

# **Book of Abstracts**

## **Wageningen Soil Conference 2015**

**'Soil Science in a Changing World'**

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**23 - 27 August 2015**

**Wageningen**

**The Netherlands**

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## SOIL INFORMATION TO FEED THE AFRICAN SOIL, CROP AND PEOPLE

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The ongoing debate about improving food security in Sub-Saharan Africa (SSA) is about how to enrich its soils. A core challenge within the risk-averse smallholder farming systems prevailing in SSA is to judiciously combine mineral with bio-organic nutrient applications and close nutrient cycles to improve soil health, hence crop productivity, with high and preferably known yearly likelihood of direct return on investment. Adequate soil information (maps) will support extrapolation of crop response to management measured at few experimental site conditions to much wider areas, using validated models. The Africa Soil Information Service (AfSIS) project compiled georeferenced and standardised legacy soil profile observation and measurement data for over 12,500 sites (Africa Soil Profiles database; AfSP) to generate soil property maps for SSA at 1-km resolution over 2-m depth. Subsequently, with the AfSP database expanded to 18,500 sites combined with newly sampled topsoil data for 9,600 clustered sites and revised geo-statistical modelling, revised maps were presented with enhanced accuracy at 250-m resolution for physical (drainage, depth, gravel, texture, bulk density, EC) and biochemical (pH, CEC, exchangeable bases and acidity, organic carbon, nitrogen) properties. Soil water retention was next derived by using pedotransfer functions and effective rooting zone depth, for maize, by rules and thresholds established together with the Global Yield Gap Atlas (GYGA) project. These soil data were used in GYGA to model water-limited yield potentials, including temporal variation, in ten African countries. The resulting information reflects the site-specific crop demand for nutrients which, relative to nutrient supply from soil fertility effects, sets the reference to quantify nutrient deficiencies and thus efficiency and likelihood of crop response to nutrient additions. The collaborative work developed a consistent and updateable high-resolution soil information basis for agronomic modelling in support to both long- and short-term goals of millions of smallholder farmers.