Determination of the Cultivated Tobacco Fields Using SPOT–6 Satellite Images: a Case Study in Tavas Plain, Denizli, Turkey

Elif Sertel, Sinasi Kaya and Berk Ustundag (Turkey)

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SUMMARY

Determination of the cultivated tobacco fields using SPOT-6 satellite images: a case study in Tavas Plain, Denizli, Turkey Muhittin Karaman1, Elif Sertel1,2, Sinasi Kaya1,2, Berk Ustundag3 1 ITU, Center for Satellite Communication and Remote Sensing, 34469, Maslak-Istanbul,Turkey 2 ITU, Department of Geomatics, 34469, Maslak-Istanbul, Turkey 3 ITU Agric. & Environ. Inf. Res. Center, 34469,Maslak-Istanbul,Turkey mkaraman@itu.edu.tr, sertele@itu.edu.tr, kayasina@itu.edu.tr, berk@berk.tc ABSTRACT One of the important industrial products of Turkey is tobacco which has been extensively planted in Aegean Region of the country. Manisa, Denizli, İzmir, Muğla, Aydın, Afyon, Kütahya and Uşak are the cities in this region where the cultivation of tobacco has been practiced. Based on the statistical information, 80.000 tones of tobacco had been produced in Turkey over a total area of 1.080.770 da in 2012. The cultivation of tobacco rate of Aegean Region is 79 % with a total tobacco production rate of 72% comprising the biggest portions compared to the other regions of the country (TÜİK, 2013). 19.470 tons of tobaccos were produced over approximately 260.951 da area in Tavas Plain, Denizli which was selected as study area in this research. Tavas plain includes two important districts namely Tavas and Kale and total tobacco production of these districts are 7% and 8 % respectively, supplying 15 % total tobacco production of Turkey. Tobacco yield of the country has increased to 74 kg/da in recent years whereas tobaccos cultivated in Tavas Plain has better yield of 78 kg/da. It is important to monitor agricultural areas sustainably and accurately and produce up-to-date agricultural inventory maps in order to support regional agriculture policies and strategies, to determine the amount of subsidies and to improve agricultural planning. Remotely sensed data has been widely used for agricultural applications like monitoring agricultural areas, identification of different crop types, production of crop maps and yield estimation. This research aims to identify cultivated tobacco field in Tavas Plain and determine physical changes over these areas during different phenological phases using recently launched high resolution SPOT-6 satellite data. SPOT-6 images were obtained on 30.04.2013 and 24.07.2013, having a spatial resolution of 1.5 m and four different bands in the spectral domain. These images were classified using ISODATA unsupervised classification algorithm to identify the spatial extent of tobacco fields. Three different classifications were conducted using different parameters to analyze the accuracy and performance of each classification to identify tobacco fields. The usability of SPOT-6 images for agricultural purposes especially for tobacco delineation was also investigated.