International Journal on Science and Technology (IJSAT)
E-ISSN: 2229-7677 ● Website: www.ijsat.org ● Email: editor@ijsat.org

IMPACT OF DOMESTIC SEWAGE FOR IRRIGATION ON PROPERTIES OF SOIL

K Adiseshu[1], D Malaki[2], S Nithin Kumar[3], S Shakeer[4], P Peddi Raju[5], K Naveen Reddy[6]

[1,2,3,4,5]Research Scholar, [6]Guide
Department of CIVIL
Tadipatri Engineering College, Tadipatri.

Abstract:
Currently, because of population increase, the demand for water has multiplied significantly, resulting inside the technology of more domestic wastewater. Domestic wastewater use improves the bodily and chemical homes of soil compared to appropriate groundwater use. Improved domestic wastewater promotes the increase of agricultural vegetation by using growing soil fertility. Domestic water use will increase the entire N, P, K and organic carbon content material of soil. Wastewater consists of vital vitamins for plant increase and heavy metals that can be harmful to animals if the permissible tiers are surpassed. For water-primarily based uses, wastewater treatment improves the physical and chemical residences of soil. Using domestic wastewater with fertilizer instead of land utility with fertilizer progressed the physical and chemical properties of soil, crop manufacturing and nutrient popularity. Compared to manipulate groundwater, the vital vitamins and fertilizer content material discovered below SW irrigation multiplied drastically in Ca, Na, N, P, K, and SO4. The effects showed that the wastewater contained ideal stages of total nitrogen, general phosphorus and potassium, which can be taken into consideration vital nutrients for crop (plant increase) and soil fertility levels. The sample may be tested for pH, turbidity, BOD, COD, N, P, and K.

Keywords: Ground water, N, P, K BOD, COD, Ph, turbidity, domestic waste water (domestic sewage).

I.INRODUCTION

The call for water in arid and semi-arid regions is growing. Therefore, excessive fine water is reserved for consuming, and coffee quality water is usually recommended for irrigation. Domestic wastewater is reasonably-priced and is considered an attractive source of irrigation water in recent times. Therefore, the priority for the reuse of irrigation water is swiftly increasing in most nations. In addition, wastewater is a valuable supply of plant vitamins and organic count that is essential for preserving the fertility and richness of drylands. Domestic wastewater carries crucial plant nutrients inclusive of N, P, K, and micronutrients beneficial for plant growth. The objective of this study changed into to evaluate the changes in soil parameters after utility of domestic waste to soil. Wastewater is used as an irrigation source for developing veggies and herbs close to cleared pastures, and is used directly or not directly by way of humans. Raw wastewater is an abundant source of natural and inorganic vitamins required for plant increase; wastewater farming could be very commonplace in all city regions of India. Wastewater from a few towns, where commercial waste is discharged, might also incorporate high degrees of toxic metals. Therefore, the composition of home waste may additionally vary relying on the share of industrial waste. Factor evaluation applied to untreated wastewater. The second largest thing become determined to be nitrification. Several studies have proven that wastewater irrigation will increase the ranges of heavy metals in soil. Some of these metals, as soon as deposited in the soil, migrate up the food chain, posing a severe health hazard to humans and animals. In addition, these metals reason deficiencies in other nutrients, consisting of copper, iron, and manganese, which

plants cannot absorb as zinc, likely because of competition for the equal nutrients inside the soil-water device. Metals which includes iron, manganese, cobalt, copper, and nickel are vital nutrients; but, their permissible limits in dwelling organisms are very low.

II.LITERATURE SURVEY

The motive of this newsletter is to look at the impact of domestic wastewater on soil fertility of irrigated land. Currently, because of populace growth, the call for for water has extended substantially, resulting in the manufacturing of extra home wastewater. Domestic wastewater use improves the bodily and chemical residences of soil in comparison to desirable groundwater use. Improved domestic wastewater will increase soil fertility and promotes the growth of agricultural plants. Greywater use will increase the overall nitrogen, phosphorus, calcium and carbon content of the soil, growing crop manufacturing as compared to irrigated irrigation [1].

