45. Assessing Agricultural Land-Cover Change and Hydroclimatic Associations in Homogeneous Mediterranean Spatial Domains

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Assessing agricultural land-cover evolution in Mediterranean landscapes requires comparable climatic and land-cover observations. This study investigates agricultural land-cover evolution and climatic associations using a Google Earth Engine (GEE)–Python methodology that addresses the spatial, thematic, and temporal heterogeneity of open raster datasets. Homogeneous raster domains in Tavoliere delle Puglie, Sibari Plain and Catania Plain were defined using one Köppen–Geiger class per domain, SRTM slopes ≤3° and ESA WorldCover (WC) 2021 cropland. CORINE Land Cover (CLC) maps for 2000, 2006, 2012 and 2018 tracked agricultural and other land-cover changes across study areas. TerraClimate data covered 2000–2021, from the first CLC date to the WC reference year; associations covered 2000–2018. Agricultural agreement at the same locations in all four CLC maps covered 98.58% of selected WC cropland in Tavoliere, 95.72% in Sibari, and 93.04% in Catania. Restricting the 2000– 2021 climatic calculations to these areas changed mean temperature by less than 0.015 °C and mean annual precipitation by less than 1.1 mm relative to all selected WC cropland. This consistency justifies retaining WC cropland for domain climatic characterization. Agricultural fractions declined in Tavoliere and Sibari and were nearly unchanged in Catania; artificial surfaces increased in all three areas. Partial least squares regression with spatial validation tested whether combined hydroclimatic period averages improved predictions beyond domain–interval mean agricultural changes. No consistent predictive improvement emerged. The methodology provides comparable climatic and land-cover observations for regional agricultural monitoring and for identifying areas and periods requiring finer-scale mapping and investigation.