RURBANIZATION : ANALYSIS OF WATER SUPPLY SCHEME FOR NEWLY APPLIED TP SCHEME IN BHANODRA

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ABSTRACT: *In India, 70% of its population are in the rural area. From the census 2011 around 83.3 crores people lives in the rural area. Now a days peoples are migrating towards the urban area from the rural area because of insufficient infrastructure facilities available .So the problem of having more population arise in the urban area. Government of India is also doing essential programmes to develop the rural area by applying different schemes like Mahatma Gandhi Nation Rural Employment Guarantee Act, Indira Awas Yojana, Pradhan Mantri Grameen Sadak Yojana, National Rural Drinking Water Programme etc.to develop the rural area. Government also provide town planning scheme for the rural area for solving this problem. This work is carried out to analysis the water supply scheme for newly applied Town Planning scheme of village and to solve the problem of insufficient water by waste stabilization pond process.*

Keywords: Rural Area, Waste Supply Scheme, Town Planning Scheme.

1. INTRODUCTION:

Drinking water supply and sanitation in India continue to be inadequate, despite longstanding efforts by the various levels of government and communities at improving coverage. The level of investment in water and sanitation, albeit low by international standards, has increased in size during the 2000s. Access has also increased significantly. For example, in 1980 rural sanitation coverage was estimated at 1% and reached 21% in 2008. Also, the share of Indians with access to improved sources of water has increased significantly from 72% in 1990 to 88% in 2008.At the same time, local government institutions in charge of operating and maintaining the infrastructure are seen as weak and lack the financial resources to carry out their functions. In addition, only two Indian cities have continuous water supply and an estimated 69% of Indians still lack access to improved sanitation facilities. Almost 85% of the drinking water needs are met from ground water. Only about 5% of the total groundwater extracted is used for domestic drinking water supply. Irrigation accounts for 85% of all groundwater extraction. The remaining 10% of the ground water extracted is utilised by other sectors including, industries. The rapid development of groundwater based irrigation in many States has caused ground water depletion. Studies have shown that the depletion is taking place at a very rapid pace and a recent NASA study has shown that in Rajasthan, Punjab and Haryana the water table is declining at the rate of 1 foot every year. Attempts were also made to tackle the problem of sustainability through the Sub-Mission on Sustainability by taking up projects for conservation of water and rainwater harvesting. So to solve the insufficient water supply in village the method of recharge well, waste stabilization pond process etc are the methods.

2. LITERATURE REVIEW

The Waste Stabilization Pond Technology:[1]

- Traditionally, Ponds have been in use for centuries to store and treat animal and household, domestic waste waters. However, within last about five decades, have the specific design criteria been developed in terms of volumetric requirements, organic loading rates of the waste water and detention periods..
- Untreated waste water causes major damage to the environment and to the human health therefore waste water should be treated in order to reduce the transmission of excreta related diseases and reduce water pollution and consequent damage to aquatic biota. Stagnant waste water will also pollute the ground water in long run, therefore the waste water must be treated and suitably disposed off.
- Waste Stabilization Ponds are very simple structures to construct, earth work is the main activity involving excavation of the soil within the pond areas and refilling the same excavated soils for making proper beds and the embankments. Other civil works are minimal with little preliminary treatment requirements, fixing

of the inlet, out let and the over flow pipes, protection of the embankments, pond lining, if necessary, depending on the soil type. WSPs are very simple in construction and also in Operation and Maintenance. Land is the main costly requirement but generally available land is only used or the existing ponds are converted in to WSPs.

- The Waste Stabilization Ponds do not require any electrical energy, making them cost effective from the O&M point of view also. WSPs are extremely efficient and they can easily achieve the BOD and the suspended solids removals up to more than 90% and so also the removal of the Ammonia to equal extent. These are particularly efficient in removing excreted pathogens in contrast to all other treatment processes requiring a tertiary treatment process such as Chlorination to achieve destruction of the bacteria.
- Waste Stabilization Ponds are very robust due to their long retention periods and more resilient to both, organic and hydraulic shock loads than other waste water treatment processes. They can also cope with high levels of heavy metals.
- Decentralized waste water treatment plants are better as they minimise the cost of sewerage systems and the expenditure on pumping of the sewage to long distances. Due to warm climate and sufficient availability of land in the rural areas, such decentralized plants are best suited and are sustainable.

Treatment process in WSPs:

- Waste Stabilization Ponds are large shallow basins enclosed by earthen embankments in which raw waste water is treated entirely by the natural processes involving both algae and bacteria. As the rate of natural oxidation is slower, longer retention periods are required.

