

COMPUTING WATER REQUIREMENT OF GROUNDNUT

P. RAMACHANDRA REDDY

Krishi Vigyan Kendra, Agricultural Research Station,
Anantapur-515001, India

ABSTRACT

Water requirement of groundnut was computed based on the four prediction formulae recommended by FAO group of scientists. It ranged from 281.48 mm to 433.59 mm. The data were compared with the data from actual field experimentation. The values from modified Penman method were more closer to the field experimental values indicating usefulness of modified Penman method in computing water requirements of crops.

INTRODUCTION

Groundnut, an important crop in semi-arid tracts of Rayalaseema region in Andhra Pradesh occupies more than 50% of cultivated area in Anantapur district. It is grown mostly under rainfed conditions in kharif season. It is also grown as rabi and summer crop under irrigated conditions to some extent. It became the most popular crop because of high remunerative prices and is extending in area under irrigated conditions. For efficient use of available irrigation water, attempts were made to work out water requirement of this at different places. Gajera et al. (1984) reported highest pod yield with 700 mm of water. Higher pod yield was recorded when irrigations were scheduled at 0.95 IW/CPE with 550 mm water on sandy loam soils at Rajendranagar (Ramakrishna Reddy et al., 1983). 490 mm of irrigation water gave maximum pod yield at Tirupathi (Seshagiri Rao et al., 1983). Thorat et al. (1984) and Kachot et al. (1984) also reported similar findings. An attempt was made to compute water requirement of groundnut for Anantapur region by estimating potential evapotranspiration (PET) values based on four prediction methods recommended by FAO group of scientists (Doorenbos and Pruitt, 1977). Water requirement of crop was also estimated by field method and the values were compared with the prediction methods.

MATERIAL AND METHODS

For computing water requirements, PET and crop coefficient (Kc) values are essential. PET values for each month were already estimated for the four methods (Table 1). The Kc values based on crop characteristics, time of sowing (Aug. 4, 1987), stage of crop development and general weather parameters were used as suggested by Doorenbos and Pruitt (1977).

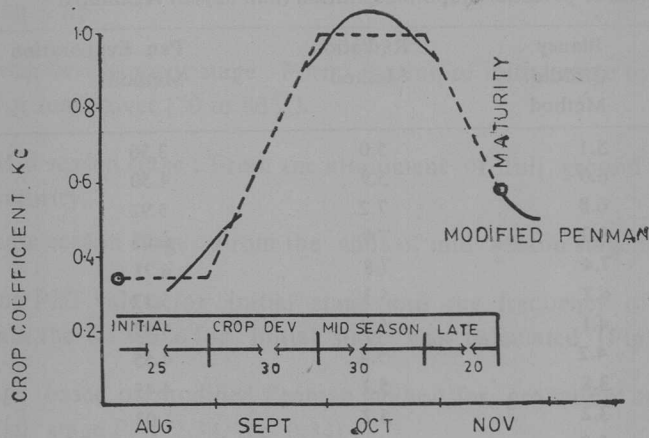


Fig. 2. Crop coefficient curve at Anantapur for groundnut

Providing irrigation at 0.8 IW/CPE ratio recorded higher pod yield over 0.6 ratio. The calculated crop water requirements are given in Table 3.

Table 3. Computed and experimentally determined crop water requirements for groundnut (mm)

Crop stage	Blaney-Criddle	Radiation	Pan evaporation	Modified Penman	Experimentally determined (IW/CPE) ratio	
					0.6	0.8
I	50.40	56.70	52.32	62.39	100	150
II	85.25	109.27	97.67	129.80	150	200
III	97.80	155.70	122.16	165.15	125	150
IV	48.03	72.05	56.47	76.25	80	100
Total	281.48	393.72	328.63	433.59	455	600

The computed crop water requirements based on PET and Kc values for Anantapur region indicated that the values ranged from 281.48 mm to 433.59 mm for the four prediction methods compared to 455 to 600 mm by field method. Highest crop water requirement was recorded with modified Penman method due to the fact that it took into consideration various weather parameters which influence consumptive use of crop. Further, these values were almost equal to the water requirements based on field method. Similar findings were reported by Ramachandra Reddy et al. (1984) and Seshagiri Rao et al. (1983). Among the different stages of crop growth, pod development (Stage III) followed by flowering and pegging stages (Stage II) appeared to be critical stages requiring more water. This trend was noticed in the all four prediction methods. In the absence of actual water requirements of crops based on field method, computed water requirements of crops based on modified Penman method can be utilised for calculating crop water requirements. This could be highly beneficial in crop water planning under irrigation projects for the efficient use of irrigation water.

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