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“Bridging the gap between increasing knowledge and decreasing resources”

Doubled-Up Legumes in Malawi: An Innovation for Sustainable Rain-Fed Cereal Production in Developing Countries

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Abstract

The basis for calorie production and income generation on many smallholder farms is monoculture cereals. Legume crops occupy only about 10 to 15 % of the land on rain-fed smallholder farms in Malawi, which is typical of mixed-maize systems across Africa. Overall, the widespread cultivation of cereal crops is understandable in that farmers prioritise production of large amounts of calories, and crops with minimal labour inputs; however, this has led to cropping systems that are dependent on nutrient inputs. Fertiliser subsidies in Malawi and neighbouring countries have to some extent addressed this need, but this is an expensive strategy. Over 10 % of Malawi gross domestic product has supported this – hampering alternative investments. A sustainable intensification strategy in African agriculture is urgently needed, and we will present evidence on a promising innovation: ‘doubled-up legumes’. This system promotes growing improved types of N₂-fixing shrubby food legume pigeonpea (*Cajanus cajan*) which is being evaluated in new regions of Malawi, in combination with an understory crop of soybean, groundnut or cowpea. Doubled up legumes addresses the urgent need for protein and high caloric food in combination with soil organic matter replenishment through leaf litter and root biomass. The performance of this system on-farm is being tested at field-scale in central Malawi through participatory action research supported by a USAID project ‘Africa RISING’. This research involves collaboration of IITA, Michigan State University, Lilongwe University of Agriculture and Natural Resources, Malawi Department of Agricultural Extension and about 1000 smallholder farmers. Farmers and researchers are co-experimenting with doubled-up legumes and related innovations, intensifying planting of improved varieties and integrated nutrient management. On-farm results show evidence for substantial gains in both grain legume productivity (0.6 to 2.4 t ha⁻¹) and fertiliser-use efficiency (30 to 100 % increase in maize response over monoculture maize). We will report on agronomic and farmer assessments of performance over two years from this large-scale sustainable intensification project.

Keywords: Multipurpose legumes, nutrient efficiency, smallholder cropping