

Recognition of Waste Water and its Critical Role in Sustainable Development of Agriculture

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ABSTRACT: Waste water is a resource that is too valuable to throw away, especially in an increasingly water scarce world so a lot of attention has been paid in current situation of waste water due to its increasing amount and problem with its disposal & it is the challenging task in waste water management System. The project deals with the well planned utilization of waste water in agriculture through Irrigation Engineering. When waste water comes in Contact with the water body, leads to water pollution intentionally or unintentionally. An attempt is made here by using 'Tailored' water in Fertigation system for Sustainable agriculture & to overcome from the disposal problem. In these project we can study about soil related to wastewater and how its effect on crop growth. It is a case of "Churning waste into wealth and turning green to Sustainable agriculture".

KEYWORDS: Agriculture, Wastewater, reuse, Soil, fertigation, Bhemmsandalake.

I. INTRODUCTION

Agriculture is the single largest user of water. Approximately, Seventy (70)% of world water use including all the water diverted from rivers & pumps from underground is used for agricultural irrigation. So that the reuse of Tailored waste water for purposes such as agricultural & landscape irrigation reduces the amount of water that needs to be extracted from natural resources as well as reducing discharge of waste water to the environment. wastewater is a byproduct of domestic, industrial, commercial. The characteristics of wastewater vary depending on the source. It is difficult to predict the future, Available fresh water resources will certainly decrease in the coming years due to the increase demand of growing world population. Wastewater that is discharged to the environment without suitable treatment can cause water pollution. In this project the terms "wastewater reuse" apply if the treated waste is used for agriculture purpose. Soil supply plants with nutrient availability are affected by soil pH, which is measure of the hydrogen ion activity in the soil solution. Concept is implementing at Bhemmasandra, Tumkur, Karnataka.

Irrigation with effluent water benefits that extend beyond the obvious potable water savings arguments. Because raw effluent typically contains significant quantities of many essential plant nutrients to those delivered via fertigation with a dilute concentration of fertilizers. Another benefit of using treated water for irrigation is that in some cases it may eliminate the need for expensive tertiary treatment of effluent. Irrigation with effluent water containing excessive quantities of nitrogen and other elements can pose a similar threat to groundwater or underground aquifers as the over application of granular fertilizers. Reclamation of municipal wastewater shows promise as a means to meet the continued demand and growing pressure on irrigation water resources. Unlike potable water reserves, quantities of reclaimed wastewater continued to increase due to population growth and provide a readily available sources of irrigation for arid.



Figure1:-wastewater

II. OBJECTIVES

1. To manage & to promote the reuse of waste water.
2. Assessment of quality of waste water.
3. To make farmers less vulnerable to water shortage.
4. To study effects on soil strength.
5. Ability of soil strength in upcoming days to grow crops that same as early or rich in nutrients or else loss in nutrients.
6. To aware about plant nutrients (nitrogen, phosphorus ,potassium)
7. It is also necessary to consider the opportunities & threats posed by the reuse of waste water in achieving goals, impact of crop production practices on water quality.

III. SCOPES

1. Utilization of wastewater as a resource maintains the ecosystem integrity.
2. Process is very economical for developing countries.
3. Reduces depletion of groundwater and improves the availability of drinking water.
4. Reduced need for fertilizer.
5. Even distribution of nutrients throughout the root zone by drip irrigation.
6. Potential for local job creation and income generation.
7. Low risk of pathogen transmission if water is properly treated.
8. Low to moderate capital and operating costs.

IV. MATERIAL REQUIRMENTS:

- 1) Agriculture land :- To implement project
- 2) Equipment to collect waste water sample & soil sample.
- 3) Fertilizer
- 4) Environment lab for testing water sample.
- 5) Geotechnical lab for testing soil sample.

V. METHODOLOGY

The methodology adopted to achieve above objectives Comprise of following steps.

1. Framing of objective
2. The project run through the help of toposheet of the village Bheemasandra, Here we are recognizing the waste water comes and collect at the out skirt of Bheemasandra.
3. Using GIS system preparing drainage map to supply wastewater for agriculture land.

