

A Case Study :

Studies on important soil properties and accumulation and bio-availability nutrients and heavy metals in soils irrigated with effluent waters flowing in *khari* canal around area of *Nawagam-Vatava* region of Gujarat (India)

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Keeping in view the possible contamination of ground water along the open canal carrying mix industrial effluents in *Nawagam-Vatava* region, a survey was carried out to assess the important soil properties, nutrient content and availability of heavy metals in soils irrigated with effluent waters flowing in *khari* canal around area of *Nawagam-Vatava* region of Gujarat (India). The soils of contaminated area were slightly neutral to alkaline whereas uncontaminated soils showed pH more towards sodicity. The available P_2O_5 and S were higher in the contaminated soil, while available K_2O it was higher in uncontaminated soil with mean of 743 kg ha^{-1} over contaminated soil. The DTPA- micronutrients were more or less similar in contaminated as well as non-contaminated soil. While, the DTPA extractable heavy metals like Cd, Cr, Co, Ni and Pb were higher in contaminated soil than non-contaminated soil. Among the heavy metals, the mean values of DTPA-Cr, Ni and Pb were quite higher in contaminated soils than uncontaminated.

In different parts of the country, the

menace of a rapidly increasing population, the want on growth of industries and increasing urbanization has created major problems with the disposal of sewage and industrial effluents. These industries generate huge quantity of solid and liquid wastes. They contain appreciable amounts of metals besides beneficial nutrients. Therefore, their continuous application to soil may lead to accumulation of heavy metals, which are likely to pose serious threat on soil health. Among the different polluting elements, the heavy metals create serious problems whenever they are accumulated in environment. The unwise use of raw sewage water and industrial waste water for irrigation continuously had elevated levels of available heavy metals in the cultivated layer of the soil. Therefore, survey work conducted for assessment of soils irrigated with effluent waters flowing in *khari* canal around area of *Nawagam-Vatava* region of Gujarat (India)

The surface (0–15 cm) soil samples were collected by screw augur in a zig-zag manner from fields and thoroughly

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Methods of soil analysis			
Sr. No.	Parameter	Method / Extractant	Reference
1.	pH and EC (1:2.5 - soil : water)	Potentiometry	Jackson (1973)
2.	Organic carbon (OC)	Modified Walkley and Black method	Walkley and Black (1934)
3.	Available P_2O_5	Olsen's method (0.5 M $NaHCO_3$, pH 8.5, Ascorbic acid)	Olsen <i>et al.</i> , (1954)
4.	Available K_2O	Neutral N NH_4OAc Flame photometry method	Jackson (1973)
5.	Available S	Turbidimetric method (0.15 % $CaCl_2$ extractable S)	Chaudhary and Cornfield (1966)
6.	Available Fe, Mn, Zn, Cu, Pb, Cd, Co, Co and Ni	Atomic absorption Spectroscopy (0.005 M DTPA)	Lindsay and Norvell (1978)