

Project Summary

Title	Modelling the potential impact of climate change on sorghum (<i>Sorghum bicolor</i>) and cowpea (<i>Vigna unguiculata</i>) production in semi-arid areas of Kenya using the agricultural production systems simulator (APSIM)
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Purpose	To assess the impact of climate change on sorghum and cowpea production in the semi-arid areas of eastern Kenya using APSIM.
Project Summary	Integrating crop simulation models with dynamic seasonal climatic forecasts offers a robust means of adding value to seasonal climatic forecasts for agriculture management. Managing crop production risks associated with inter-annual climate variability has received insignificant attention in the semi-arid areas of Kenya. It is against this backdrop that the potential impact of climate change on sorghum and cowpea production in the semi-arid areas of Kenya will be assessed using the Agricultural Production System Simulator (APSIM). The study will employ participatory tools in the use of APSIM model to identify risks and cropping system improvement options and designing cropping strategies for field experimentation. The field experiments (Mother/Baby trial design will be used) will be conducted in Machakos and Kibwezi district of Eastern Province, Kenya. A farmers' workshop will be held in the study sites to gather information on the farmers' experience with recent climatic changes and possible causes, effect on current farming systems, coping and adaption strategies to current management practices. Farm households' perceptions of risks, options to reduce climatic risks, specific vulnerabilities of the current cropping systems and coping strategies will be documented using semi-structured interviews during farm surveys. This is in addition to establishing the socio-economic and agricultural systems setting of the smallholder farmers. Farmers will directly be engaged with the simulation models to create virtual 'experiential learning' opportunities that mirror the current and/or desired farmers' situation. Potential technologies to address the anticipated negative impacts of climate change in respect of cowpea and sorghum cropping system will jointly be identified with the farmers and a subset of tactical adaptation options identified. The options will initially be tested on-station (mother trials, researcher managed) in the first year and on farm (baby trials, farmer managed) in the

	<p>second year. The on station experiments will be conducted for two (four seasons) years to model sorghum and cowpea growth and soil-water, soil organic carbon and nitrogen dynamics in a legume-cereal cropping system. The APSIM model will be validated to simulate both the legume and cereal components of the cropping system. The integrity of the simulated system will be evaluated by comparing the simulated performance of the crops with actual experimental crop data and by exploring other facets such as water use, denitrification and leaching. The selection and construction of scenarios to be used in assessing the impact of climate change on crop production will be made based on historical climate data (baseline data) spanning a period of 48 years (1961–2008). The results of the study will enhance knowledge on management of the impacts of climate change on cropping systems at the farm scale and potential adaptations to anticipated climate change. This is in addition to better understanding of the effects of climate change for informed crop management decisions such as selection of crops, residue management and sowing dates.</p>
Country and Specific Location(s)	Machakos (Katumani Research Station) and Kibwezi (University of Nairobi Dryland research station) districts of Eastern Province, Kenya.
Participating Institutions	University of Nairobi
Start Date	October, 2009
End date	October, 2011
Amount of Funding	USD 30,000

