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RECYCLE AND REUSE OF SULLAGE WATER OF INDIVIDUAL HOUSEHOLD

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ABSTRACT-- *Due to population out-burst in Vadodara city. Water demand and its use have increased much in last decade. Waste water generated from the households are directly treated in municipal waste water treatment plant and discharged in Vishwamitri River. To cope up with this shortage, individual house can reuse own wastewater to certain extent. We are therefore trying to provide an idea to reuse the domestic waste water to lessen water demand and save water by few percent.*

KEYWORDS --Wastewater, Demand, Reuse, Recycle, Environment

I. INTRODUCTION

Hydrologists estimated that all the water available on the planet-from oceans, lakes, rivers, atmosphere, underground aquifers, glaciers and snow-could be spread over the surface, the earth would be flooded to an overall depth of three kilometres but only 3%of all these is freshwater, and out of the three percent, only about one-hundredth is the accessible freshwater that can be used for human demand. If this available water could be evenly distributed, still it is enough to support a population about ten times larger than today.

The foremost use of water by humans is for the biological survival. However, water need for the biological survival is not the only issue being discussed in the world today. Because, apart from drinking, water is required also for household needs such as cooking, washing, and it is vital for our development needs, such as for agriculture and industry.

Unfortunately, the available freshwater supplies are not evenly distributed in time and space. Historically, water management has focused on building dams, reservoirs, and diversion canals etc., to make available water wherever needed, and in whatever amount desired. Soaring demands due to rapidly expanding population, industrial expansion, and the need to expand irrigated agriculture, were met by ever larger dams and diversion projects. Dams, river diversions, and irrigation schemes affected both water quality and quantity. Demands on water resources for household, commercial, industrial, and agricultural purposes are increasing greatly. The world population will have grown 1.5 times over the second half of the twenty-first century, but the worldwide water usage has been growing at more than three times the population growth. The main concern lies in the fact that freshwater availability is not increasing to satisfy the ever growing population.

The availability of water for use on a per capita basis is falling. Out of 100 countries surveyed by the World Resources Institute in 1986, more than half of them were assessed to have low to very low water availability, and quality of water has been the key issue for the low water availability. Given the rapid spread of water pollution and the growing concern about water availability, the links between quantity and quality of water supplies have become more apparent. In many parts of the world, there is already a widespread scarcity, gradual destruction and increased pollution of freshwater resources.

The need for increased water requirement for the growing population in the new century is generally assumed, without considering whether available water resources could meet these needs in a sustainable manner. The question about from where the extra water is to come, has led to a scrutiny of present water use strategies. A second look at strategies has thrown a picture of making rational use of already available water, which if used sensibly; there could be enough water for all. The new look invariably points out at recycle and reuse of wastewater that is being increasingly generated due to rapid growth of population and related developmental activities, including agriculture and industrial productions. This help us to reduces costs and energy spent for water supply. Reduces the wastewater quantity and thus infrastructure, money and energy required for treatment reduces. This can produce livelihood (e.g. urban farming) and increase food security increases water availability for other uses.

II. LITRATURE REVIEW

1. WASTEWATER REUSE

On-site wastewater reuse can reduce water use in both urban and rural households. At present most homes use potable (drinkable) water for practically everything in the house and garden. In domestic use the wastewater created is known as grey water or black water.

Minimise the use of cleaning chemicals and use of natural cleaning products is possible. Use low or no sodium laundry detergents, soaps and shampoos Use a lint filter. Clean and replace as necessary to ensure water can flow through it easily. Do not dispose of household chemicals down the sink.

2. RECYCLE AND REUSE OF DOMESTIC WASTEWATER

Reuse of wastewater for domestic and agricultural purposes has been occurring since historical times. However, planned reuse is gained importance only two or three decades ago, as the demands for water dramatically increased due to technological advancement, population growth, and urbanization, which put great stress on the natural water cycle. Major emphasis of wastewater reuse has been for non-potable applications. In spite of developing sound technological approaches to producing water of any desired quality from reclaimed wastewater. There are several other key issues that include evaluation of health risks associated with trace organic and inorganic contaminants in reclaimed water.

3. REUSE OF DOMESTIC WASTE WATER FOR INDUSTRIAL PURPOSE

The recent trend towards the use of reclaimed municipal wastewater for purposes such as landscape, various non-potable industrial uses and food crop irrigation, ground water recharge, and recreational impoundment often requires tertiary or advanced wastewater treatment. The treated sewage effluent characteristics and after giving polishing treatment as shown below all parameters are meeting the standards for reuse.

To overcome the shortage of water by the industries if the water is purchased from private agencies by tankers, then the conveyance of treated wastewater (sewage) from the treatment plant by providing surge tank near the outlet of the secondary clarifier at required height with necessary pumping and then it is being conveyed. This sewage treatment plant provides good quality waste water which after treatment meets with criteria for reuse of wastewater.

