

Yield and Drought Resistance of Maize in *Gliricidia sepium* and Pigeonpea Intercropping Systems in Semiarid Tanzania

Anthony A. Kimaro¹, Leah L. R. Renwick², and Johannes Hafner^{1,3}

¹Center for International Forestry Research-World Agroforestry Center (CIFOR-ICRAF), Tanzania Country Program, Dar es Salaam, Tanzania
²Pontificia Universidad Católica de Chile, Santiago, CL
³Leibiz-Zentrum für Agrarlandschaftsforschung (ZALF) e. V. Müncheberg, Germany



Maize monoculture (Kimaro A.A., 2020)

Introduction

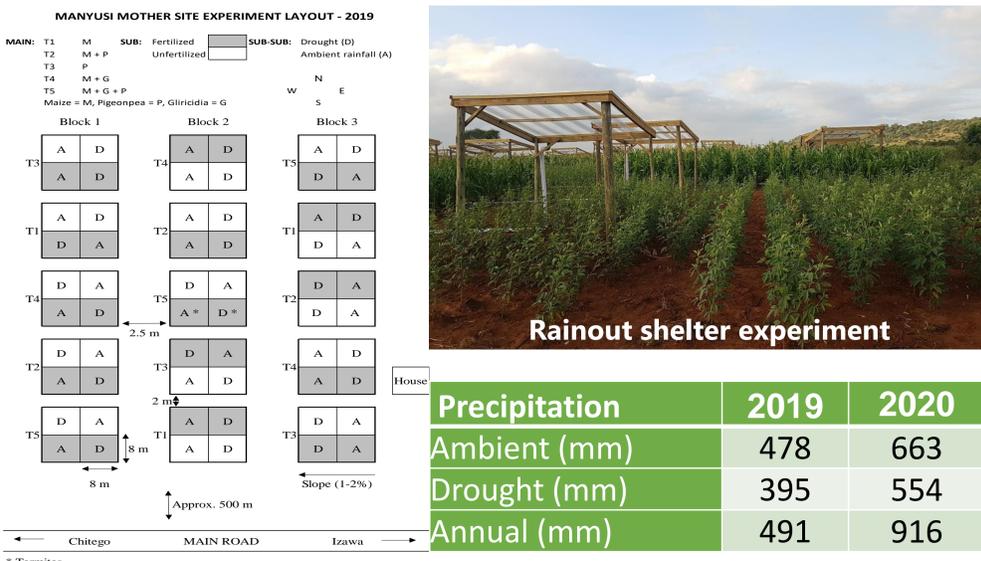
- Crop diversification via intercropping enhances agroecosystem resilience and the adaptive capacity of farmers.
- Intercropping increases the use efficiency of growth resources and diversifies crop production options and income sources.
- There is insufficient evidence for the adaptation benefits of agroforestry and the underlying mechanisms in semiarid areas.

Objectives

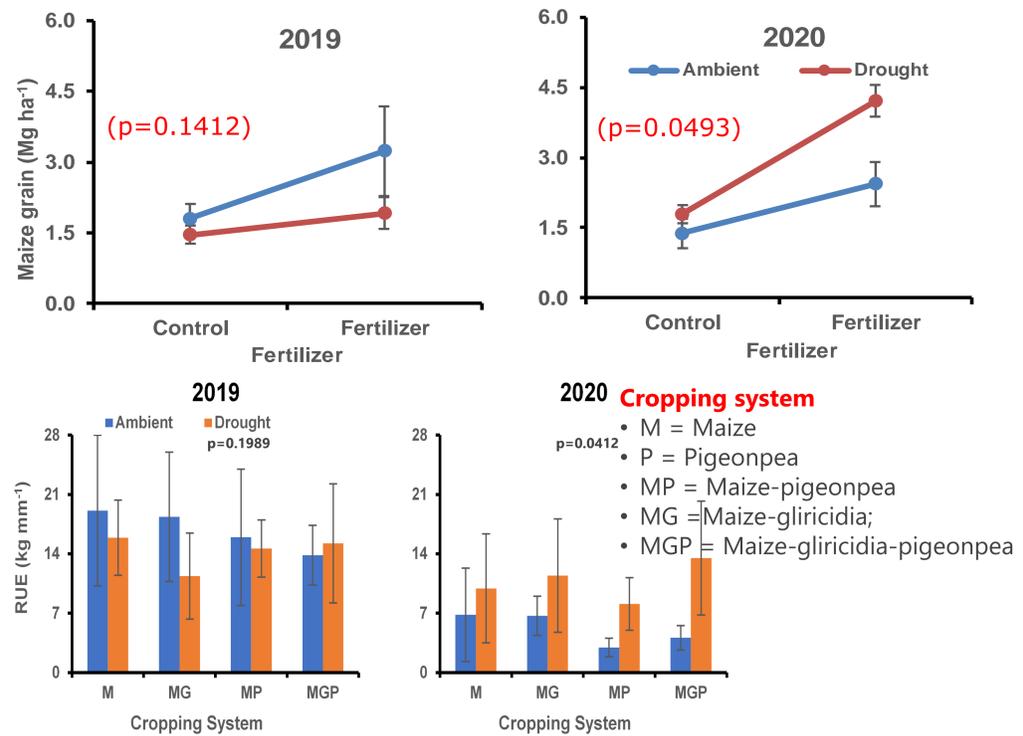
- To assess whether intercropping maize with *Gliricidia sepium* and/or pigeonpea improves productivity and drought resistance of maize in semiarid Tanzania.

