

## **Monitoring Land Cover Changes in Halabja City, Iraq.**

### **ABSTRACT**

This paper presents land use / land cover changes of the Halabja city in the north part of Iraq over 1986 to 1990 by utilizing multi-temporal remote sensing imagery. Halabja city has been facing severe land use/land cover changes following a series of wars beginning with Iraq-Iran war (1980-1988) to the just concluded invasion of Iraq (March 19, 2003 – 2011). In this study, multi-temporal Landsat images (TM) between the years of 1986 and 1990 were used. All images are rectified and registered to Universal Transverse Mercator (UTM), zone 38N and WGS\_84 datum. Hybrid classification as a combine of k-Means and Maximum Likelihood Classification (MLC) algorithms were applied to classify the images in five different land cover categories: water body, cultivated area, shrub land, urban area and bare land. Quantitative analysis was conducted by using post-classification change detection technique. The results show an overall accuracy for 1986 and 1990 images are 92.2% and 96.8% respectively. During 1986 to 1990 land use / land cover changes a lot with a huge decrease about 40.8% in cultivated area whereas, urban area, Shrub Land and bare land classes increased by 57.9 %, 67.1 % and 14 % respectively.

**Keyword:** Remote sensing; Change detection