ANNEXURE III

CHRISTIANSEN METHOD

Christiansen (1968) proposed an empirical formula, to estimate pan evaporation from climatic data when reliable measured pan evaporation data are not available for estimation of evapotranspiration.

$$E_V = K_{ev} \cdot R \cdot C_t \cdot C_w \cdot C_h \cdot C_s \cdot C_e \cdot C_m$$

in which, E_V is the computed pan evaporation equivalent to class 'A' pan evaporation, K_{ev} is a dimensionless empirically developed constant, the value of which is given by Christiansen as 0.473, R is extra-terrestrial radiation and C_t, C_w, C_h, C_s and C_e are coefficients for temperature wind velocity, relative humidity, percent of possible sunshine and elevation respectively and C_m is a monthly coefficient by which all the basic formulae would have to be multiplied to obtain the measured evaporation and averaged to obtain the measured evaporation and averaged tc obtain mean monthly values of C_m. The values of C_m mostly range between 0.90 to 1.10 and vary from latitude to latitude.

The simplified and nondimensionless equation for different coefficients are given below -

$$C_t = 0.393 + 0.02796\ T_c + 0.0001189\ T_c^2$$

in which, T_c is the mean monthly temperature in °C

$$C_w = 0.708 + 0.00339\ W - 0.0000039\ W^2$$

in which, W is the wind velocity in km/day at 0.6 m height

$C_{hn} = 1.25 - 0.87\ H_n + 0.75\ H_n^2 - 0.85\ H_n^4$

in which, H_n is the mean monthly relative humidity at noon expressed decimally.

or $C_{hm} = 1.25 - 3.37\ H_m - 0.60\ H_m^5$

in which, H_m is the mean relative humidity for the month expressed decimally.

$C_s = 0.542 + 0.80\ S - 0.78\ S^2 + 0.62\ S^3$

in which, S is the mean sunshine percentage expressed in decimals.

$C_e = 0.970 + 0.0000984\ E$

in which, E is the elevation in metres.

ANNEXURE III.B

Potential Evapo-transpiration (PET) (Christiansen's Approach)

Month	Mean Evaporation (Cm)	PET			
		Cotton K_c^*=0.68	Cereal & Maize 0.60	Forest 0.50	Banana 0.96
Jan	9.80	6.66	-	4.90	9.41
Feb	11.05	7.51	-	5.52	10.61
Mar	18.44	-	-	9.22	17.70
Apr	22.00	-	-	11.00	21.12
May	24.40	-	-	12.20	23.42
Jun	21.61	14.69	12.96	10.80	20.74
Jul	14.78	10.05	8.86	7.39	14.18
Aug	15.18	10.32	9.11	7.59	14.57
Sep	14.52	9.87	8.71	7.26	13.94
Oct	10.96	7.45	6.57	5.48	10.52
Nov	11.94	8.12	-	5.97	11.46
Dec	10.11	6.87	-	5.05	9.70