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“Bridging the gap between increasing knowledge and decreasing resources”

Influence of Water Harvesting and Soil Fertility Management on the Performance of Wheat in Kenya

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Abstract

Cropping systems in Njoro sub-county of Kenya are based on cereal-root crop alternating between the long (LRS) and short rain seasons (SRS) using di-ammonium phosphate and calcium ammonium nitrate. Cereals (maize) are usually sown at the beginning of the LRS as either monocrop or sole crop while wheat is planted as a monocrop. Potato crop is usually planted during the SRS as a sole crop when rain fall is becoming increasingly unpredictable and with prolonged drought periods while the nutrient and organic matter-impoverished soils have very low water holding capacity. In view of the foregoing, a study was conducted at the Kenya Agricultural Research Institute (KARI) to develop climate smart - soil nurturing technologies for small scale farmers. Four factors were studied and included (1) water harvesting (WH=no ridge and tie ridge), (2) crop rotation (CR) lablab-potato-wheat-potato-lablab-potato; wheat-lablab-potato-lablab-wheat-potato; wheat-potato-lablab-potato-lablab-potato), (3) intercrop (IC= with or without intercrop) and (4) soil fertility management (SFM) = which included four treatments such as untreated control, farm yard manure (FYM) at 5 t ha⁻¹, green manure (*Leuceana triachandra*) at 2.5 t ha⁻¹ in the main season. The treatments were replicated three times in a split-plot design. This paper informs on data generated on WH and SFM from the 2013 season (July-November) during which the mean rainfall was 568.5 mm with mean minimum and maximum temperatures of 9.2 and 21.8°C, respectively. The data was subjected to an analysis of variance (ANOVA) using SAS statistical package. Results show that all the yield components of wheat and *Lablab purpureus* (cv DL1002) were not influenced significantly ($p > 0.05$) by WH and SFM strategies. Soil moisture accumulation was higher in the tie-ridged than non tie-ridged plots, however, it improved more with the incorporation of green manure (*Leuceana triachandra*). Grain yield of wheat was positively influenced by inorganic fertiliser (calcium ammonium nitrate) at 25 kg N ha⁻¹ as opposed to the other organic sources. In the event of reduced or unreliable rainfall, use of water harvesting structures and organic sources of nutrients may be established to help conserve moisture to increase crop productivity.

Keywords: Climate change, Dolichos, smallholder, wheat