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How the soil spatial scale information impacts on the strategies to achieve the SDG2 aim at 2030

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Sustainable Development Goal 2 (SDG2) is an ambitious goal that combines the problems of hunger, food security and sustainable agriculture. Under the Millennium Development Goal (MDG) framework this fell under a broader goal: eradicate extreme poverty and hunger.
Soil science, as a land-related discipline, has important links to several of the SDGs, and in particular on SDG2, which are demonstrated through the functions of soils and the ecosystem services that are linked to those functions (e.g. crop production).
The fundamental concept of SDG2 is to achieve double the agricultural productivity by 2030 with a sustainable agriculture. The achievement of SDG2 goal can be evaluated at different spatial scales taking into account the effect of climate change on crop production by means the use of agro-hydrological simulation models.
However, the farm scale is the scale where the crop yields are realized, and where the evaluation should be made. In this context, this research work wants to analyze the effect of soil spatial variability detail, in the evaluation of crop production under climate change when SDG2 goal want to be achieved.
The study was carried out in Campania region (Southern Italy), an area typically cultivated with maize for buffalos feeding. The simulation model used was CropSyst (St¨ckle, 1996), the climatic information used for simulation runs are high resolution climate projections derived through the regional model COSMO-CLM on the basis of two different IPCC emission scenarios, namely Representative Concentration Pathway, RCP4.5 and RCP8.5. Simulations were performed for Reference Climate RC (1971-2001) and RCP 4.5 and RCP 8.5 from 2006 to 2100.
The study was carried out in a Regional experimental farm (Improsta - SA) placed in an irrigated district of Campania region (Destra Sele, Southern Italy). The calibrated simulation model CropSyst was applied at farm scale (about 140 ha) to evaluate the maize yields under two Representative Concentration Pathway scenarios (RCP 4.5 and 8.5) when optimal nutrient and irrigation condition where applied, considering three soil spatial scale information (1:5000 farm soil map;1: 50000 district soil map; 1: 100000 European soils database of Joint Research Center -JRC).
The outputs where used to: 1) analyze the trends of maize yields under the RCP 4.5 and 8.5 compared to the reference climate period (1971-2005); 2) evaluate if the SDG2 goal will be achieved in the 2030; 3) how and how much the soil spatial information influence the results of two previus aims (1-2). Results show how the different level of detail is important to determine with accuracy future maize biomass, but a certain degree of approximation obtained moving from a low to a high details scale is useful for future yield forecasting at low cost.