The 36th International Symposium on Remote Sensing of Environment,
11 – 15 May 2015, Berlin, Germany, ISRSE36-585-1

DETECTING OLIVE OIL MILL WASTE DISPOSAL AREAS IN CRETE/GREECE WITH THE USE OF GIS AND REMOTE SENSING

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THEME: Agriculture and Food Security

KEY WORDS: Remote Sensing, GIS, IKONOS, Landsat 8, Disposal Areas

ABSTRACT:

Olive oil mill wastes (OOMW) constitute a major factor in pollution in olive-growing regions and an important problem to be solved for the agricultural industry. The olive-oil mill wastes are normally deposited at tanks, or directly in the soil or even on adjacent torrents, rivers and lakes, posing a high risk to the environmental pollution and the community health. This study aims to develop integrated satellite remote sensing methodologies to detect and monitor OOMW disposal areas in the island of Crete, Greece in South Eastern Mediterranean. More than 1000 disposal tanks were mapped through an extended GPS survey that took place throughout the island depicted. Satellite images of both high (IKONOS) and medium (Landsat 8 OLI) resolution were pre-processed and analysed by applying geometric, radiometric and atmospheric corrections. A library with spectral signature of OOMW concerning different time periods as well as satellite sensors was developed. At the same time, ground spectroscopy campaigns were carried out and a complementary spectral signature library was developed. Both libraries were compared for their accuracy through statistical approaches and the optimum spectral range for detecting OOMW areas was estimated. In addition, vegetation indices were developed, applied and compared for their efficiency in detecting the wastes ponds. Furthermore, a final integrated methodology was developed in GIS environment employing, spatial analysis and classification algorithms for the detection of the wastes tanks. The study highlighted the potential of means of Geoinformatics to the semi–automatic detection of OOMW disposal areas in the context of the Mediterranean landscape.

This work was performed in the framework of the PEFYKA project within the KRIPIS Action of the GSRT. The project is funded by Greece and the European Regional Development Fund of the European Union under the NSRF and the O.P. Competitiveness and Entrepreneurship.

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