



Impact of Irrigation Strategies on Maize (*Zea mays* L.) Production in the Savannah Region of Northern Togo (West Africa)

Agossou Gadédjisso-Tossou (1), Tamara Avellán (2), and Niels Schütze (3)

(1) Institute of Hydrology and Meteorology, Technische Universität Dresden, Dresden, Germany (tossou@unu.edu), (2) United Nations University Institute for Integrated Management of Material Fluxes and of Resources, Dresden, Germany (avellan@unu.edu), (3) Hydrology and Meteorology, Technische Universität Dresden, Dresden, Germany (niels.schuetze@tu-dresden.de)

Northern Togo is a dry savannah area where rainfed maize is one of the major crops grown. The agricultural production system is subject to frequent yield losses due to erratic rainfall. To ensure food availability and improve the productivity of agricultural production system, it is necessary to produce maize during the dry season under irrigation. The correct application of full and limited irrigation requires a thorough understanding of the crop parameters and yield response to water. Thus, this field experiment study investigated the effect of full and limited irrigation on maize (*Zea mays* L.) plant above-ground biomass, leaf area index, canopy cover, plant height, and grain yield. A field experiment was carried out from December 2017 to April 2018 in northern Togo at ITRA (Institut Togolais de Recherche Agronomique) research station. Three irrigation treatments [full irrigation (FI), 80% FI and 60% FI] were applied. The results showed that in the late season stage, the differences in the above-ground biomass between the FI and 60% FI treatments were significant ($p < 0.05$). On average, the fully irrigated treatment had the greatest grain yield (2.2 Mg/ha), while the lowest grain yield was recorded under the 60% FI (1.1 Mg/ha). Also, the grain yield differences between FI and 60% FI were significant ($p < 0.05$). Nevertheless, the grain yield differences between FI and 80% FI were not significant ($p > 0.05$). The 80% FI treatment had the greatest water productivity (0.22 kg/m³) on average. The results of this study illustrate that different volumes of irrigation water significantly affect above-ground biomass and grain yield of maize in northern Togo. Under moderately limited irrigation the above-ground biomass and the grain yield of maize are reduced while the water productivity is slightly increased under these experimental, soil and crop management, and climatic conditions. Dry season maize cultivation is a delicate practice. Its realization is subject to water availability in the soil, especially during crucial crop growth stages.