Today, because of the scarcity of clean water for irrigation, wastewater, particularly sewage water, is being used to irrigate agricultural land. The experiment became conducted for 365 days beneath agronomic practices using experimental vegetation along with wheat (AKW-1071), pea (Jackie-9218), spinach (Pusa Jyoti), fenugreek (Kasuri) and persimmon (Multicut). The land became irrigated with water and household waste. Each crop changed into implemented at the endorsed NPK fertilizer rate for processing. Compared to the results of water-based totally fertilizer application, application of household waste with fertilizer extended the bodily and chemical homes of the soil, crop yield and nutrient reputation. When grey water irrigation became carried out through the years, there has been a moderate change in salt solubility and alkalinity in clay soil with grey water irrigation, but the effect changed into now not great [2].

Water is taken into consideration a restricted and fragile resource for lifestyles. In modern day era, agricultural fields have grown to be an area of sewage disposal. A multi-stage random sampling method is used. A general of a hundred thirty five farmers had been selected to acquire data for the observe. The accrued statistics changed into offered in tabular shape for clean assessment. The accumulation of chemical compounds, oils and acids within the wastes destroys the unique homes and value of the bacterial population. Farmers admitted that the land is contaminated with water, which is obvious from the color of the well water and its blackness. Health troubles which include diarrhea, cholera, malaria and typhoid have been greater not unusual among farmers in water-borne villages compared to farmers in freshwater villages, resulting in higher consistent with capita healthcare expenditure amongst farmers in water-borne villages. Farmers inside the take a look at region suggested that fruits and vegetables grown in easy water have a shorter shelf lifestyles and taste worse than fruits and greens grown in freshwater. On the alternative hand, end result and veggies fetch higher charges due to their larger size, beauty and brightness. Therefore, there may be a want to provide strategic and proactive strategies to increase socially proper, economically possible and price-powerful wastewater remedy systems to prevent ability harmful effects on environment, fitness and groundwater [3].

Use of wastewater for irrigation improved the chemical homes and fertility of soil. Wastewater incorporates essential factors for plant increase and heavy metals which can be harmful to animals if the permissible stages are passed. To monitor this example, a take a look at was conducted to determine the heavy metal accumulation in agriculture due to waste water irrigation of crops in some precise areas of Vidyaranyapuram, Mysore city. The consequences discovered that the wastewater contained ideal degrees of overall nitrogen, overall phosphorus and potassium, that are considered critical nutrients for crop (plant growth) and soil fertility degrees. The heavy metal content material within the waste water was within the limits endorsed by means of the Food and Agriculture Organization. The analysis confirmed that within the soil aggregate, except for a widespread boom in Fe, SW and TSW irrigation had extensive ($P < 0.05$) consequences for all elements. Our take a look at showed that during vegetation, SW which re-used the water delivered approximately a significant boom ($P < 0.05$) in N, P, K, Ca, Mg, and Na content material. The detection of heavy metals in

waste water irrigation (SW) led to a full-size boom ($p < 0.05$) in Fe, Mn, Cu, Zn, and Pb in comparison to groundwater irrigation (GW). Where there has been no substantial effect on grass increase, as shown within the concentrations of heavy metals inclusive of Cd, Ni, Co, and Cr [4].

With the increasing demand for fresh water (FW) for home use, handled wastewater (TW) is turning into a welcome source of water for agricultural irrigation. The number one objective of this have a look at turned into to evaluate the results of 15 years of irrigation on water high-quality and drift strategies in clay soils, in relation to WWS software. The distribution of this impact on water first-class alongside the soil profile depth changed into additionally quantitatively investigated. Laboratory-scale soil bodily model methods and numerical solutions of hydrological equations have been used to determine the fundamental soil water properties of disturbed soil samples from zero-20, 20-40, and 40-60 cm layers inside the root region. The effects showed that the hydrological conductivity, absorption capacity, and infiltration charge at saturated intensity in WSW-irrigated soils were always decrease for all samples. WWS software affected water retention and water delivery overall performance, resulting in a smaller simulated wetted quantity under the drip line for WWS-irrigated soil cowl. These outcomes demonstrate the combined and complicated effects of WW software on the percentage of exchangeable sodium inside the soil and adjustments in touch perspective and pore length distribution. They also show that WW software has unique results in extraordinary zones of the soil profile, relying at the environmental management parameters and the absorption homes of the flora [5].

