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Improving Cassava Root Yields through Supplementary Dry Season Irrigation and Fertiliser Application

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Abstract

The growing global demand for cassava cannot be met by the current production practices. In sub-Saharan Africa cassava is grown mainly on small holdings by low-income farmers, using little or no external inputs or irrigation. Most of Nigeria experiences a 4–5 months dry season during which cassava sheds leaves and growth ceases. With the onset of rains cassava mobilises starch from roots and stems to form a new canopy, leading to root and starch yield depression, which to compensate for requires additional growing time. Trials were established at IITA Ibadan to assess the effects of supplementary irrigation through the dry season, on the fresh root yield and the response to fertiliser. Two two-factorial experiments were planted with the first factor irrigation regime: I0 (no irrigation) versus I1 (2 mm/day), applied as furrow irrigation; second factor was fertiliser application: F0 (Nil) versus F1 (75:20:90 kg ha⁻¹ N:P:K). Irrigation started on December 1st about 1 month after rains stopped. Water was applied every other day by pouring the required amount (equiv. 4 mm) into the furrows between cassava ridges. Trial one was harvested at 12, trial two at 15 months after planting (MAP). Irrigation increased the number of plants reaching harvest, the number of stems and branches and the fresh root yield significantly in both trials. Fertiliser application increased the branch number and the fresh root yield in both trials. Adding 3 months of growing time increased the stem yield and the fresh root yields. Lowest yields were attained at 12MAP without irrigation (16.1 Mg ha⁻¹), irrigation added 5.3 Mg ha⁻¹ at 12MAP. Harvesting at 15MAP increased root yield to 22.6 Mg ha⁻¹ (+6.5 Mg ha⁻¹) without irrigation and from 21.4 to 30.3 Mg ha⁻¹ (+8.8 Mg ha⁻¹) when irrigated. This indicates that maintaining water supply through the dry season affects root yields positively even after the onset of rains. Fertiliser application had no effect when harvested at 12MAP but added 6 Mg ha⁻¹ when harvested at 15MAP. Generally a longer growing time increased effects on root yield of irrigation and fertiliser application.

Keywords: Cassava, dry matter, fertiliser application, irrigation, root yield