

# Application of mineral fertilisers and organic resources - Malawi

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## Challenges & Study objective

- ✓ Soil organic matter has declined on most farms, making fertilizer use efficiencies poor.
- ✓ In Malawi, the most feasible approach to building SOM is through cycling low and high quality crop residues. Livestock populations are low, while an important resource elsewhere, animal manure is in insufficient quantities to make a significant impact on farms.
- ✓ Residues from grain legumes can be used to optimize fertilizer responses of maize, improve soil health and food security across diverse agro-ecologies. Burning of crop residues as part of land preparation is practice that must be discouraged

**Main study objective:** To quantify the ecological, economic and nutrition benefits of growing maize in rotations with legumes when crop residues are properly used in the cropping systems

## Introduced technologies

- Mineral fertilizer (Mz69) at 10 kg P & 69 kg N ha<sup>-1</sup>.
- Maize in rotation with soybean (SbRot), groundnut (GnRot), or peanut/pigeonpea intercrop (GnDRLR douled-up) at 6 kg P and 35 kg N ha<sup>-1</sup> and,
- Continuous maize/pigeonpea intercrop (MzPp) –improving the traditional system hat 6 kg P and 35 kg N ha<sup>-1</sup>

## Evidence

- There were no significant differences between fertilized maize (Mz69) and maize in rotation with legumes at reduced
- Rotating maize with legumes increased nitrogen use efficiency by 56% relative to Mz69.
- Adding half the rate of fertilizer and integrating legumes increased gross margins of maize by 29 – 75% and increased protein and calorie production by 200 – 450%.
- Over time, integrating grain legumes in maize systems resulted in stable maize yields (Fig 1)

## Approaches of taking the technologies to scale

- Field days and training workshops centered on showcasing the benefits of good fertilizer practices and legume integration (Fig 2).
- Capacity building of extension system – institutionalizing knowledge in Malawi extension system
- Private sector involvement – local agrodealers/farmer partnerships for improved access to seed or fertilizer availability

## Proposals for the future

- Using a calibrated and validated APSIM model for the different technologies we will further optimize maize – legume by exploring management options such as plant ratios, fertilizer rates, cultivar types and planting dates.
- Make use of ICT technologies for targeted reach to thousands of farmers

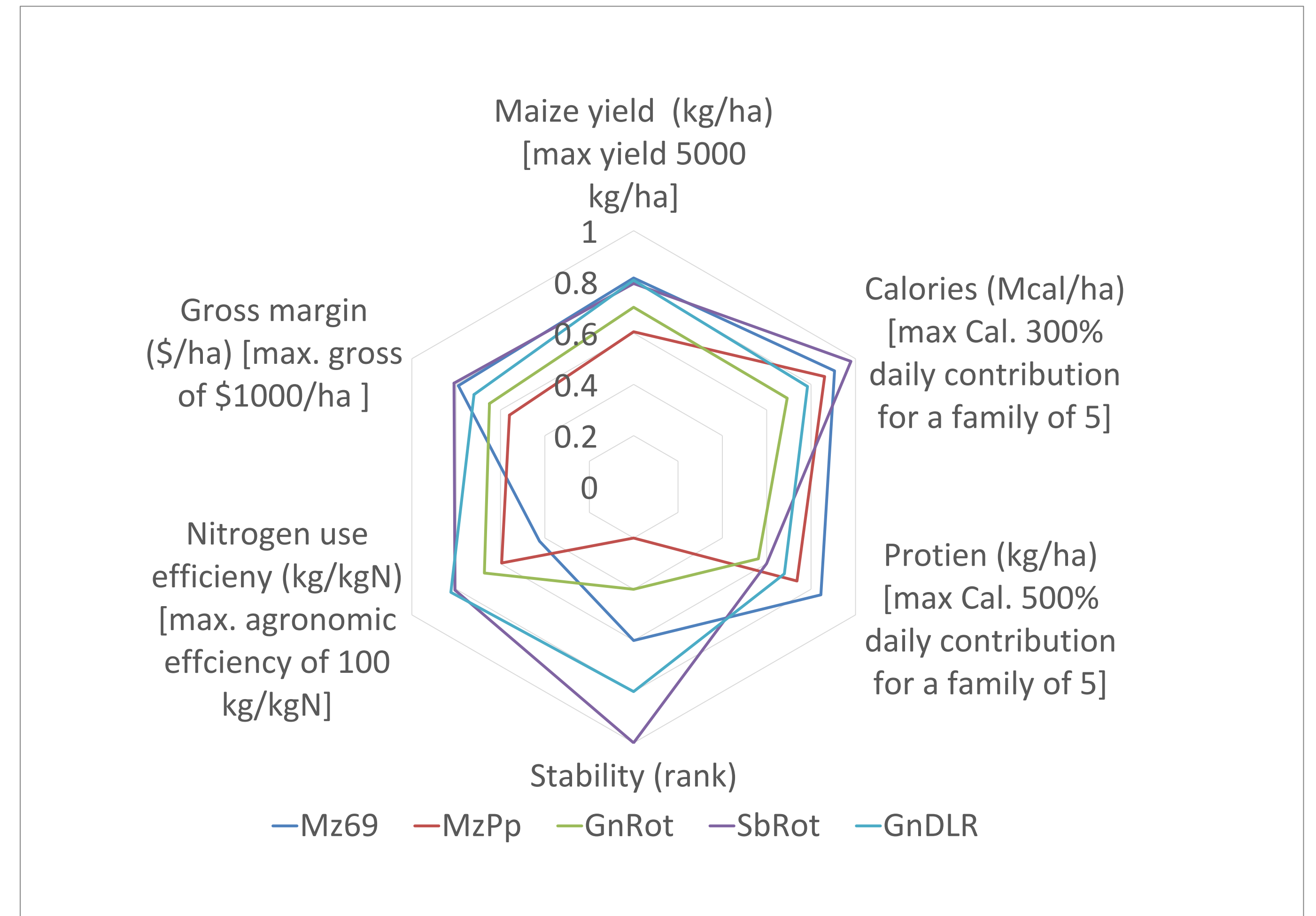


Figure 1. Comparison of SI parameters [yield, calories, proteins, yield stability, nitrogen use efficiency, gross margin] for the different treatments



Figure 2 Farmers participating in a farmer field day in Linthipe

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