The effects of wastewater irrigation on the buildup of heavy metals (HMs) in soil, crops, and subsoil had been investigated with the aid of monitoring wastewater remedy fields inside the jap suburbs of Beijing for distinctive periods of time (20, 30, and 40 years). The region became no longer irrigated with wastewater as a control. The outcomes show that lengthy-time period wastewater irrigation will increase the quantity of soil natural count. The maximum concentrations of Hg, Pb, and Cu had been found in the pinnacle layer of soil (0-30 cm) from the irrigated areas for forty years. High concentrations of Cd, Cu, and Zn have been glaring in the deeper soil layer (forty-70 cm) close to the sewer line. The switch coefficients of various TMs obtained within the cropping device ranged from 0.002 to 0.491. The TM of cereals and crops irrigated with wastewater in the zones did no longer exceed the prescribed limits. Long-term water runoff does now not pollute the soil and does no longer color the land. However, in areas where wastewater is handled for irrigation, special care should be taken to screen the concentrations of Hg, Pb, and Cu, in an effort to prevent these HMs from coming into the food chain and posing a fitness danger [6].

In arid and semi-arid regions, due to the scarcity of fresh water, the usage of treated home wastewater for irrigation is becoming not unusual. However, wastewater used for irrigation can affect the chemical and hydrological properties of soils. This paper investigates the outcomes of irrigation with separate water losses on the hydrological homes of semi-arid and arid lands. Irrigation of semi-arid and sandy loam soils with secondary drift extended salinity at depths of ~1.Five m and in solonchaks at depths of ~1.5 and >4 m, respectively. Increased natural rely loading within the runoff water had an unfavourable effect on organic remember within the reveille, at the same time as the 'priming' effect of the runoff water might also have reduced natural count in the subsoil. Water infiltration thru the soil profile may also reduce its saturated water conductivity (Ks), which depends at the exceptional of the drift, the chemical properties of the soil and the pore length distribution of the soil. Second-float liquefaction reduced the Ks of clay and silty soils because of the presence of rock solids, while it became not tormented by sandy soils because of their large common pore length. Irrigation of dryland with excessive sodium content material handled by means of reverse osmosis ended in a decrease in Ks due to a lower within the electrolyte awareness within the wastewater, which expanded soil swelling and soil enlargement [7].

III.EXISTING SYSTEM

The current approach uses household sewage for irrigation in order to produce high-yield crops. Additionally, the residential sewage was tested for N, P, K, and Ph. The soil and water samples will be tested for those 3, 7, and 10 days. The outcomes were then contrasted with a sample of household waste water and regular ground water.

OBJECTIVE

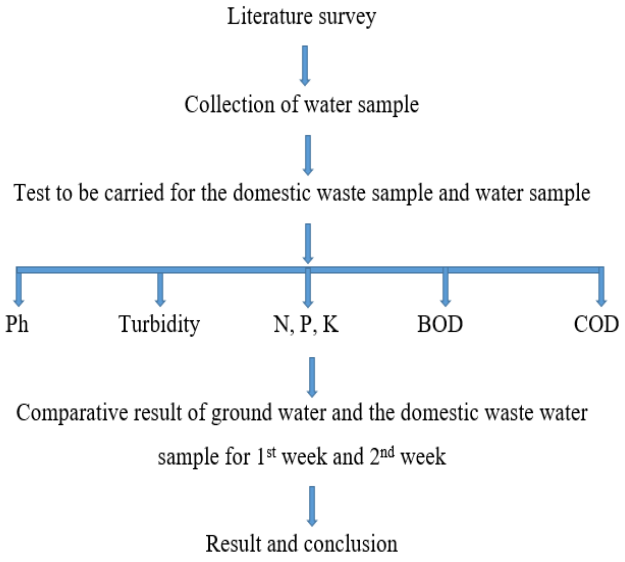
This project's primary goal is to ascertain whether home and industrial sewage may be used for irrigation. Samples of groundwater, industrial sewage, and household waste water are released into the soil independently in order to examine the positive effects of household waste water on soil characteristics. Two soil samples including sewage and groundwater were tested for turbidity, BOD, COD, and soil parameters N, P, K, and pH after the first and second weeks after wastewater application.

IV.PROPOSED SYSTEM

The suggested technique uses household sewage for irrigation in order to monitor agricultural yield. The first and second weeks of the soil and water sample are used to test the soil in this project. The soil is next tested for turbidity, BOD, COD, N, P, K, and Ph.

