THE IRRIGATION REQUIREMENTS OF GROUNDNUT, COTTON AND GREENGRAM ON A YELLOW LATOSOL IN THE NORTH WEST DRY ZONE

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ABSTRACT

A field trial was conducted to determine the crop water requirements of groundnut, cotton and green gram on Yellow Latosols. Greengram and groundnut were grown both in the 1981 maha and the 1982 yala, cotton was grown in the maha with final harvest in the yala. Irrigation water was applied at 10, 40 and 75% depletion of available water, returning the soil to field capacity. Ten percent depletion was maintained with drip irrigation and 40 or 75% depletion by basin irrigation. In the maha, instead of the 75% depletion level, the plots were rainfed. Treatments included fertilized and unfertilized plots, the former with N or NP in the maha and N or NK in the yala. Soil moisture was recorded in both seasons and soil samples were taken for salinity measurements.

Groundnut yielded more with irrigation at 40% depletion but used irrigation water more efficiently at 75% depletion. There was no yield increase with 10% depletion. There was an only a 7% significant increase in pod yield with 22kg N/ha compared to unfertilized plots. Addition of 25kg P or 23kg K/ha with nitrogen resulted in no further increase in the yield.

Cotton yield increased when the maximum depletion was reduced from 75 to 40%, but there was no further increase with 10% depletion. There was a response to nitrogen at 100kg N/ha, the total application for both seasons, but not to 30kg P/ha when added with the nitrogen.

Sensitivity to salt accumulation (0.7 to 2 dS/m) may have been the cause of low greengram yield (40 to 573 kg/ha). The Penman method for crop evapotranspiration generally overestimated and the corrected pan method underestimated the actual evapotranspiration as estimated from a soil water balance.