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Land Suitability Classification of Persian Walnut Cultivation in Iran Using Geographic Information System (GIS)

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The efficient use of water resources, soil, and climate parameters as the main pillars of plant sustainable production requires land suitability evaluation for each crop and area. This research was conducted to evaluate land suitability of walnut in Iran using geographic information system (GIS). For this purpose, the climate data obtained from 375 synoptic stations of Iran, the geographical data obtained from Aster satellite with a precision of 150 m (5 seconds) and the edaphic data obtained from a database prepared by Iran's Water Resources Management were used. In this regard, the initial maps (layers) were obtained based on the studied parameters including geographic coordinates, temperature, chilling requirement, electrical conductivity of soil and water, relative humidity and land slope. Finally, the final mapping of suitable areas for walnut cultivation was presented as land suitability classification by combining these layers. The results showed that around 582844 km^2 (35.36 %) of Iran is suitable (to fairly suitable) for walnut cultivation. In the other hands, 9.13, 16.70 and 9.54 % of Iran's area are best, suitable and fairly suitable for walnut cultivation, respectively. Also, 1065351 km^2 (64.64 %) of Iran is not recommended for walnut cultivation. Based on the obtained maps, the suitable areas for walnut cultivation in Iran are northern strip and northwestern and western provinces of Iran. Also, parts of Kerman, Fars, Isfahan and Yazd province are considered as suitable areas to walnut cultivation.

Keywords: ArcGIS, Chilling requirement, Climate factors, Iran, Persian Walnut.

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