



Tropentag, September 16-18, 2015, Berlin, Germany

“Management of land use systems for enhanced food security:  
conflicts, controversies and resolutions”

## Effect of Pre-Crop on Growth and Yield of Potato in Kenya

PATRICK AWUOR OORO<sup>1</sup>, RHODA BIRECH<sup>2</sup>, JOYCE MALING'A<sup>1</sup>, JÖRN GERMER<sup>3</sup>, FOLKARD ASCH<sup>3</sup>, BERNHARD FREYER<sup>4</sup>, RAEL TAIY<sup>5</sup>

<sup>1</sup>*Kenya Agricultural and Livestock Research Organization (KALRO), Food Crops Research Institute-Njoro, Kenya*

<sup>2</sup>*Egerton University, Crops, Horticulture and Soil Chemistry, Kenya*

<sup>3</sup>*University of Hohenheim, Institute of Plant Production and Agroecology in the Tropics and Subtropics, Germany*

<sup>4</sup>*University of Natural Resources and Life Sciences (BOKU), Division of Organic Farming, Austria*

<sup>5</sup>*Ministry of Agriculture, Agricultural Sector Development Support Programme, Uasin Gishu County, Kenya*

### Abstract

The pre-crop is a crucial component of competitiveness of grain legumes and yield benefits to subsequent crops depending on fertilization and the type of pre-crop. A field experiment was conducted between 2013 and 2014 at KALRO, Njoro, in Kenya, to evaluate the benefits of legumes in crop rotation on potato yields. The site lies within the semi-humid, lower highland zone three (LH3) also classified as wheat/maize/barley zone (AEZ LH3) with a bi-modal rainfall pattern of 275 mm in the short rains and 425 mm in the long rains (total 960 mm) with mean maximum/minimum temperatures of 24°C/8°C, respectively. The soils are well drained, deep to very deep, dark reddish brown, friable and smeary, silt clay, with humic topsoil classified as mollic Andosols. The experiment was laid out in a split split-split plot-design with four factors including water harvesting (two levels), crop rotation (four levels) and soil fertility management (SFM) (four levels). Water harvesting (wh) was assigned as the main treatment, crop rotation as the sub-plot while soil fertility management as the sub-sub plot and sub-sub-sub plot was inter-crop (IC). It was evident that potato grown in the long rains (lr) after the legume (*Lablab purpureus* (L.) Sweet) in the short rains (sr) attained the budding stage, 2 days, significantly ( $P < 0.05$ ) earlier, took longer to reach physiological maturity (4 days) and produced a higher tuber yield (24%) than when grown after wheat (*Triticum aestivum* L.). Legume as a pre-crop had a profound effect on physiological traits which resulted in increased period between crop emergence and budding. Similarly, the period between emergence and physiological maturity also increased significantly, subsequently resulting in increased tuber yields. This therefore agrees with the fact that legume as a pre-crop contributes more positively to yield components and tuber yield of potato than when cereals are planted as pre-crops.

**Keywords:** Lablab, Njoro, potato, pre-crop