

Land Suitability Assessment for Vineyards in Afghanistan Based on Physical and Socio-Economic Criteria

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Abstract : Land suitability analysis is essential for table grape cultivation in order to increase its production and productivity under the dry condition of Afghanistan. In this context, the main aim of this paper was to determine the suitable locations for vineyards based on satellite remote sensing and GIS (geographical information system) in Kabul Province of Afghanistan. The Landsat8 OLI (operational land imager) and thermal infrared sensor (TIRS) and shuttle radar topography mission digital elevation model (SRTM DEM) images were processed to obtain the normalized difference vegetation index (NDVI), normalized difference moisture index (NDMI), land surface temperature (LST), and topographic criteria (elevation, aspect, and slope). Moreover, Jaxa rainfall (mm per hour), soil properties information are also used for the physical suitability of vineyards. Besides, socio-economic criteria were collected through field surveys from Kabul Province in order to develop the socio-economic suitability map. Finally, the suitable classes were determined using weighted overlay based on a reclassification of each criterion based on AHP (Analytical Hierarchy Process) weights. The results indicated that only 11.1% of areas were highly suitable, 24.8% were moderately suitable, 35.7% were marginally suitable and 28.4% were not physically suitable for grapes production. However, 15.7% were highly suitable, 17.6% were moderately suitable, 28.4% were marginally suitable and 38.3% were not socio-economically suitable for table grapes production in Kabul Province. This research could help decision-makers, growers, and other stakeholders with conducting precise land assessments by identifying the main limiting factors for the production of table grapes management and able to increase land productivity more precisely.

Keywords : vineyards, land physical suitability, socio-economic suitability, AHP

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