

Drought and its effect on vegetation, comparison of NDVI for drought and non-drought years related to Land use classifications

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Paper Reference Number: 07-69-5561

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Abstract

The purpose of this study is to analyze the effects of drought on various land use types. This study uses a combination of remote sensing data, field observations and information from local people to analyze the effects of drought on various land use changes for 2 years 1999 and 2004 in Isfahan. Imagery was selected for both drought and non-drought conditions based on precipitation data. The Normalized Difference Vegetation Index (NDVI) was then calculated for both images in order to detect the amount of change within the study area. The NDVI images were then analyzed for land use classification to determine which classification was the most susceptible to drought in terms of reduced NDVI values. Overall there was a decrease in the NDVI values for drought conditions as expected. The results of this experiment indicated that the rangeland classification had the highest percent change between the two NDVI images; mean NDVI value change from 0.199 to 0.895 resulting in a 63.6 percent change due to drought effects. Therefore rangeland were the most effected land classification; however there are several factors that occur in this class including grazing, enclosure and harvest that could have skewed the results.

Key words: Drought, NDVI, Land Use

1. Introduction

Drought are natural phenomena that occur throughout history. drought are associated with a shortage of water resources over a large geographical area, which extends for a significant period of time. There is not a universally accepted definition of drought at is depends on wide variety of climatological parameters, with significant spatial variability. Drought occurs in both high and low rainfall areas and virtually all climate regimes.

As Obasi mentioned, droughts had affected 50% of 2.8 billion people who suffered from weather-related disasters. Moreover, 1.3 million people have died due to the direct and indirect cause of drought during 1967–1991.

Remote sensing methods are based on brightness values of the land cover types and enable the characterization of the land cover. Because vegetation differentially absorbs visible incident solar radiant and reflects much of the near infrared (NIR), data on vegetation biophysical characteristics can be derived from visible and NIR and mid-infrared portions of the electromagnetic spectrum. Several vegetation indices have been introduced using ratios of these reflections.

The purpose of this project will be to determine drought effects on NDVI in the Semirom region (Isfahan) and also the effects on selected land use types within the region to determine which type is most susceptible to drought conditions. Iran is currently under severe drought conditions and has been for the previous year. Precipitation data suggests that rainfall is several milimeter below normal. In order to determine the effects of drought and make a