Conversely the population poverty rates decreases by about 5 to 12%. Even though climate change negatively impacts maize and beans, the adoption of inorganic fertilizer+ irrigation had the greatest impact to offset the climate effects. Further research is needed to understand how to address current barriers to adoption in addition to the trade-offs of improved technologies, especially with regard to strategies that introduce environmental risks and expose farmers to costs.

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Maize-Grain Legume Intercropping: Ecological Intensification to Enhance Resource Use and Production Efficiency for Smallholder Farmers in Northern Ghana.

*Michael Kermah*1, Angelinus C. Franke2, Samuel Adjei-Nsiah3, Robert Abaidoo3 and Ken E. Giller1, (1) Wageningen University, (2)University of the Free State, (3)International Institute of Tropical Agriculture (IITA)*

Intercropping is practised by many smallholder farmers in northern Ghana for household food and income security. We evaluated effects of maize-legume intercropping patterns on resource use efficiency and productivity of maize and grain legumes under different field fertility types in two sites in savanna agroecologies. Treatments tested were maize-legume within-row, 1:1 and 2:2 distinct rows of maize and legume (cowpea, soybean and groundnut) and their respective sole crops. Intercropping improved photosynthetically active radiation (PAR) interception relative to sole maize. Mean % intercepted PAR (IPAR) at maximum plant biomass were: within-row (86), 1:1 (80) and 2:2 (77) for maize-cowpea; while sole cowpea and maize intercepted 93 and 68 respectively. Land equivalent ratios (LER) indicated intercrops were relatively productive than sole crops with values ranging from 1.3 to 1.9, 1.1 to 1.7, 1.0 to 1.7 for within-row, 1:1 and 2:2 intercrops respectively signifying better efficiency and productivity with within-row system. Intercrops in fields poor in soil fertility had superior LER (ranged from 1.1 to 1.9) than those in fields with high soil fertility (1.0 to 1.6). Intercrop grain yields followed similar trend as IPAR and LER with highest intercrop yields (cowpea–2.06; soybean–1.79; groundnut–0.82; maize–3.07 t ha-1) achieved with within-row. Maximum grain yields of sole crops (t ha-1) were: legumes (cowpea-2.18; soybean-2.46; groundnut-1.09) and maize (3.78). Results show that with maize-grain legume intercropping we can achieve higher LER, for that matter higher resource use efficiency and grain productivity in poor fertility fields, safeguarding household food and income security.

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Multilocation Evaluation of Drought Tolerant Bean Lines in Uganda.

*Stanley Nkalubo1, Kesiime Eunice Vasiter*1, Michael Ugen2 and Jane Mukabalanga1, (1)National Crops Resources Research Institute, (2)National Crops Resources Research Institute (NaCRRI)*

Intermittent and sometimes terminal drought constrains common bean (Phaseolus vulgaris L.) production in Uganda and many other regions within east and central Africa and as such identification of drought tolerant cultivars is crucial for sustainable intensification of bean production in the region. The aim of this study therefore, was to evaluate a set of 12 pre-selected (SCN1, SCN 11, SCN 8, SEN 56, SEN 46, SEN 80, SEN 70, SEN 95, SEN 98, SCR 26 & SCR 35) drought tolerant lines in comparison with five (5) market class Ugandan bean varieties (NABE 4, NABE 15, NABE 16, NABE 2 & K132) in eight drought prone regions of Uganda to identify suitable lines which combine drought tolerance and yield potentials for possible utilization in these areas. Eight genotypes were selected from two season's evaluation in 2014A and 2014B. The selected genotypes were evaluated in the same eight on-station sites with twenty-two on-farm sites to carry out farmer participatory selection. Measurements taken included plant stand count at four weeks after planting, percentage ground cover, trifoliate leaf number at four weeks after planting, number of plants harvested, average number of pods per plant, average seeds per pod and yield at harvesting. Analysis of variance among genotypes and drought prone environments was performed using Genstart statistical package (14th edition). Results obtained were of significantly ($P \leq 0.005$) wide variation in the average genotypic performance of measured traits within and among environments. Genotypes SCN 11, SCN1, SCR26 and SEN 80 had the best mean yields while ABI, NGETTA and RAKAI were the best environments. As far as grain yield production was concerned, Rakai was the best environment for the genotypes with an average yield of 1797.4 kg ha-1 while NaSARRI with an average yield of 72.3 kg ha-1 was the worst environment. In all SCN 11 was the best performing genotype with an average of 1095.3 kg ha-1 while K132 was the worst with 555.2 kg ha-1

Key words: Bean genotypes, Environments, Drought tolerance, Yield