THESIS

SOIL AND WATER POLLUTION WITHIN IMMEDIATE VICINITY OF INDUSTRIAL UNITS IN SUBURBS OF LAHORE

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ABSTRACT

SOIL AND WATER POLLUTION WITHIN IMMEDIATE VICINITY OF INDUSTRIAL UNITS IN SUBURBS OF LAHORE

This study was carried out during 1996-97 in the industrial area in the suburbs of Lahore in order to evaluate the water quality of different industrial effluents for agriculture and their effects on the soil/water chemical characteristics. For this purpose three industries viz Paper and Board Mill, Fertilizer Factory and Leather Industry were selected on Lahore-Sheikhupura Road and same number of industries viz Ittehad Chemicals, Ravi Rayan Industry and Nabil Industry were selected on Lahore-Gujaranwala Road. The effluents samples from industries on Lahore-Sheikhpura Road were collected in May, 1996 and from industries on Lahore-Gujranwala Road in April, 1997. After collection these samples were immediately transferred to the Soil Reclamation Laboratory of Centre of Excellence in Water Resources Engineering, Lahore for analysis. To investigate the impact of effluents on surface and groundwater quality, water samples from canal, shallow and deep groundwater were also collected near the selected industries. As the effluents from the industries were being used for irrigation purposes, therefore some fields were selected to study the effects of industrial effluents on soil chemical properties. For this purpose two fields were selected close to the each selected industry, one being irrigated with industrial effluent and other with canal or tubewell water. From each field six soil samples upto the depth of 90 cm with an interval of 15

cm each were collected. The soil and water samples were analyzed for pH, total soluble salts (TSS), sodium adsorption ratio (SAR), soluble anions and cations and heavy metals. Organic matter content was also determined from soil samples.

The results of study showed that effluent from different industries were quite variable in quality. Effluent from Paper and Board Mill had low salt content and sodium adsorption ratio (SAR) and therefore it was useable for irrigation. The water quality of fertilizer factory effluent was marginal and it could be used under special management practices. However, the effluent from other industries were hazardous and should not be used for irrigation purposes. The water from canal, shallow and deep groundwater near the industries was of good quality except shallow groundwater close to Paper and Board Mill which was marginal.

The heavy metals in effluents of Paper and Board Mill, Fertilizer Factory, Leather Industry and Nabil Industry were quite low and were less than the recommended maximum concentrations by the FAO. However, the Ravi Rayan Industry effluent had high manganese content and Ittehad Chemicals effluent had high nickel content. The heavy metals of all other effluents were within the permissible limits. The heavy metals of canal, shallow and deep groundwater were quite low and within permissible limits. The chemical analysis of soils irrigated with different industrial effluents showed that the soil have been deteriorated by their use because they had very high salinity and sodicity status as compared to the soils irrigated with canal or tubewell water in the same vicinity.

It is concluded from this study and from analytical data collected from different industries located in other cities that some of the industrial effluents are useable as an irrigation source due to their good quality. However, before any industrial effluent is recommended for agriculture use, its quality should be thoroughly evaluated.

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