Project Title: Enhancing productivity of the Maize-Cowpea intercropping system in coastal lowland Kenya through drought tolerant and insect resistant varieties

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Abstract: Maize is the most important food crop in the Coast Province of Kenya, and particularly in Kwale and Kilifi counties, which together account for half of all the maize produced in the region. The average maize grain yield is 0.5–1.0 t ha\(^{-1}\) while the potential for the region is 3.0 t ha\(^{-1}\). Maize production in the region is affected by both biotic and abiotic factors. The abiotic factors are low soil moisture and low soil fertility while the biotic factors are weeds and insect pests. The coastal region has low and erratic rainfall of 700–1000 mm per year that comes in two seasons. Most of the soils are sandy, highly drained and low in organic matter. Water infiltrates easily and passes rapidly through the rooting zone. Crops grown on them are therefore prone to water stress. Soils in the region are deficient in essential plant nutrients, especially nitrogen. The low soil fertility problem is made worse by rapid growth of weeds that compete with crops for the limited soil moisture and the small quantities of nutrients available in the soil. A study will be conducted at Pwani University College (PUC) and with selected farmers around PUC and Kenya Agriculture Research Institute (KARI) Mtwapa and Msabaha with the aim of enhancing the productivity of the maize-cowpea intercropping systems in the coastal lowlands of Kenya. Six (6) experiments will be conducted: (i) eleven cowpea varieties (4 improved and 7 local) will be screened for drought tolerance; (ii) the eleven cowpea varieties also will be screened for insect-pest resistance in coastal lowland Kenya (drought tolerant local maize landraces were identified in an earlier study), (iii) the drought tolerant and insect-pest resistant maize and cowpea will be intercropped; (iv) the best performing maize–cowpea intercropping system will be evaluated under four nitrogen rates (0, 30, 60 and 90 kg N ha\(^{-1}\)); (v) the best performing maize–cowpea intercropping system will be evaluated under four rates of farmyard manure (0, 2, 4 and 8 tonnes ha\(^{-1}\)), and (vi) the best performing maize–cowpea intercropping system will be evaluated under surface mulching, crop residue incorporation and nitrogen treatments. The data to be collected will include: growth, yield and yield components, nodule counts, nutrient uptake, water use and light interception. Weed load and insect pest count will be done just before weeding time within the net-plot. The data will be subjected to the analysis of variance (ANOVA) using the General Linear Model (GLM) of Statistical Analysis System (SAS). Means will be separated using the Least Significant Difference (LSD) at the 0.5%
level of significance. Regression and correlation analysis will be carried out where necessary. The expected output includes cowpea varieties which are tolerant to drought stress and insect pest infestation; recommendations on use of organic and inorganic fertilizers; crop residue management practices in the maize-cowpea intercropping system; increased productivity of the maize-cowpea intercropping system and publications in a refereed journal.