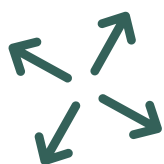# UNLOCKING THE POTENTIAL OF CROP UP-GRADING STRATEGIES IN DODOMA, TANZANIA

FRIEDER GRAEF, SONOKO DOROTHEA BELLINGRATH-KIMURA, MARCOS LANA

Tied ridges with pearl millet and peanut intercropping

Poverty and hunger continue to be prevalent features of rural semi-arid Tanzania. This study aims to reduce production risks and improve pearl millet productivity by evaluating tied ridges and microfertilization as upgrading strategies (UPS) in the local farmers' context. Pearl millet cultivation is simulated based on spatial and temporal rainfall variability quantified using 60–70 rain gauges using the crop models DSSAT and APEX, comparing UPS and local crop management activities.
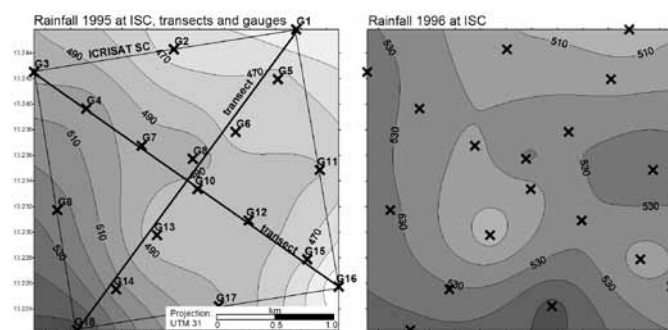
Despite continuous efforts to reduce the number of people suffering from hunger since 1990, only a mere 5% reduction has been achieved in Sub-Saharan Africa. Land degradation, depletion of soil fertility, water stress, and high fertilizer costs contribute to low crop yields, particularly for pearl millet, which is a main staple food crop in semi-arid regions of Tanzania. The onset, ending, and duration of the rainy season and growing period has become increasingly erratic, resulting in higher risk of crop failure, and consequently poverty and hunger.

This research project will test, compare, and combine upgrading strategies (UPS) of scientists and farmers to reduce the production risks of pearl millet. Over two rainy seasons, it will investigate tied ridges and microfertilization as scientifically proven in comparison with the management strategies of local farmers in the Tanzanian Dodoma region. The risk minimising strategies of the local farmers include e.g. (a) time-dependent measures such as dry seeding, resowing and the use of differently maturing crop varieties, (b) coping with spatial rainfall variability through the cultivation of large and widely dispersed fields, and (c) measures for maintaining soil fertility.

This study will evaluate the spatial (survey level up to a few kilometers) and temporal (annual, monthly, daily, hourly) rainfall variability and its effects on the UPS of up to 15 different farmers. Rainfall data is collected from 60–70 rain gauges. The crop models DSSAT and APEX will be used to simulate pearl millet cultivation in order to understand the interlinkages between crop management along UPS, and the socio-economic and biophysical environment.

Spatial rainfall variability in a semi-arid environment in two different years (Graef and Haigis 2001)