An Integrated Approach for the Sustainable Watershed Development in Mulki River Basin

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Submitted to Visvesvaraya Technological University, Belgaum

in partial fulfilment of the requirements for the

Award of Bachelor of Engineering Degree in

CIVIL ENGINEERING

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June-2009

SPONSORED BY : KARNATAKA STATE COUNCIL FOR SCIENCE & TECHNOLOGY

ABSTRACT

Fast urbanization, infrastructure development and industrialisation becoming the spurt of activities in this era, the scarcity and contamination of the surface and groundwater is becoming a major issue at present. An integrated approach to sustainable Watershed Development and management through water resource planning is the need of the hour. Mulki River basin, being a typical rectilinear river basin of coastal Karnataka sprawling in an area of about 353 sq. Km., dotted with many industrial establishments, developmental activities and Special Economic Zones (SEZs) has been studied for a sustainable watershed development using integrated approach in a GIS platform incorporating geomorphological, geophysical and hydrogeochemical methods and data.

In this study the watershed has been delineated and various thematic maps have been prepared out of satellite imageries, SOI Toposheets, geophysical studies and geochemical parameters of groundwater samples collected from the basin using Arc GIS 9 and ERDAS IMAGINE 9.1. Software. Geophysical investigations have been carried out at selected places to find out the existence of deeper fractures and feasibility of untapped deeper aquifers. Over 75 ground water samples have been collected and tested for following water quality parameters: alkalinity, TDS, BOD, EC, pH, iron, nitrates, sodium, potassium, calcium, turbidity, sulphates, chlorides, hardness, fluorides, etc.,. Isogram maps or variation maps and statistical analysis of above parameters have been carried out to understand the quality parameters of ground water. A comparison of the previous year's water quality parameters has been made using GIS to understand the change in the same. An integration of all these data has been carried out using GIS platform for the better understanding of groundwater development and management of the basin.

72 traditional rain water harvesting structures and about 56 micro water sheds have been identified and delineated using the satellite imageries. Deeper potential aquifers located beyond 300 feet exist in this basin. It is noticed that quality of the water pollution has affected much more regions compared to last year during the same period. The vulnerability map of water quality has been made and found that certain parameters like Fe, Ca, Cl, pH, TDS, Total Hardness and Turbidity are beyond permissible limit of potable water. Water table is declining at an alarming rate in this area. Also it is noticed that the salt water intrusion has taken place up to about 6 KM and at deeper aquifer level to more than 11.6 KM stretch from the coast and is progressing. The Geographic Information System (GIS) is found to be an effective tool for the integrated studies of river basin and the present studies and data can be utilised for pre-industrialized situation of the watershed which will be helpful for the sustainable development of the water in this area.