V.METHODOLOGY

After gathering water from the residential regions, a sample of waste water was taken. Because ground water is scarce, a sample of household wastewater is examined for irrigation purposes. In the approach, the steps that must be followed throughout the project will be explained. This will provide an explanation of the complete project in accordance with the methodology. Below, the brief chart will be displayed.



TEST TO BE CARRIED FOR THE DOMESTIC WASTE WATER SAMPLE:

There are some of the test will be carried as follows :

- Ph
- Turbidity
- Nitrogen test (N)
- Potassium test(K)
- Phosphorous test (P)
- Biochemical oxygen demand (BOD)
- Chemical oxygen demand (COD)

1. Testing Procedure Of Ph:

The aim to find the Ph of the water sample.

Using a sterile dropper, deposit the sample onto the pH paper. Take note of the pH paper's colour shift. Now contrast the colour shades on the normal pH chart with the colour obtained on the pH paper. Note the pH value that was determined.

2. Testing Procedure Of Turbidity:

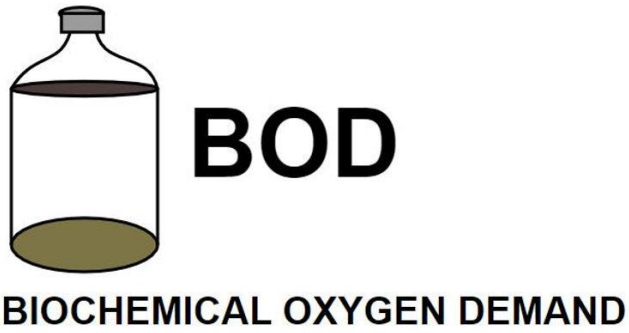
The aim is to find the turbidity content of the water sample.

The amount of light scattered by particles in a water sample is measured by a nephelometer or turbid meter, usually at a 90-degree angle, to test for turbidity. The results are represented in Nephelometric Turbidity Units (NTU). Light penetration is the technique it utilizes to measure turbidity. Turbidity is measured by shining a light through the sample and measuring how much of it is dispersed and reflected back to the sensor. Light is highly scattered in a turbid liquid and vice versa.

3. Testing Procedure of Bod:

The aim is to find the find the bod content of the water sample.

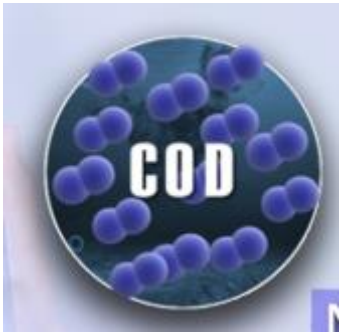
By incubating a sample in a sealed container at 20°C for five days, measuring the dissolved oxygen (DO) before and after incubation, and computing the difference, the BOD (Biochemical Oxygen Demand) test determines how much oxygen microorganisms need to break down organic matter in a water sample. Appropriate sample dilutions are made for the BOD analysis. After that, preliminary measurements of dissolved oxygen are made. Dissolved oxygen readings are taken again after five days of incubation at 20°C +/- 1°C, and computations are made using the difference between these readings and the data obtained prior to incubation.



4. Testing Procedure Of Cod

The aim is to find the cod of the water sample.

Organic matter in a wastewater sample is oxidized using a powerful oxidant as part of the Chemical Oxygen Demand (COD) test procedure. The amount of oxygen consumed during the oxidation process is then measured, usually with a spectrophotometer or titration. Potassium dichromate (K2Cr2O7) or potassium permanganate (KMnO4) are typically employed as oxidizing agents in accordance with the conventional techniques for detecting COD. Toxic reagents like as Ag+ and Hg2 + salts are also used in the conventional procedures for COD measurements.



VI.COMPARATIVE RESULT OF THE SAMPLE

In order to determine the precise results of two distinct samples, the comparative study will describe the differences in each water sample.

