Book of Abstracts

Wageningen Soil Conference 2015

'Soil Science in a Changing World'

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COMPARATIVE ANLYSIS OF OPTIONS FOR THE SPATIAL FRAMEWORK OF YIELD GAP ANALYSES: A FOCUS ON SOIL DATA

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Water-limited yield potential is the yield of an adapted crop cultivar when grown without nutrient limitations and biotic stresses effectively controlled, while yields can be limited by water supply during the growth period. To estimate the difference between water-limited yields and actual farmer's yields, the so-called yield gap, it is essential that information about soil properties that determine plant-available soil water is available. Recently, a high-resolution gridded dataset (AfSoilGrids, 250m and 1km resolution over 2m depth) has been developed, which provides the required information for Sub-Saharan Africa, indicating per gridcell the effective root zone depth (cm) and available water capacity (%v). Combined with weather and management data, this information can be used by crop models to simulate water-limited yields. The application of a high-resolution dataset might however be limited due to computation capacity and the limited capacity for collecting relevant local crop management data for the simulations and evaluating the simulations. To investigate the effects of different spatial coverage of soil information we compared several spatial frameworks, which differentiate in the degree of considered spatial variation in soil data. The basis of the frameworks is the climate zonation developed within the Global Yield Gap Atlas (www.yieldgap.org). Per climate zone one or more weather stations are identified. For sorghum in Burkina Faso and Ethiopia, crop simulations are carried out considering i) all soil data available per climate zone, and ii) all soil data available within a 100km buffer zone around the weather stations. Next simulations are carried out considering, based on harvested areas, the three most dominant effective root zone depth and available water capacity combinations per iii) climate zone and iv) buffer zone. It is hypothesized that, especially if weather stations are located in minor crop growth areas and for arid regions, simulated yields will differ significantly between the frameworks.