4. WASTE WATER TREATMENT

The concepts of sustainable development suppose solving the problems which appear in a present activity, so that, not to appear negatively aspects of that in the future. It was created, generally, of late, the opinion that, wastewater meaning environmental destroys especially surface and underground water and because of this has to be treated. It comprises of the following units: sedimentation tanks: either plain or chemical precipitation, describing a septic tanks and how this activate the sludge digestion. The waste water contributes in a sizable measure to such as negatively aspect, Initials factors within the scope of an improvement plan would include: initiate proper information and maintenance procedures for the system with record keeping, begin installation of appropriate pre-treatment for tank that lack these systems, and optimize flow distribution through the tank to provide ideal detention times for removal of settling particles and sludge digestion.

5. TREATMENT OF DISTILLERY WASTEWATER USING MEMBRANE TECHNOLOGIES. (PAWARAVINASH SHIVAJIRAO).

The purification of waste water from various industrial processes is a worldwide problem of increasing importance due to the restricted amounts of water suitable for direct use, the high price of the purification and the necessity of utilizing the waste products. Maintaining the drinking water quality is essential to public health. Although various water treatments is a common practice for supplying good quality of water from a source of water, maintaining an adequate water quality throughout a distribution system has never been an easy task.

Now a day's wastewater treatment is not an easy task for distribution of water to the public it is necessary. The distillery wastewater has high amount of organic matter so without treatment pull down in water stream is not ethical. Objective of my study is treatment of distillery wastewater using membrane technologies. The scope is to first characterize the distillery wastewater and membrane technology, then by these studies membrane techniques use for treatment of distillery wastewater.

III. METHODOLOGY

SULLAGE:

We have collected four sample different houses and our objective is to reuse this waste water for toilet flushing and gardening. To test the quality of waste water we checked some parameters.

TABLE NO 1: Analysis of Sullage Sample 1

SR NO	PARAMETERS	RESULTS
1	pH	8.6
2	TOTAL DISSOLEVED SOLID	2744 mg/L
3	SUSPENDED SOLIDS	220 mg/L
4	COD	400 mg/L
5	BOD	220 mg/L
6	TOTAL NITROGEN	46.9 mg/L

TABLE NO 2: Analysis of Sullage Sample 2

SR NO	PARAMETERS	RESULTS
1	pH	8.8
2	TOTAL DISSOLEVED SOLID	2662 mg/L
3	SUSPENDED SOLIDS	235 mg/L
4	COD	418 mg/L
5	BOD	212 mg/L
6	TOTAL NITROGEN	46.8mg/L

TABLE NO 3 Analysis of Sullage Sample 3

SR NO	PARAMETERS	RESULTS
1	pH	8.9
2	TOTAL DISSOLEVED SOLID	2720 mg/L
3	SUSPENDED SOLIDS	205 mg/L
4	COD	410 mg/L
5	BOD	198 mg/L
6	TOTAL NITROGEN	48.3 mg/L

TABLE NO 4: Analysis of Sullage Sample 4

SR NO	PARAMETERS	RESULTS
1	pH	8.6
2	TOTAL DISSOLEVED SOLID	2692 mg/L
3	SUSPENDED SOLIDS	217 mg/L
4	COD	396 mg/L
5	BOD	202 mg/L
6	TOTAL NITROGEN	47.8 mg/L

By comparing this sample parameter with the during water standard we get that TDS, TSS, BOD, COD are very high.

