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Root Zone Technology System

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Abstract: ***Increasing population affect the quality and quantity of the water resources. This has resulted in pollution of freshwater bodies due to increased generation of domestic waste, sewage, industrial waste etc. In this system planted filter beds are being used which contains sand,gravel,and fine aggregate. This Technique uses a natural way to effectively treat domestic and industrial effluents. RZTS are well known in temperate climates and are easy to operate having less installation, low maintenance, and operational costs and incorporates the self-regulating dynamics of an artificial soil eco-system. This system is been used widely across the world. Use of constructed wetlands can now be recognized as an accepted low-cost eco-technology, especially beneficial as compared to costly conventional treatment systems. It is very important to use such systems in developing country like India where waste water disposal is major problem to protect environment.***
Keywords: Root Zone, Constructed wetland, Sedimentation, Absorption, Nitrification, Uptake

I. INTRODUCTION

Due to fast growth in population the disposal of sewage or waste water has become an crucial problem in India. People allow the untreated water from domestic activities and from industries also to flow in the rivers . RZTS are artificially prepared wetlands consisting of clay or plastic lined excavation and emergent vegetation growing on gravel/sand mixtures and is also known as constructed wetland.

A number of factors like low operating cost, less energy requirement and ease of maintenance attribute to making ROOT ZONE SYSTEM an best alternative for wastewater management.

The process in a ROOT ZONE SYSTEM to treat the sewage begins with passing the raw effluent after removing grit or floating material horizontally or vertically through a bed of soil having impervious bottom. The effluent percolates through the bed that has all the roots of the wetland plants spread very thickly, nearly 2,500 types of bacteria and 10,000 types of Fungi, which harbor around roots, get oxygen form the weak membranes of the roots and aerobically oxidize the organic matter of the effluent. The characteristics of plants of absorbing oxygen through their leaves and passing it down to roots through their stems which are hollow, is utilized as a bio-pump. And with no operating costs, low maintenance costs, enhances the landscape, provides a natural habitat for birds, and does not have any odor problem it can be a best alternative to other conventional treatment plant. In India IGBC (Indian Green Building Council) has adapted LEED to create LEEDINDIA and is responsible for certifying buildings under this system.

II. LITERATURE REVIEW

The literature review pertaining to survey of root zone technology system and literature related to pure experimental aspects of waste water treatment with various methods are presented below.

A. Title

Root Zone Sensors for Irrigation Management in Intensive Agriculture

1) Author: Aleberto Pardossi, Luca Incrocci

2) Abstract; At the farm level, irrigation is generally scheduled based on the grower's experience or on the determination of soil water balance . An alternative method for the measurement of soil water status. The expensive and sophisticated root zone sensors (RZS) like the neutron probes are available for use of plant scientists and soil. For irrigation manage in commercial crops cheap and practical devices are needed. The paper tells the main characters of RZS' for the irrigation industry and discusses how such sensors can be inserted in the wireless network of computer controlled irrigation like deficit or dual water irrigation. The main results of current research work conducted by authors in Tuscany on the irrigation management are also considered in the paper.

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B. Title

Wastewater Treatment Through RZTS with special reference to Shahpur Lake of Bhopal

1) *Author:* Kalpana Thakur ,Avinash Bajpai 2)Abstract; The effectiveness and feasibility for Horizontal surface flow constructed wetland/Root Zone Unit which was constructed by Environmental Planning & coordination organization (EPCO). They collected the samples quarterly from the inlet and outlet of root zone system. Using standard methods samples were tested for DO,COD,BOD,nitrates and phosphates. The result obtained indicates that the Root Zone System works effectively and treated water can be used for recreational activities like washing clothes, fishing, swimming, irrigation etc.

C. Title

RZTS as energy efficient and cost effective treatment

1) *Author:* Binita Desai
2) *Abstract:* That construction and operation of sewage treatment plant (STP) requires multi disciplinary approach. For the design of sewage treatment plant numerous conventional methods are available.The process involved in these treatments is either aerobic, anaerobic or combination requiring number of mechanical and electrical items there by requiring substantial energy. By advance technologies and intelligent supervision the conventional method of sewage treatment can be made efficient. National Environmental Engineering Research Institute treats the sewage with the help of developed root zone technology. It is found from the study carried out on nine STPs at various locations, it uses only 20% of the energy as compared to conventional sewage treatment plants.

