



Study on Groundwater Quality Using Geographic Information System (GIS), Case Study: Ardabil, Iran

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Abstract

This study involves the analysis of water resources pollution data using Geographic Information System (GIS), which is a subset of the purposes such as: study on the status (situation) of the aquifer, the natural and man-made effects on aquifer quality, evaluation and investigation of quality monitoring results of Ardabil aquifer, study on quality limitations by comparing the results of analysis of wet and dry seasons from water resources with selected standards. Therefore, samples were collected from 76 wells, in this region, for the purpose of the aquifer water quality assessment, identification of changing process of pollution and statistical analysis of quality parameters included NTU, TDS, Nitrates and Chloride. Afterwards, maps for each parameter were produced in the geographic information system (GIS) using scientific methods. Thereupon, situation and condition of water quality was measured by quality mapping index of NSFQW and was applied for whole the basin. This maps and database, which were created by the software, provide and offer an obvious view of what happened in the study area. As a result, it could be applied for a better management of these water resources and planning to prevent further pollution, by relevant organizations.

Keywords: Geographic Information System (GIS); Ground Water; Ardabil; Aquifer; NSFQW.

1. Introduction

Water is the most essential element of life. More than 70 percent of Earth's surface is covered with water, however only 3% of this water is available as fresh water. Another remarkable point, the major portion of fresh water is found in groundwater or in the form of icecaps and glaciers. Therefore, monitoring, controlling and management of water quality in aquifers, as the main sources of fresh water, are important facts. According to the assessment of scientists and researchers, in the 21st century, amount of world water reserves will be reduced due to the global climate change, which will lead to the freshwater shortage in most countries. Groundwater is the world's largest freshwater source after glaciers and it is used in developed countries, mostly. It is because of the better quality in the case of the bacteria than the other freshwater resources. Thereupon, water-related disease outbreaks are minimized using these kind of water resources. Despite this, with increasing of population, agricultural and industrial activities, these water resources are facing with the risk of pollution and it caused this precious resource been unusable. The evacuation of thousands cubic meters of industrial and domestic wastewaters and also, drainage water of agricultural lands into the surface and groundwater resources, caused to increasing of pollution of these resources and, finally, it has been led to the creation of environmental disasters. Since the significant portion of the pollutions, which created on the surface of the basin, enters into its aquifers, groundwater pollution has increased considerably. Therefore, in recent decades, significant efforts has been done to

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