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Water Saving Method of Irrigation for High Yielding Rice Crop

R. K. SIVANAPPAN[1] and E. S. A. SAIFUDEEN[2]

Studies were conducted to economise the irrigation water in rice cultivation. The water used and the yield obtained in water saving method of irrigation and surface flooding were calculated for six high yielding rice varieties. It was found that submergence was not necessary in the early stages of plant growth. The saving of water by water saving method was upto 49 per cent. After flowering standing water to a depth of 2.5 to 3.5 cm. was necessary.

In Tamil Nadu 80 to 85 per cent of the total irrigation water is used for rice cultivation. Due to frequent failure of monsoon, the water table is gradually going down and the cost of utilising ground water also is on the increase. Therefore, it is apparent that any significant saving by any new method of irrigation, however small it is, will be a substantial quantity and this will be utilised to irrigate more area.

The most successful result was obtained when the field was only submerged after the formation of young panicle by which a total of 20 to 30 per cent irrigation water saved and the grain yield was also increased by 10 per cent as compared to continuous irrigation (Fukuda and Tsutsui 1968).

In India, Chaudhry and Pandey (1968) of Cuttack have observed that continuous stagnation of water in the field was not at all necessary for rice crop to obtain the maximum yield. In sandy soils of Thanjavur maintaining 12.5 cm. constant water in the field recorded the highest yield (Sundra, 1970). Chandramohan (1970) had shown that submergence to a depth of 5 cm. of water seems to be the optimum requirement for rice. Hence an experiment was conducted to estimate the water requirement of six high yielding rice varieties by water saving method using conventional method as control.

MATERIALS AND METHODS

The experiment was conducted in a field at the Paddy Breeding Station, Tamil Nadu Agricultural University, Coimbatore which has complete border ridges. The soil type is clayey loam. Water was made available directly from the borewell at the site. Considerable hydraulic head between the irrigation channel and field surface exists. A plot size of 31.66 m x 25.76 m. was taken up and a brick wall of 11.25 cm. thickness was constructed to a depth of 75 cm. below and 15 cm.

1, 2 : Department of Soil and Water Conservation Engineering, College of Agrl. Engineering, Tamil Nadu Agrl. University, Coimbatore-641 003.

above the field level at the periphery to eliminate the possible lateral movement of water. Piezometer tubes were fixed at various places to ascertain the water movement underneath. The field was divided into two plots of equal size (10 cents each) by an earthen bund formed at the middle of the field with the core wall in the centre (Fig. 1).

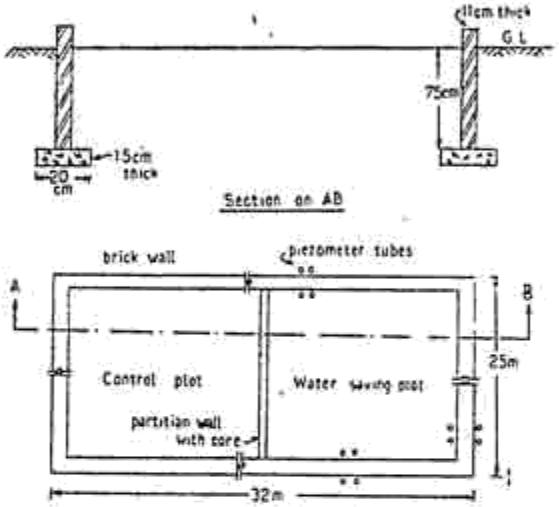

FIG. 1. Field lay out

A V-notch was used for accurate measurement of quantity of water applied to the field. Precision hook gauges were used to measure the depth of water over V-notch and also to find the depth of water in the fields. One of the two plots was used as a control plot maintaining 5 to 10 cm. of water throughout the crop growth. In the other one, *viz*, the water saving plot, only a thin film of water was allowed upto flowering stage of the crop and subsequently submergence to a depth of 2.5 to 3.5 cm was maintained. Uniform cultivation practices were adopted for both plots.

RESULTS AND DISCUSSION

The amount of water used and the yield obtained from the two methods of irrigation adopted for the six high yielding rice varieties are given in table.

It was found that the water saving method of irrigation does not effect any significant change in the yield of rice except in Vaigai and Co. 39. The reason for less yield in these varieties might be that saturation could not be

TABLE. Effect of different methods of irrigation on the yield of rice varieties

	Water used in cm. (*including rainfall*)		Percent of water saved in water saving method	Yield in kg/ha		Rainfall in cm.
	Water saving method	Control plot		Water saving method	Control plot	
IR. 22	65.53	104.23	37.0	4740	4700	15.03
IR. 24	83.12	115.52	28.0	4370	4273	37.92
Kanchi	67.16	131.97	49.0	4840	4990	4.50
Bhavani	61.39	96.32	36.0	5450	5500	26.72
Vaigai	73.48	111.48	34.0	3800	4600	11.20
Co. 39	45.49	78.00	42.0	3317	4098	9.00

maintained once the water saving plot due to failure of pump. Further the data collected on the daily evapotranspiration and pan evaporation were analysed and it was found than the ET/EP for the early period was less than the ET/EP during the late period. The water requirement of rice crop upto flowering stage is far less than what is normally believed. Therefore no submergence is actually needed during this period. It is just enough if the field is kept saturated or allowing a thin film of water upto flower initiation and then allowing standing water to a depth 2.5 to 3.5 cm. upto maturity (Fukuda and Tsutsui, 1968 and Chaudry and Pandey, 1968). The saving of 28-49 per cent of total irrigation water will be not only a substantial saving in the irrigation cost, but also the water saved will be utilised for irrigating additional area.

REFERENCES

CHANDRAMOHAN, J. 1970. Studies on water requirements of crops in Tamil Nadu. *Madras agric. J.* **57** : 251-63.

CHAUDHRY M. S. and R. PANDEY, 1968. Rice responds to good water management. *Indian Farming* **27** : 31-33.

FUKUDA, H. and H. TSUTSUI. 1968. Rice irrigation in Japan, Food and Agricultural Organisation, Rome.

SUNDRA, C. 1970. *Report on the preliminary studies on water use management of paddy crops in Thanjavur* p. 18.