- Schematic diagram of treatment of waste water for individual house hold

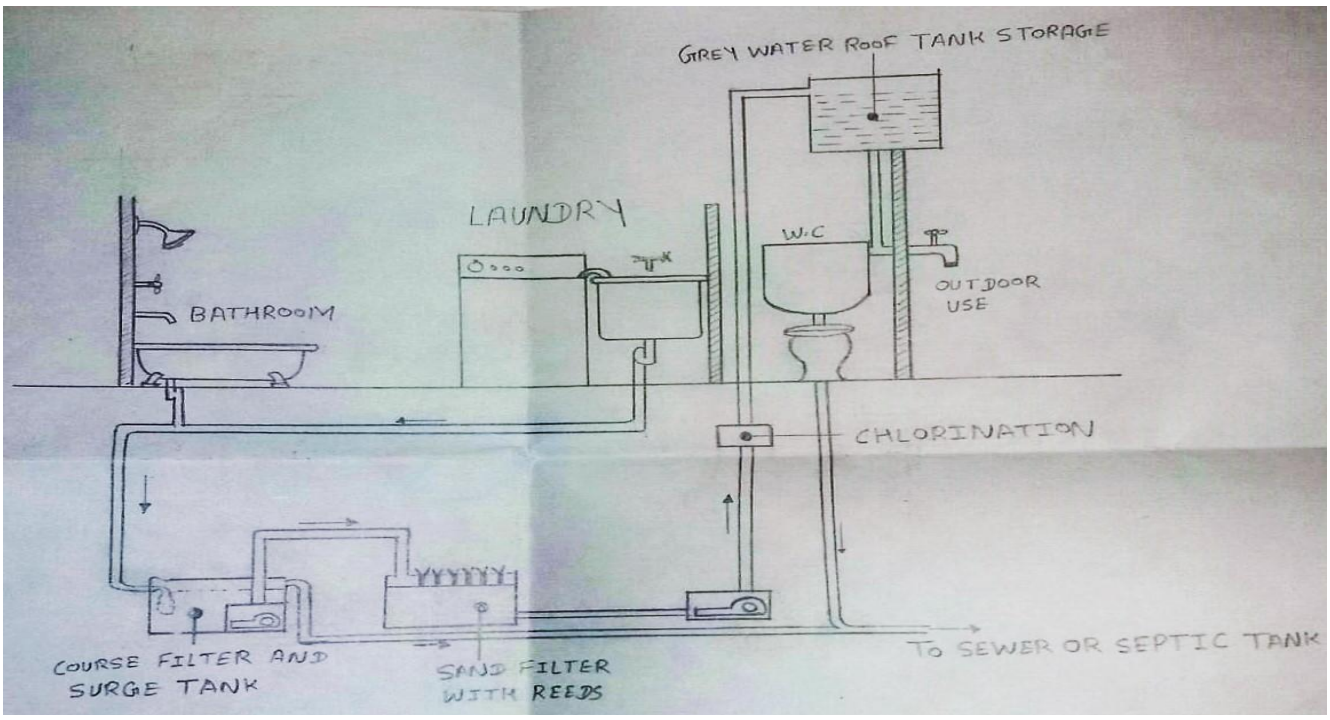

Figure: 1 Proposed Treatment System for Grey Water Reuse for Individual Household

Coarse filtration to remove large particles, including hair, and prevent clogging. It can be as simple as a waterproof box and a filter bag or stocking attached with rubber bands. Check the stocking or bag frequently and replace it when full.
Fine filtration and biological treatment, using a sand filter and reed bed combination. Microbes in the sand break down organic matter in the water and the reeds take up nutrients. The basic structure is a waterproof box filled with coarse sand laid over a gravel bed. It is designed so that grey water percolates either vertically or horizontally through the media.
Grey water reused indoors must be disinfected. All disinfection systems require frequent maintenance .Chlorine, although the most common disinfectant has been found to have adverse environmental impacts. Alternatives such as chlorine or ozone disinfection should be used where possible but they do require electric power to operate. Chlorine sterilisers disinfect the water as it passes through them and use about 20–40W of electric power depending on the water. In the figure no 1 the treatment system for the grey water reuse is shown.

IV. RESULTS AND DISCUSSION

ANALYSING THE TREATED SULLAGE.

TABLE NO 1: Analysis of Sullage Sample 1 after Proposed Treatment

SR NO	PARAMETERS	RESULTS
1	pH	7.9
2	TOTAL DISSOLEVED SOLID	823.2 mg/L
3	SUSPENDED SOLIDS	25 mg/L
4	COD	178 mg/L
5	BOD	75 mg/L
6	TOTAL NITROGEN	18.23 mg/L

TABLE NO 2: Analysis of Sullage Sample 2 after Proposed Treatment

SR NO	PARAMETERS	RESULTS
1	pH	7.6
2	TOTAL DISSOLEVED SOLID	830 mg/L
3	SUSPENDED SOLIDS	27 mg/L
4	COD	175 mg/L
5	BOD	74.5 mg/L
6	TOTAL NITROGEN	18 mg/L

TABLE NO 3: Analysis of Sullage Sample 3 after Proposed Treatment

SR NO	PARAMETERS	RESULTS
1	pH	7.8
2	TOTAL DISSOLEVED SOLID	820 mg/L
3	SUSPENDED SOLIDS	24 mg/L
4	COD	182 mg/L
5	BOD	79 mg/L
6	TOTAL NITROGEN	17.9 mg/L

TABLE NO 4: Analysis of Sullage Sample 4 after Proposed Treatment

SR NO	PARAMETERS	RESULTS
1	pH	7.5
2	TOTAL DISSOLEVED SOLID	846mg/L
3	SUSPENDED SOLIDS	26.5 mg/L
4	COD	180 mg/L
5	BOD	77 mg/L
6	TOTAL NITROGEN	18.46 mg/L

The value of tds, ss, bod, cod all are in permissible limit. So that the treated water are used for toilet flushing, gardening etc.

V. CONCLUSION

1. Grey water is safe for gardening and also can be use for flushing. During this era scarcity to water is an approving issue this process minimize about 10 to 20 litter of water wastage per persons every day.
2. The domestic wastewater is good quality of waste water compare to other waste waters. The domestic waste water after treatment meets with criteria for reuse of waste water.
3. The treatment system for reuse of indoor grey water by course filter and surge tank sand filter with reeds found good system and techno economical solution.
4. Looking to the budgetary capital cost and operating cost of each scheme of polishing treatment. The treatment of chlorination is found to be most techno economical solution.

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