4. Waste water can be treated in treatment plant by adding fermspect chemical to remove foul smell.
5. Collection of wastewater sample at treatment plant.
6. Tests on waste water sample are conducted.
7. Results are recorded on the basis of test conducted in laboratories.
8. The effluents are removed and liquid content is passed through pipeline to reach Bheemasandalake.
9. To avoid the disposal of waste water we are proposing a project to utilize this water to agriculture through fertigation system.
10. Preparing drainage patter by using GIS system to the agriculture land and utilize the treated wastewater for growth of crop by using this it can reduce use of fertilizer to crop.
11. Cultivating the land & Farming the crops with the help of farmers.
12. Test are conducted on the soil taken from the cultivated land.
13. By using wastewater the impact on soil can be determine and can analysis the which type if crop is sutiable for grow are not.
14. Results are recorded on basis of test conducted in laboratories.
15. The conclusion is given based on results.

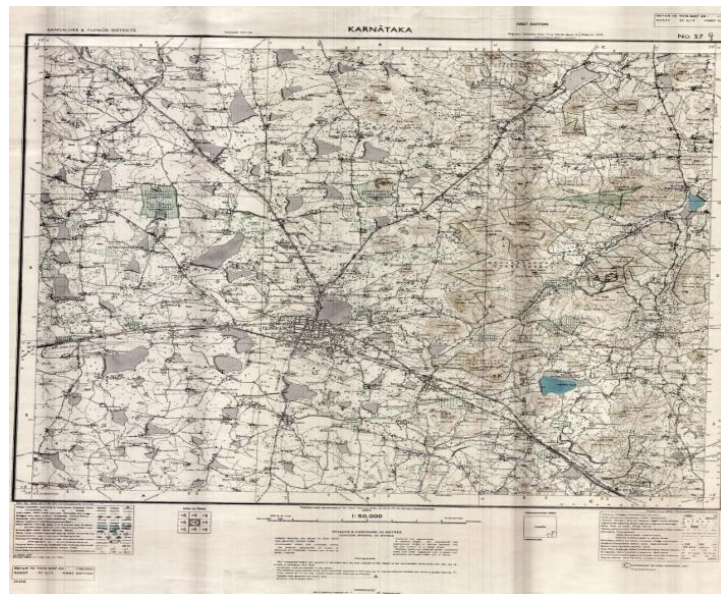


Figure 2. Toposheet of Karnataka

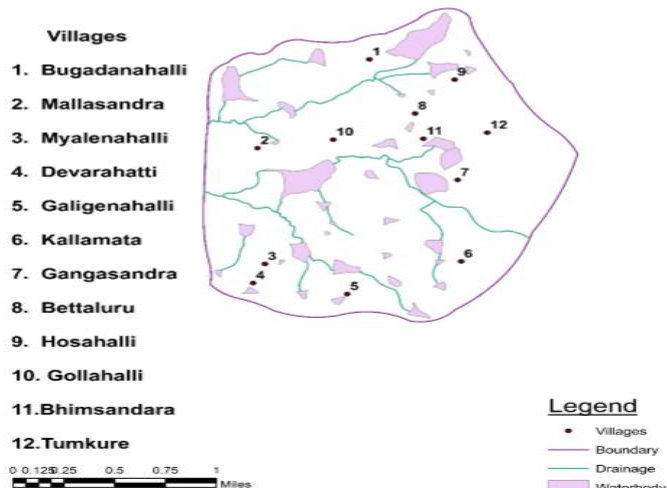


Figure 3. Drainage Map

VI. TEST

Table1: Water Analysis report

Sample name	PH	EC	Na Ppm	Chl Meq/l	S Ppm	Ca Ppm	Mg Ppm	CO3 Meq/l	BCO3 Meq/l	SAR	RSC
Critical limit	6.5-7.5	ds/m	ds/m	< 3.0	me/l	me/l	me/l	me/l	1.50-7.50	<8.00	<2.50
Exit	7.0	1.5	0.5	5.0	0.8	5.5	2.0	0.5	0.8	1.0	0.2
Entry	7.1	2.0	0.9	6.5	2.1	6.8	3.0	0.5	11.0	1.7	0.4

