

# **Soil and groundwater contamination in Katedan Industrial Development Area: sources of contamination and remediation**

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Detailed studies were carried out at Katedan Industrial Development Area near Hyderabad, India. Soil, sediments, groundwater and surface water samples were studied for their major, minor and trace elemental contamination. The main objectives of the study were (i) Assessment of extent of pollution in soil and water (ii) To delineate the source of pollutants as natural or anthropogenic (iii) Preparation of Geochemical/distribution maps of various toxic elements for water/soil/sediments (iv) To give suitable recommendations for minimizing the contamination and to suggest preventive and remedial measures.

The study area consists of granites of igneous origin belonging to the Archaean age. 250 soil samples were collected from a depth of 5 - 15 centimeters (top soil) covering entire study area. About 150 sediment samples were collected during pre- and post-monsoon season along the streams, Lake Periphery and from different parts of lake. Soil and sediment samples were analyzed by X-ray fluorescence spectrometer for trace elements e.g. arsenic, vanadium, chromium, nickel, copper, cobalt, molybdenum, strontium, rubidium, lead, zinc and 10 major oxides. 90 surface water and 100 groundwater samples were also studied.

It was observed that main sources of contamination were (i) free discharge of industrial effluents in open streams, (ii) random solid waste (hazardous) dumping by the side of road and lakes (iii) Open sewage and (iv) random garbage dumping. The studies revealed that surface soil was highly contaminated with arsenic (up to 100 mg/kg), lead (up to 2000 mg/kg), chromium (up to 800 mg/kg) and zinc (up to 1600 mg/kg). Groundwater showed very high concentrations of arsenic (93 ug/kg), chromium (330 ug/kg), nickel (240 ug/kg), lead (1500 ug/kg), zinc (5000 ug/kg) and cadmium (37 ug/kg). The studies show that all the Media in the study area are contaminated: surface, soil, sediments, subsoil, surface water and groundwater. The contaminants on the different media are inter-related through water streams connecting five lakes in the area. There is a need for holistic approach for remediation involving all the industries.