

# GIS MODELLING OF LAND DEGRADATION IN NORTHERN JORDAN USING SATELLITE IMAGERY

Salem Al Hussein

## ABSTRACT

Northern Jordan has undergone tremendous land cover change during the last three decades. This study tried to answer the following question: How have population growth and socio-economic influences affected soil quality in northern Jordan? The underlying factors that have led to the changes in land use and land cover are poorly documented, but efforts in this area started to be effective with the creation of the Badia Research and Development Programme. However, there has been little efforts to spatially correlate the land cover changes with soil quality. An empirical model based on high resolution spatial and temporal remotely sensed data offers the ability to assess the degradation impacts of changes in land cover in a spatial context. In an attempt to assess the impacts of changing land cover on soil, a GIS-based erosion model has been developed to predict annual soil loss by water in northern Jordan. This model uses the Revised Universal Soil Loss Equation (RUSLE).

Spatially distributed static (topographic and soil) parameters for this model are extracted from a regional GIS developed specifically for the Badia Programme area. The dynamic (vegetation cover) parameter is estimated from the land cover maps, derived by digital processing of multi-resolution, multi temporal Landsat MSS (14. 9. 1972, 16. 7. 1985) and TM (28. 8. 1992). Mapping of vegetation cover was carried out by applying TM-Linear Mixture Modelling and NDVI, while mapping of fallow lands was carried out by both on-screen digitizing and sketch mapping in the field. The image difference technique was used in the change detection analysis.

The erosion model predict an increase in the amount of soil loss in the study area from 1972 to 1992, as a result of land cover changes. It was concluded that the degradation of the soil in the study area, observed during the last two decades, was caused by effects of these land cover changes.