet flushing and clothes washing, both significant water consumers.

Black water requires biological or chemical treatment and disinfection before reuse. For single dwellings, treated and disinfected Black water can be used only outdoors, and often only for subsurface irrigation

III. METHOLOROGY

Various uses in House Hold:-

In this project we consider all waste water parameter and from that data we give design of reuse water tank with given primary filter to waste water and use this water use in flushing, ground water recharging as well as in gardening purpose also reduces the overall cost of water meter charges and less loading given on waste water treatment plant.

TABLE:-1:-WATER USES

Use	Water requirements(lpcd)
Drinking	5
Cooking	5
Bathing	55
Washing of clothes	20
Washing of utensils	10
Washing and cleaning of houses and Residency	10
Flushing of water closets	30
Total	135lpcd

at most of Usable water is generally wasted purposes and varies from 85% to 90%. This project aims in reusing this wastewater by design of filter, underground storage tank and rainwater harvesting tank. All economic parameters and factors are taken into consideration while designing the system so that all type of people can benefit and the country can cope with water scarcity scenario under critical condition. In One Year, one household unit. wastes 246 to 260 m3 and by implementation of this system, 7o to 8o% water waste will be reduced.

GREY WATER CHARECTERISTICS:-

Grey water is a wastewater fraction which is not heavily polluted. It includes wastewater from hand wash basins, showers, kitchen sinks and household appliances like washing machines or dishwashers and excludes toilet wastewater. The major pollutants are thus derived from soaps, shampoos, detergents, sweat, dead skin, hairs, oil and grease (from kitchen wastewater) and might include bacteria and pathogens. However the contamination by pathogens in grey water is considered to be very low due to the absence of toilet wastewater. The amount of grey water is directly related to the water consumption of the residents and to the appliances used in the household.

The average grey water production per person varies between 30 to 120 liter depending on access to piped water and people's habits and their culture. In practice, the grey water flows can be roughly estimated based on surveys with the target population. If water meters are installed the grey water amount can be approximated as 75 % of the total water consumption of the household (25 % is estimated to be used for toilet flushing).

A more detailed calculation of the grey water volumes and flows from the number of residents and the connected appliances is possible and should be conducted by trained professionals, using reliable data. The composition of grey water strongly depends on the behavior of the inhabitants and the individual choice of soaps and detergents in the household. Therefore, the overdosing of shampoos and detergents as well as the use of strong detergents (e.g. with high sodium content, phosphate content or chlorine) should be avoided.

HOW TO TREATE GREY WATER:-

Improving water quality and mitigating water scarcity are closely linked to gray water management

Reuse of treated gray water, generated by bath, laundry and kitchen, and amounting two thirds of the total domestic waste water produced, could have the limited sources of fresh water. Even if reuse of gray water is not considered a priority (for reasons of abundance of fresh water resources or cultural barriers), appropriate gray water treatment prior to its discharge could significantly reduce water pollution. Also gray water contributes to half of the total organic load.

There is a high amount of variability in the chemical and physical quality of grey water produced by any household, due to factors such as source of water the water use efficiency of appliances and fixtures and individual habits, product used (e.g. Detergents shampoos, soaps etc.) and other sate specific characteristics. The amount of salt (sodium magnesium, potassium and other salts): oils, greases, fats, nutrients and chemicals in grey water can largely be managed by the types of product used within a household Most cleaning agents contain sodium salts, which can cause excessive soil alkalinity inhabit seed germination products containing ammonia are safe to use, as plants can use at to obtain nitrogen.

Black water contains pathogens that must decompose before they can be released safely into the environment. However, if black water does not contain excess water, or if it receives primary treatment to de-water, then it is easily processed through composting.

One such method is rapid sand filtration is a simple, efficient and reliable technique for the treatment of waste water. The rapid sand filtration process is expected to remove such biological particles as cysts, algae, bacteria, viruses. The design period will depend upon the local circumstances. The components of a filtration unit include intake, pre-treatment (if any), filter box, piping, disinfection (if any) and treated water storage. The layout should be site specific, the most important characteristic of the filter medium is diameter and their uniformity or size range of that particular media such as sand gravel grit and charcoal has been used for research. The sand must have low silt content. The filter medium should be of uniform grain sizet between grans having the same size so that the filter efficiency should be equal over the bed.

