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Could be the future climate change an opportunity for the winegrowers? The case study of Aglianico wine in southern Italy.

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Water deficit is a limiting factor to yield production and crop adaptation to future climate conditions. This is true for crops addressed mainly for biomass production (e.g. maize, wheat, etc.) but not for those where the quality is relevant. Specifically, in grapevine water stress (mid or limited) - occurring during specific phenological phases - is a factor to produce good quality wines. It induces for example the production of anthocyanins and aroma precursors. Therefore, the water stress, due to the future increase of temperature and the rainfall decrease, could represent an opportunity to increase winegrowers' incomes.
The study was carried out in Campania region (Southern Italy), in an area vocated to high quality wines production (ZOVISA project: Viticultural zoning at farm scale)
The study was realized in two different soils (calcisol and cambisol), under the same climate, on Aglianico cultivar, standard clone population on 1103 Paulsen rootstocks placed along a slope of 90 m length with 11% of gradient.
The agro-hydrological model SWAP was calibrated and applied to estimate soil-plant water status at the various crop phenological phases for three vintages (2011-2013). Crop water stress index (CWSI) - estimated by the model – was related to physiological measurements (e.g leaf water potential), grape bunches measurements (e.g. sugar content) and wine quality (e.g. tannins). For both soils, the correlation between measurements and CWSI were high (e.g. -0.97** with sugar; 0.895* with anthocyanins in the skins).
Then, the model was applied to future climate condition (2021-2051) obtained from statistical downscaling of GCM in order to estimate the effect of the climate on CWSI and hence on vine quality. The results show that the effects of the climate change on the vine quality is dependent by the soil, being relevant to the cambisol and less pronounced to the calcisol, with an expected improvement of wine quality in the cambisol.