# Land Use Changes Detection and Spatial Distribution Using Digital and Satellite Data, Case Study: Farim Basin, Iran

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## Abstract

Land use change may influence many natural phenomena and ecological processes, including runoff, soil erosion and sedimentation and soil conditions. Decrease of the forest area in the North of Iran is one of the critical problems in recent years. The aims of this study were to detect land use changes between: 1967 and 2002, using satellite images of Land Sat 7 ETM+ (2002), aerial photos and digital topographic maps (1967 and 1994) and to investigate the effect of some physical and socio economical factors on land use dynamic. The forest maps of 1967 and 1994 were collected from 1:25000 digital maps in Micro Station and then transfered to Arc View 3.2 software. The interpretation of the maps of other land uses was derived using aerial photos. ETM+ Satellite data were used to generate land use maps for 2002. The images quality assessment and georeferencing were performed on images. Different suitable spectral transformations such as rationing, PCA, Tasseled Cap transformation and data fusion were performed on the images in ENVI and IDRISI software. Image classification was done using supervised classification maximum likelihood and minimum distance classifier utilising original and synthetic bands resulted from diverse spectral transformation and the forest area was separated from non forest area. Unsupervised classification was used to separate other types of land use. Change detection has shown that the forest area decreased between 1967 and 2002 by 21 % from 7322 to 6947 ha. Also, the area with irrigated land farms have been increased to 202.01 ha (+1.6 %) and the dry land farming area decreased to 9.2 %. Overlaying the map of land use change with roads and residential maps showed that by increasing the distance from roads and residential areas and villages, deforestation rate and conversion of forest to arable lands were reduced, but conversion of arable lands to released lands increased. Also, the most quantity of deforestation was observed in lower slope angle, but the dry land farming converted to release lands was observed in higher slope angle.

**Keywords:** Change detection, Farim Basin, Iran, land use map, spectral transformation

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