FLOW DIAGRAM OF TREATMENT METHOD:-

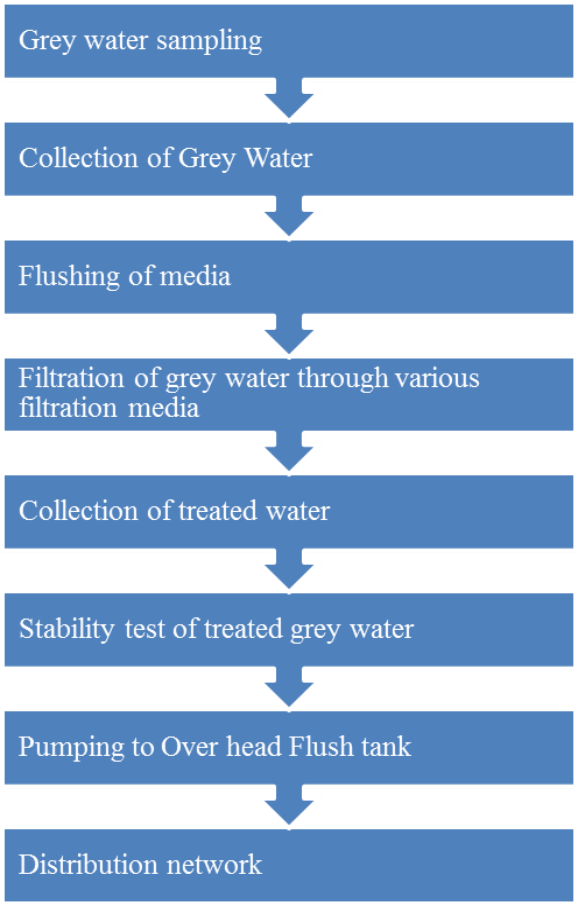

Figure 1:-TREATMENT FLOW DIAGRAM

Chemical Parameter of domestic grey water & Practical analysis:-

1. pH
2. TDS (Total Dissolved Solids)
3. COD (Biological Oxygen Demand)
4. BOD (Chemical Oxygen Demand)
5. Turbidity test

Physical Properties of Grey Water after Treatment:-

Temperature:- Grey water temperature is often higher than the temperature of raw water supply due to hot tap water used for personal hygiene and laundry. Temperature of treated grey water was higher than untreated grey water. The study shows that untreated and treated grey water have 270C and 280 C temperatures, respectively at peak flow time of morning.

Colour:- The cloudiness of grey water is caused by large number of individual particles, Removal efficiency of Colour was found by using designed small scale waste water treatment plant.

Turbidity:- The measurement of turbidity is a key test of water quality. It is a measure of cloudiness of water, i.e. higher turbidity indicates greater murkiness, which is a result of the presence of suspended solids in the water, could potentially shield microbes and increase treatment loading. The untreated grey water obtained 80 NTU and was reduced by filtration process up to 30 NTU.

Odour:-The Odour of untreated grey water found was non-offensive at all times. The Odour of treated grey water was reduced substantially.

TABLE 3:- PHYSICAL TEST RESULT

Properties	Untreated	Treated
Temperature	270C	290C
Colour	Cloudy	Clear
Turbidity	80NTU	35NTU
Order	Minor	Reduced

CHEMICAL PROPERTIES OF GREY WATER AFTER TREATMENT:-

TABLE 4:- CHEMICAL TEST RESULT:-

Properties	Untreated	Treated
Ph	7.7	7.32
Turbidity	80NTU	35NTU/23 NTU
TDS	847ppm	635ppm
COD	234 mg/lit	122 mg/lit
BOD	88 mg/lit	32mg/lit

IV. CONCLUSION

Reducing pressure on the sewerage network and centralized wastewater treatment plants due to the reduction in the quantity of wastewater generated from households.

Reusing of treated grey water for toilet flushing according to relevant environmental standard.

Reusing of treated grey water for toilet flushing according to relevant environmental standard. Decreasing water ban at the household level by savings 50-75 % of the total bill based on grey water consumption rate.

Nowadays, to achieve self-sufficiency n urban areas, treated grey water can be reused far urban.

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