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## Evaluation of Effect of Ridging on the Rainwater Use Efficiency of Soybean Production in Northern Ghana

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### Abstract

As climate change continues to influence rainfall patterns, it is causing frequent and more intense rainfall events, directly influencing the future of agriculture. Social-ecologically, a shift in land management practices, specific to soil ridging rather than conventional tillage/flattening could help minimise these severe rainfall events impact.

Fluctuations in soil moisture due to the variability in rainfall must be stabilised in order to create an efficient crop production system. Soil ridging promotes the soils ability to allow water to infiltrate, have ideal permeability and water holding capacity —both necessary capabilities a soil must have in order to maintain consistent, proper moisture content.

The objectives of the research were to see if a) stabilisation of soil moisture could be achieved via soil ridging and b) to determine if the stabilisation of soil moisture content caused a significant difference in yield compared to conventional soil preparation.

The experiment was carried out during the 2016 cropping season in the Chereponi District of Ghana's Northern Region. The ridges constructed were able to evacuate water during times of heavy rainfall whilst the troughs maintained higher soil moisture content during periods of brief drought, as compared to adjacent non-ridged plots. It was found that over the 14 trial fields ridging produced an average yield of 1603 kg/ha (SEM +- 161) while non-ridged plots produced only 1258 kg/ha (SEM +- 142). The differences in yield could be evidence of greater root penetration and nutrient scavenging, accredited from not only the increased water infiltration created by the soil ridges but also soil de-compaction which occurred during ridge formation.

**Keywords:** Ghana, Soil Ridging , Soybean