

The Assessment of Desertification changes in the South of Yazd Using Remote Sensing

Ali Asghari¹, Saeed Shojaei^{2,*}, Maryam Khosropur³

¹Department Agricultural, Payame Nour University, Iran

²Ph.D Student of Desertification at University of Kashan, Department of Desert Engineering, Faculty of Natural Resources and Geo Sciences, University of Kashan, Kashan, Iran

³Master of Science Desert Management, Yazd University, Yazd, Iran

E-mail: s_shojaei@ut.ac.ir

Abstract: Desertification is the ecological and biological reduction of the earth, which may be either normal or abnormal. Desertification mainly affects arid and semi-arid regions and decreases the efficiency of the lands rapidly, so it is essential to recognize this phenomenon. In this study, the satellite images of Landsat 8 were used to investigate the desertification as the basis for studies. Based on the studies conducted on satellite images, Isfahan has grown about 260 square kilometers. During the same 10 year-period, the southeastern part of Yazd shows the most decrease in vegetation that is about 26 percent.

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1. Introduction

Desertification (or more properly, lands desertification) is considered as one of the aspects of land degradation and natural hazards that, in recent decades, has been introduced as natural disasters to threaten the life of residents in areas prone to desertification, especially in arid, semi-arid, and dry and sub-humid regions due to population growth in the world, particularly in developing countries. Desertification is basically a process, in which part of the natural fertility of the soil will be lost due to improper exploitation, water logging of the lands, salinity and sodicity of the soil. In other words, desertification will lead to land degradation and reducing the capabilities of soil subsistence in arid, semi-arid, and dry and sub-humid regions. This phenomenon is a result of various factors, including human activities and climatic variations (Qi et al, 2012:39).

Nowadays, human interferences in nature and its inappropriate managements in using natural resources may lead to human desertification and technogenic desertification (desertification due to the growth of technology and industrialization). Thus, desertification, which is considered as one of the consequences of land degradation, makes the human role clearer in developing, controlling and severity of the phenomenon. The consequences of desertification has had irreparable damages such as the loss of fertile lands, reducing biomass in forests, fertile pastures and plains, decline of groundwater and loss of the surface water, soil salinization and reducing the quality of water resources (Sepehr et al, 2012:39). The process

of identifying differences in the status of a phenomenon by observing it at different times is basically called monitoring (Singh, 1989:991). The timely recognition of changes in the properties of land surface complications provides a basis to better understand the relationship between human and natural phenomena for better management and use of resources. In general, monitoring involves the use of multi-temporal data sets to quantitatively analyze the temporal effects of a phenomenon (Lu et al, 2004: 2368).

Moradi et al (2008) examined land use changes in desertification in Ardakan using remote sensing. The results indicate a decrease in the extent of desert areas from 1334 to 1376 of 2000 hectares as well as 1376 to 1381 of 160 hectares and the increase in the area of other land uses. Since the process of desertification and its monitoring occur at a large scale in time and space, thus, the RS and GIS techniques can be useful for initial recognition of the regions and assessing desertification changes, as a handy tool to achieve this objective (Mosavi et al, 2013: 86).

2. Materials and methods

This study is based on the use of data and Landsat satellite images. Landsat 8 contains 9 spectral bands that 8 bands are 30 meters and its panchromatic band 8 has a spatial resolution of 15 meters. The bands have been generally recorded between the visible and near-infrared range, except the 9-band of the Landsat 8 containing the wavelength of 1/36 to 1/38 micrometers. DEM of 10 meters was used to identify

the changes (United States Geological Survey) (Alipur et al., 2016; Shojaei et al., 2016).

3. Results and discussion

According to the results of this study, in recent years, vegetation changes provide suitable conditions to desertification due to a decrease in precipitation and

average moisture. As the results show, the southern parts are more impressive in terms of the expansion of desert areas since some seasonal precipitation have been reserved in the northern part of the region due to the elevations and the destruction of vegetation is slowly moving forward.

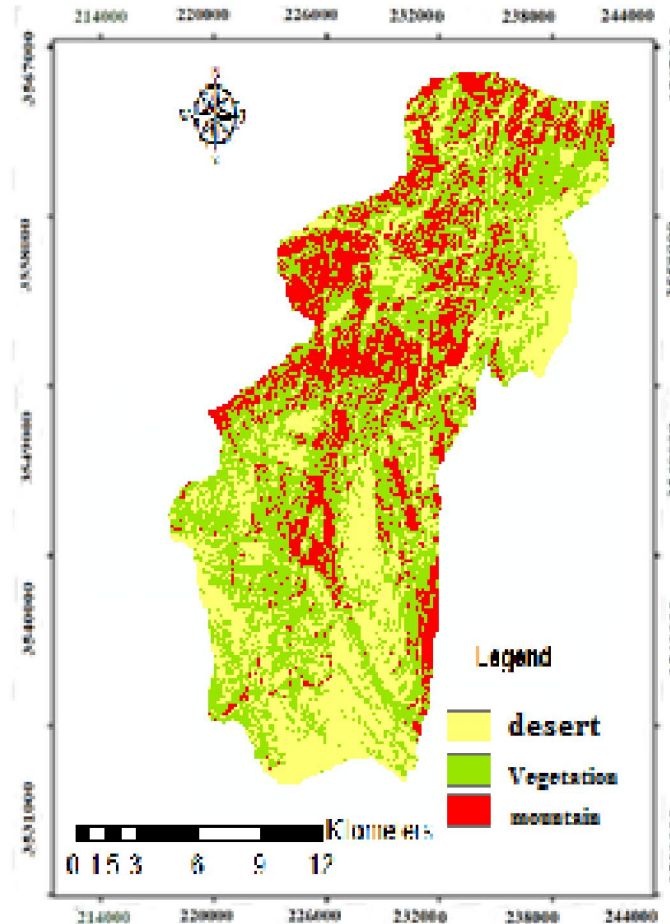


Figure 1. Land use in 2016

4. Conclusions

Desertification is currently considered as a destructive phenomenon affecting many countries of the world, particularly in developing countries, which results in the loss of renewable resources in each of these countries (Ahmadi, 2004). Desertification occurs in arid and semi-arid as well as the sub-humid regions. Based on the definition, it is the loss of land potential due to one or a combination of criteria such as wind erosion, water erosion, and destruction of vegetation, destruction of water sources, water logging and... that aggravated by environmental or human factors. In this study, satellite images used to identify desertification.

The results showed that, during 10 recent years, the vegetation has fallen more than 26 percent that the highest rate can be seen in the southeast and east sections.

Corresponding Author:

Saeed Shojaei
Department of Management the
Arid and Desert Regions,
Yazd University, Iran
Telephone: +989013988871
E-mail: s_shojaei@ut.ac.ir

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