Study Site and Methodology

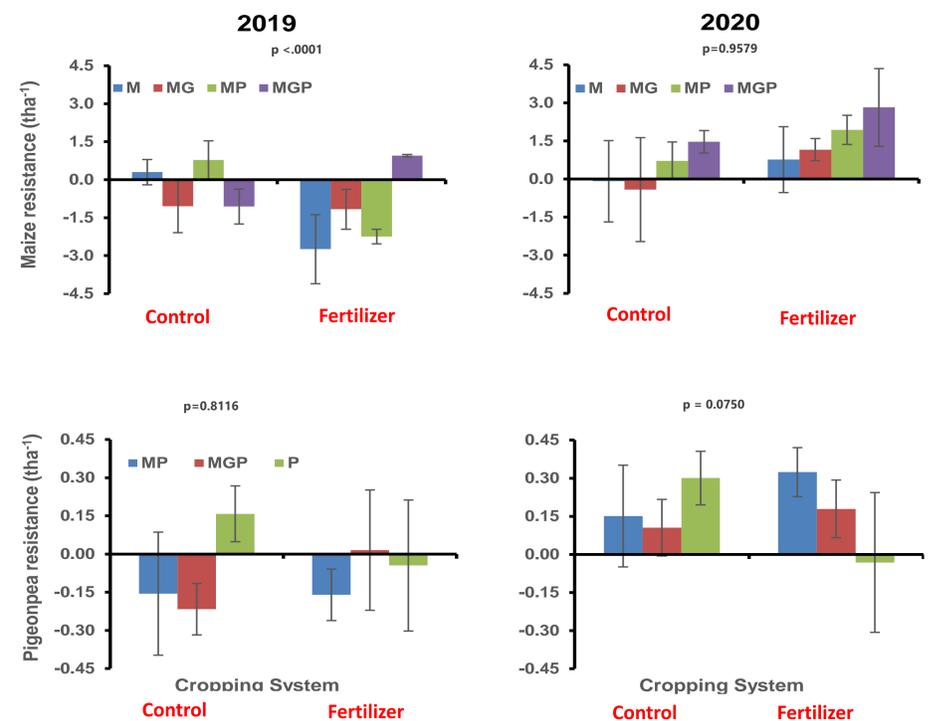
- The study was conducted at Manyusi village, Kongwa District of Dodoma Region in semiarid Tanzania.
- Split-split plot experimental design was adopted.



Maize Grain Yield and Rainwater Use Efficiency (RUE)



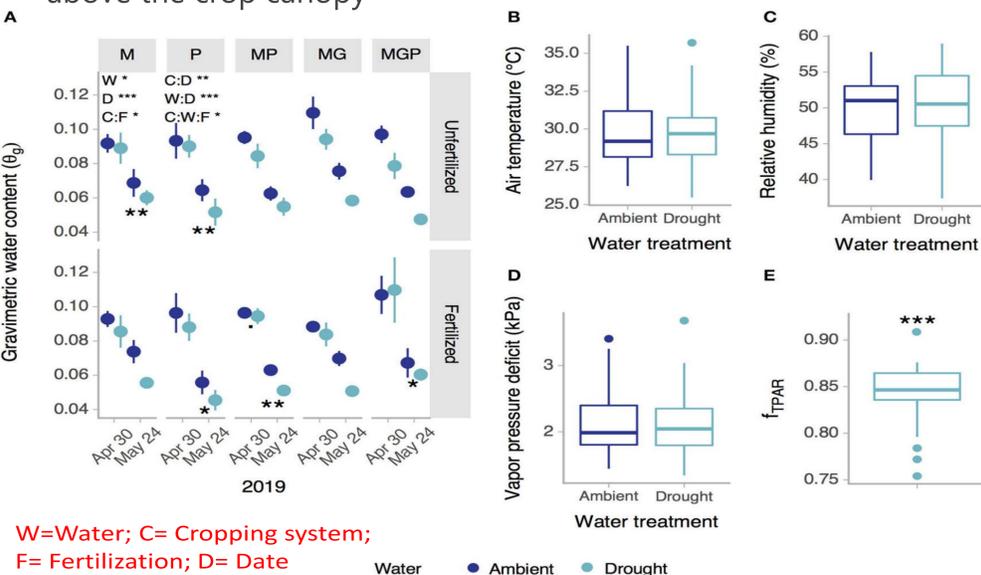
Maize and Pigeonpea Drought Resistance



Results

Microclimate Amelioration

- Shelters reduced gravimetric soil moisture by 12.5% in 2019
- No effects on air temperature, RH, and vapor pressure deficit above the crop canopy



Highlights and Conclusions

- Rainout shelters reduced soil moisture content during the dry season (2019) without creating artificial growing conditions for crops.
- Intercropping improved water use efficiency under shelters in 2020
- Maize drought resistance was not affected by intercropping, but it was reduced by fertilizer in 2019 and not in the wet season (2020).
- Pigeonpea drought resistance was stable across seasons.
- Intercropping improved resource use efficiency and crops yield.
- Appropriate selection of a drought resistant crop component help to sustain crops yield across cropping seasons.

Correspondence:

Anthony A. Kimaro
 E-mail: a.kimaro@cifor-icraf.org
 International Forestry Research-World Agroforestry Center (CIFOR-ICRAF), Tanzania Country Program, P. O. Box 6226, Dar es Salaam, Tanzania.