III. PROPOSED WORK

A. Advantages of RZTS

1) It has no sludge handling problem.
2) It enhances the landscape and gives the site a green appeal.
3) It provides natural habitat for birds .
4) It doesn't have odor problems.
5) It becomes a green Zone and it does not have mosquito problem.
6) As there is no machine power the maintenance cost is low.

B. Disadvantages of RZTS

1) Location or area requirements.
2) Steep topography or high water tables may limit the use of constructed wetlands .
3) Possible problems with pests.

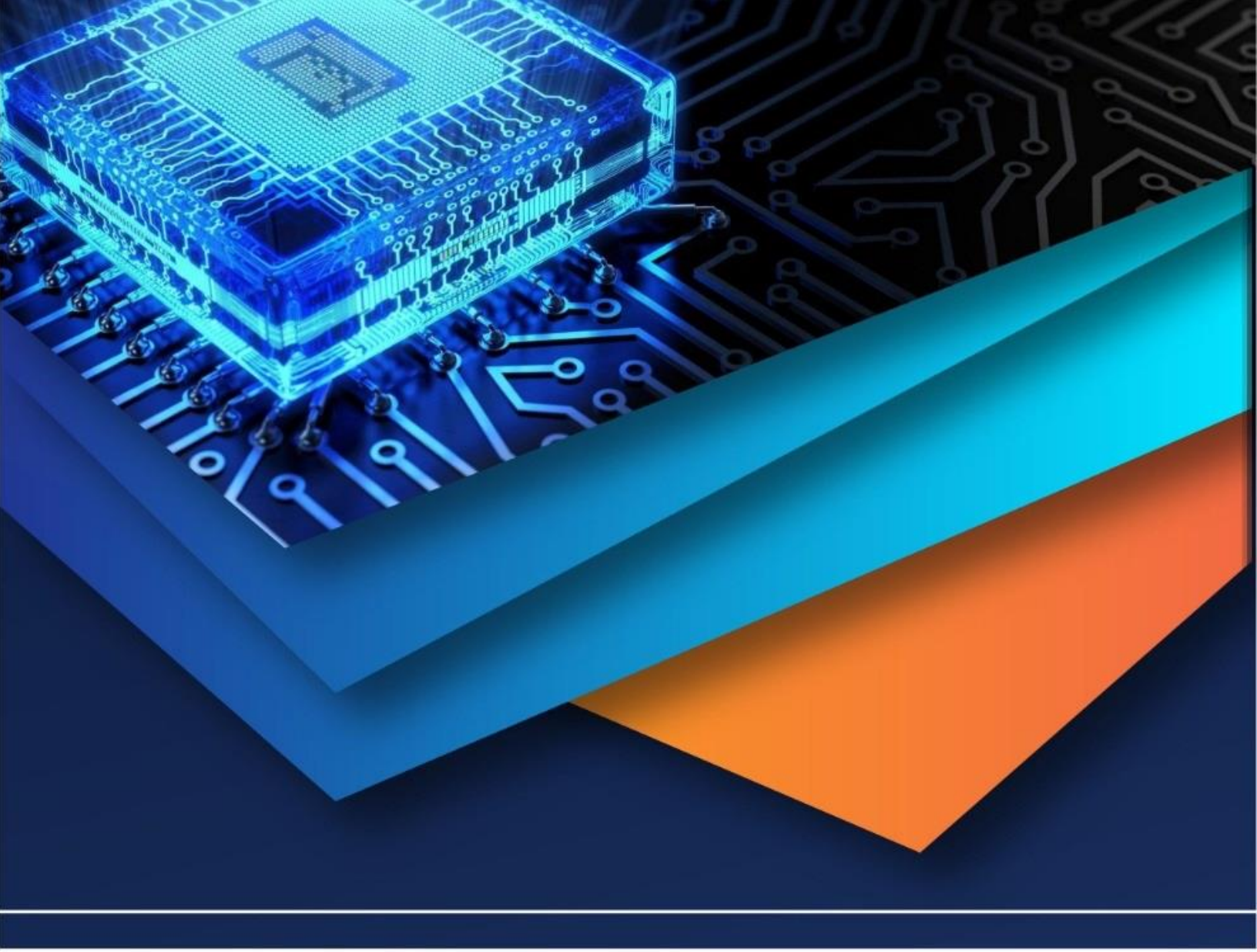
IV. CONCLUSION

The root zoning technique is very useful for small scale work while we can plan it for huge network also. This has resulted in pollution of fresh water bodies due to increased generation of domestic waste, sewage, industrial waste etc. This Study reviews the effective method by comparing wetland waste water treatment method and water hyacinth treatment method **.**

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