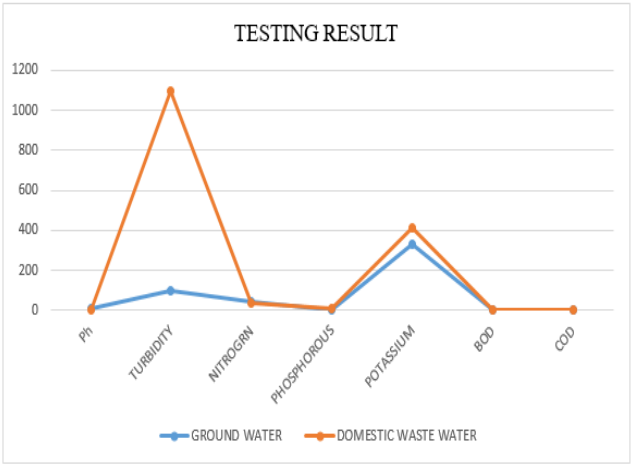
Testing Result for Normal Ground Water:

S.NO	PARAMETERS	RESULT	UNIT
1.	Ph	7.71	-
2.	Turbidity	0	NTU
3.	Nitrogen	46.23	mg/L
4.	Phosphorous	4.80	mg/L
5.	Potassium	330	mg/L
6.	BOD	4.02	%
7.	COD	1.5	%

Testing Result for Domestic Waste Water for 1st Week:

S.NO	PARAMETERS	RESULT	UNIT
1.	Ph	3.26	-
2.	Turbidity	1100	NTU
3.	Nitrogen	34	mg/L
4.	Phosphorous	5.93	mg/L
5.	Potassium	411	mg/L
6.	BOD	0.39	%
7.	COD	2.45	%

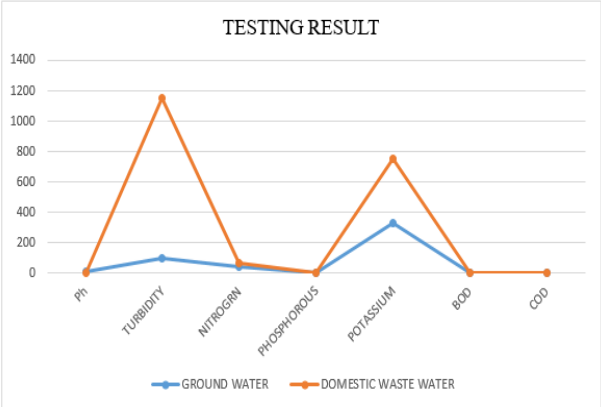
Comparative Study of Ground and Domestic Waste Water for 1st Week:



Testing Result for Domestic Waste Water for 2nd Week:

S.NO	PARAMETERS	RESULT	UNIT
1.	Ph	5.5	-
2.	Turbidity	1150	NTU
3.	Nitrogen	68.65	mg/L
4.	Phosphorous	5.5	mg/L
5.	Potassium	750	mg/L
6.	BOD	4.75	%
7.	COD	3.15	%

Comparative Result for Ground and Domestic Waste Water for 2nd Week:



VII.CONCLUSION

The idea involves collecting and treating household wastewater before using it for irrigation. This was done since ground water is currently scarce. in order for waste water from different locations to be gathered, undergo initial treatment, and then be used for irrigation because the home waste water sample contains nitrogen, phosphorus, and potassium. To determine the results of the normal ground water and the residential waste water, the test was conducted for two weeks.in order for the findings to show that, in comparison to the first week, the value of the potassium, phosphorous, and nitrogen levels gradually increases in the second week.

REFERENCES:

1. Mojiri A, Hamidi AA, Shuokr QA, Gholami A, Mahnoosh A. has proposed on "Impact of Urban Wastewater on Soil Properties and Lepidium sativum in an Arid Region" , International Journal of Scientific Research in Environmental Sciences.
2. Intizar H, Raschid L, Hanjra MA, Marikar F, Hoek WVD. Have an investigation on "Framework for analyzing socioeconomic, health and environmental impacts of wastewater use in agriculture" International Water Management Institute.
3. Kiran DL, Krishna DL , Manik VS, Ramteke DS have studied on "Impact of Domestic Wastewater Irrigation on Soil Properties and Crop Yield", International Journal of Scientific and Research Publications.
4. Singh PK, Deshbhratar PB, Ramteke DS have investigated on "Effects of sewage wastewater irrigation on soil properties, crop yield and environment" Agricultural Water Management.
5. Agrawal V, Bhagat R, Thikare N have studied on "Impact of Domestic Sewage for Irrigation on Properties of Soil" International Journal of Research Studies in Science, Engineering and Technology.