



Tropentag, September 17-19, 2014, Prague, Czech Republic

“Bridging the gap between increasing knowledge and decreasing resources”

An Integrated Pathway of Production Systems Modelling Analysis in Sub-Saharan Africa

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Abstract

Most parts of sub-Saharan Africa are characterised by low crop productivity and large yield gaps. According to FAO (2011) a rise in food demands of about 70% is expected globally by 2050 with largest increase rates in sub-Saharan Africa. On the other hand, sub-Saharan Africa remains the region with the lowest crop productivity per hectare (highest yield gap) and lowest adaptation capacity to the expected climatic changes. A comprehensive and detailed analysis of the production systems in each country at the national level is resource and data limited. However, emerging issues like closing yield gaps or impacts of climate change could be addressed via model based, spatially explicit scenario analysis of national production system, estimating the impact of intensification/adaptation scenarios on the national food production. One major output would be the identification of potential hotspots of vulnerability to climate change or of most promising areas for investment into intensified crop production.

Due to the fact, that a national assessment of the food production systems may require a high level of generalisation, which would not be able to account for the specificity of local or regional production systems, a two-phase approach is proposed. The approach is based on a finer resolution analysis of local/regional production systems using cropping system/agroforestry system models combined with farm scale models to represent locally relevant bio-physical and bio-economic drivers. Then the results of the first phase analysis will be integrated into national food system models taking into account economic and physical equilibrium of demand and supply at the national scale. A possible pathway for such two-phase analysis will be presented.

Keywords: Production systems modelling, sub-Saharan Africa, yield gap