- Before starting project wastewater must be tested before it used for irrigation purpose. As per result base the wastewater pH is enough to use for irrigation purpose In water, water for irrigation should have a pH between 6.5 and 7.5. Water with pH below 7.0 is termed “acidic” and water with pH above 7.0 is termed “basic”; pH 7.0 is “neutral”.
- The test is used to determine the electrical conductivity (EC) of the water to the higher the salt content, the greater the flow of electrical current.
< 1.5 desired rang
>1.5 potential problem
> 3.0 will burn under certain conditions.
- The SAR is also an index of the sodium permeability hazard as water moves through the soil. The main problem with a high sodium concentration is its effect on the physical properties of soil. A breakdown in the physical structure of the soil can occur with continued use of water with a high SAR value. The effects of high SAR on the infiltration of irrigation water are dependent on the EC of the water.
- The sodium (Na++) cation is often found in natural waters due to its high solubility. When linked to chloride (Cl) and sulfide (SO4), sodium is often associated with salinity problems. High concentrations in the soil can adversely affect turf grasses. Poor soil physical properties for plant growth will result as a consequence of continued use of water with high sodium levels.
- Calcium levels below 40 mg/L will typically need fertilizer additions of calcium to prevent deficiency while high levels of calcium above 100 mg/L may lead to antagonism and resulting deficiency in phosphorus and or magnesium. High levels of calcium may also lead to clogged irrigation equipment due to scale formation.
- Bicarbonate (HCO₃⁻) and carbonate (CO₃⁻²) are common constituents of irrigation water, and can influence soil properties and turfgrass performance. If bicarbonate and/or carbonate levels are high (>120 and 15 mg/L, respectively), these ions can react with calcium and magnesium in the soil to form insoluble calcium carbonate and magnesium carbonate (lime) hazard of irrigation water.

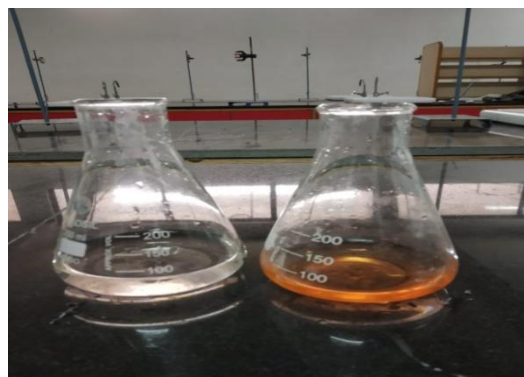


Figure 4:-waste water collecting

Table 2: Analysis of Soil Test Report:-

SL.NO	Name of test	Result	Critical limit
1	Ph	5.6	6.5-7.5
2	EC(dSml)	0.48	<1
3	N(Kg/Ha)	72.524.6	280-560
4	P(Kg/Ha)	235	22.5-55
5	K(Kg/Ha)	857	125-336
6	Ca(ppm)	857	800-1500
7	Mg(ppm)	225	150-250
8	Fe(ppm)	15.5	5-10
9	Zn(ppm)	1.1	0.75-1.0
10	Cu(ppm)	0.7	0.5-1.0
11	Mn(ppm)	8.0	3-8

1. Soil testing is a useful tool that can help to ensure the efficient use of applied plant nutrients. Soil tests measures the quality of a nutrient that is extracted from a soil by a particular extractants.
2. Excess N potential to cause nitrogen injury, excessive vegetative growth, delayed growing season and maturity, and potential to cause economic loss to farmer.
3. Excessive amount of N & P can cause excessive growth of undesirable aquatic plant.
4. Dissolved inorganic substances such as EC, Na, Ca, Mg cause salinity and associated adverse impacts. It's also affect the permeability and soil structures.
5. Heavy metals such as Cd, Pb, Zn, As, etc., causes accumulate in irrigated soils and the environment. Toxic to plants and animals impacts on health.
6. Hydrogen ion concentration in soil pH possible adverse impact on plant growth due to acidity or alkanity.
7. The DEWATS effluents significantly increased N and extractable P concentrations.

VII.CONCLUSION

1. A steady increase in urban population and insufficient sewage treatment facilities have resulted in the direct disposal of untreated or partially treated municipal waste water in to water channels downstream from cities. It is clear that waste water needs to be more fully recognized within the overall water cycle, as one of the greater untapped opportunities to enhance sustainable developments wise investments to waste water management through irrigation will generates significant returns, as addressing waste water is a key step in reducing poverty & sustaining ecosystem services.
2. Fertigation using wastewater effluents to maintain soil field capacity added excessive N &P more than was required by crop.
3. The measured quality of extractable nutrient in soil is then used to predict the crop yield response to application of the nutrient through fertilizer, manure and any other amendments.
4. Proper utilization wastewater for irrigation can avoid the use of extra fertiliser to crop.
5. Further study of this project carried out by testing of crop and analyse the soil properties which crops is suitable to grow in that area by using wastewater and what is the soil condition by continues use of wastewater, yield of crop can be determine.

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