SOIL EROSION MODELLING AND SOIL MOISTURE MONITORING BY USING REMOTE SENSING

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Nowadays one of the major problems on global scale is the rapidly increasing demand to the food. This demand is of course totally parallel to the population growth. Even more land is used for agricultural purposes day by day. Cultivation without using specific control techniques, unplanned land use, such as establishing industrial facilities or constructing summer houses on the agriculture land, uncontrolled urban development and also destroying forests are fundamental factors of soil erosion. This paper will focus on the size of the amount of soil loss because of the erosion in the surrounding area of the Işıklar Mountain over Thrace Peninsula region in Turkey. Işıklar Mountain is the second highest point in this peninsula with its 945 metres peak. This region lies approximately between 27º00' and 27º30' East longitudes and 40º30' and 41º00' North latitudes covering an area of approximately 1000 km2, has the most fertile territory for the agriculture especially for vineyards. The rainfall varies from 540 to 1034 mm, depending on elevations, most of which of which falls in the rainy season (November-April). This reality makes this study much more important for decision-makers and for all authorized people who are responsible for agriculture developing strategies.

In this study satellite imagery is used to reach rapidly to the actual land use classification. Morgan method is applied to solve the modelling problem of the soil erosion and a geographic information system software named ILWIS is used to monitor the probable success of the determining method. The question why Morgan method is preferred can be answered by the following explanations made by geologists and agricultural engineers. According to them Morgan method has a more powerful physical fundamental than the USLE method and is easier and more flexible method than the CREAMS method.

At the first stage of this study all the possible data for modelling soil erosion about the study area will be obtained. These data are the slope angle and the altitude of the study area, ph value, surface texture, stoniness and drainage class of the soil, annual precipitation, soil depth, land use classes and crop texture. If enough necessary data can be collected, a predictive model about the soil loss per year will be established. The results of this model will be presented in ton / hectare per year. These results make it easier to determine if the soil loss under the average tolerance limit is or not.
Soil loss determination method consists of two different base phases. First one is the water phase; second one is the sedimentation phase. At the water phase kinetic energy of rainfall, overland flow and annual precipitation values and at the sedimentation phase rate of soil detachment by raindrop impact and transport capacity of overland flow values are calculated for every pixel by generating maps for each input data. Land use/cover data is obtained from classified LANDSAT 5 TM image data. By the classification process ISODATA (Iterative Self Organizing Data Analysis) unsupervised classification is chosen.