Stages of treatment:[2]

- First stage of waste water treatment is the removal of large floating particles and heavy mineral particles such as sand and grit which can be done by simple screening and grit removal before the raw waste water enters the other units of the WSP.
- Measurement of the incoming waste water is important which can be done by a Venturi or Parshall flume, before it enters the treatment units. It is essential for determining diurnal flow variations and for evaluating the performance of the treatment system.
- The system typically comprises of three treatment units, the anaerobic pond, facultative pond and the maturation ponds. Liquid depths in these units are 2 to 5 metres in the anaerobic ponds, 1 to 2 mts in the facultative ponds and 1 to 1.5 meters in the maturation ponds. The depth of the anaerobic and facultative ponds should be more than 1 metre so as to avoid growing of the vegetation from the pond base, resulting in to hazards of mosquito and snail breeding.
- Anaerobic and facultative ponds are designed for BOD removal and the maturation ponds are designed for faecal bacteria removal. Some removal of faecal bacteria does take place in the anaerobic and facultative ponds and some BOD removal occurs in the maturation ponds also which also remove some of the nutrients.
- Facultative and maturation ponds are photosynthetic ponds i.e. the oxygen needed by the pond bacteria to oxidize the waste water BOD is mainly supplied by the micro algae which grow naturally in these ponds and the Carbon dioxide needed by the algae is mainly provided by the pond bacteria as an end product of their metabolism.

Types of waste stabilization pond[3]

➢ The ponds are classified as:

- Anaerobic ponds
- Facultative ponds
- Maturation ponds
- Fully aerated ponds
- Partially aerated ponds
- Controlled discharge ponds
- Complete retention ponds
- Hydrograph controlled release

Advantages :

- Resistant to organic and hydraulic shock loads.
- High reducution of solids, BOD and pathogens.
- High nutrient removal if combined with aquaculture.
- Low operating cost.
- No electrical energy required.
- No real problems with flies or odours if designed and maintained correctly.
- Can be built and repaired with locally available materials.
- Effluent can be reused in aquaculture or for irrigation in agriculture.

Disadvantages :

- Requires large land area.
- High capital cost depending on the price of land.

- Requires expert design and construction.
- Sludge requires proper removal and treatment.
- De-sludging (normally every few years).
- Mosquito control required.
- If the effluent is reused, salinity needs to be monitored.
- Not always appropriate for colder climates.

Observations :[4]

- Waste Stabilisation Pond technology is the simplest and most suitable technology to treat waste water in rural areas. It is a proven technology being used in different places and countries. The technology adopted for different sites visited, is as per the norms. However, sizes of the ponds are larger, looking to the population of the villages and the waste water discharge.
- Incoming waste water and outgoing effluent from each unit of the WSP should also be measured through some simple measuring devices to monitor the performance of these treatment ponds. Representative samples of the effluents from each unit may also be taken on a regular basis and analysed for those parameters for which effluent discharge or reuse requirements exist.
- It is also suggested to use boulders at the inner embankment of the ponds, up to the level of waste water, to check any erosion of soil. This would also help in the maintenance of the embankments.
- Since there will be no discharge of effluent into any river and the effluent will be used for agriculture in nearby areas, the question of meeting standard discharge norms of the Central or State Pollution Control Boards does not arise. However, officials were requested to send the analysis reports of treated waste water. As already mentioned, presently no effluent is coming out of the facultative ponds and it may take quite some time for it to reach the final outlet of the system.
- A simple maintenance protocol and check list for maintenance of such WSPs should be Prepared. Points related to removal of screenings and grit, cutting and removal of the grass on the embankments, removal of floating scum and floating duckweed from the surface of the facultative and maturation ponds to maximise photosynthesis and surface aeration, , recording of the inflow and out flow measurements, sampling and testing of the samples from various units, desludging details of the anaerobic pond etc should be included. The maintenance functionaries of the PRIs should also be trained on these aspects.
- Difficulties such as removal of sludge from the existing village ponds manually are there, earth work in dry areas of the pond may be taken up.
- In general, renovation of the existing unused village ponds, which had become sludge ponds and were creating foul conditions, into Waste Stabilisation Ponds with community participation, has been useful in terms of waste water treatment and environmental up gradation. Care should be taken for the above mentioned points.

3. CONCLUSION:

In this research paper I have introduce the technique of waste stabilization pond so that the insufficient water problem can be solve and the further work is to study about recharge well and other alternatives to solve out the insufficient water problem in the village and to come out with the best techniques via cost comparison**.**

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