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B. Bapuji Rao, V.M. Sandeep,
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Summary

The global water consumption is doubling every 20 years and projected increase in food demand will have to be met by irrigation. Appropriate scheduling of irrigation increase the irrigation water use efficiency allowing more water available for other human and environmental uses. Timing and quantum of water to be applied requires data on Actual Evapotranspiration (AET). The measurement of AET is a very difficult and time consuming task. Because of this, the concept of Potential Evapotranspiration (PET) is widely used. Direct measurement of PET across locations is cost prohibitive for a country like India and an indirect method using meteorological data is a potential alternative. Though a number of empirical formulae / approaches are available, availability of climatic data limits their application across all the locations. In the present investigation, seven methods were employed to estimate the PET and the resultant values were compared with Penman-Monteith estimated PET for 51 locations across the country. On an annual basis,Turc method resulted in more errors followed by Thornthwaite and Blaney-Criddle. During southwest monsoon period PET estimated from Open pan and Christiansen pan method resulted in more errors whilst during northeast monsoon season Hargreaves and Christiansen pan resulted in more errors. During summer, modified Penman and Hargreaves are the best methods to adopt. During winter modified Penman and PET from Open pan resulted in few errors. Hargreaves method is surprisingly resulted in more errors during winter season compared to summer.

Calibration coefficients were evolved on annual and seasonal basis for different methods to reduce the errors in PET estimation in comparison to Penman-Monteith method. The efficiency of these coefficients were determined using an independent data set which showed that the errors can be minimized to a great extent by applying these coefficients. A station close by the 51 stations studied or per se climatologically analogous can employ the calibration coefficients directly. Maps indicating the spatial distribution of the coefficients across the country were presented so that any user can estimate PET for a station interspersed two PET isolines.

Potential Evapotranspiration estimation for Indian conditions: Improving accuracy through calibration coefficients

Introduction

Water foot printing is a useful tool to assess future consumption of water for production of crops and consumers based products that give a forecast of water demand on regional or national basis. The global consumption of water is doubling every 20 years, more than twice the rate of human population growth. An FAO estimate puts that 70-80 per cent of the increase in food demand between 2000 and 2030 will have to be met by irrigation (OECD, 2008). Irrigated agriculture is practiced on about 300 million hectares only or 20 per cent of the cultivable area (FAO, 2010), but contributing substantially with more than 40 per cent of world's food production. Irrigation can reduce the risks associated with the unpredictable nature of rainfed agriculture in dry regions. It helps to insulate farming from droughts that are predicted to occur more frequently. Efficient water use can increase crop diversity, produce higher yields, enhance employment and lower food prices (IFAD, 2008). Irrigated agriculture offers great potential for economic growth and poverty reduction. Considering the dominant role of irrigated agriculture in global water use, management practices that increase the productivity of irrigation water use can greatly increase the availability of water for other human and environmental uses (Tiwari and Dinar, 2002).

Evaporation demand or potential evaporation is projected to increase almost everywhere in the world in future climate scenarios (IPCC, 2008). This is because the water holding capacity of the atmosphere increases with higher temperatures, but relative humidity is not projected to change markedly. As a result water vapor deficit increases in the atmosphere as does the evaporation rate. Thus, the process of evapotranspiration (ET) is of great importance in present and future climates. The measurement of ET from a crop surface is a very difficult and time consuming task.

In spite of the efforts of numerous scientists, reliable estimates of regional ET are extremely difficult to obtain mainly because of its dependence on soil conditions and plant physiology, so that advances in the knowledge of the underlined interactions and it's all round influence have been few and far between. Because of its complexity, the concept of potential evapotranspiration (PET) has been introduced, which is largely independent of soil and plant factors but has shown dependent on climatic factors. Temporal variations of PET and quantification of its trend can serve as a valuable reference data for the regional studies of hydrological modeling, agricultural water management, irrigation planning and water resource management as demonstrated by Liang *et al.* (2010).

Potential evapotranspiration

Potential evapotranspiration is defined as "the rate of evapotranspiration from an extensive surface of 8 to 15 cm tall, green grass cover of uniform height, actively growing, completely shading the ground and not short of water" (Doorenbos and Pruitt, 1977). As the definition suggests that the PET is for a grass reference ET_o. The concept of reference ET is being used to avoid ambiguities associated in the definition of PET (Jensen, 1974 and Perrier, 1982). Reference ET_o refers to ET from a vegetative surface over which weather data are recorded and allows to develop a set of crop coefficients to be used to determine ET for other crops. By adopting reference ET_o, it has become easier to select crop coefficients and to make reliable ET estimates in new areas. The use of ET_o – crop coefficient approach has been largely successful in obviating the need to calibrate a separate ET equation for crop and stage of growth (Jensen *et al.*, 1990). In the present investigation short grass as defined by Doorenbos and Pruitt (1977) is considered as reference crop and PET values estimated by any method is in reference to that.

Measuring Potential evapotranspiration

The measurement of PET from a grass surface maintained as per specifications is very difficult and time consuming process. However, different approaches to measure the same can be listed as:

1. Water budgeting technique.
2. Direct soil water measurement (Gravimetric, neutron probe, TDR etc).
3. Hydrologic budget (mass balance) method.
4. Lysimetric(Weighing, non-weighing, drainage lysimeters) measurement.
5. Indirect meteorological (Bowen ratio and eddy correlation) methods.
6. Chamber techniques.
7. Biological (Sap flow technique, Porometer, photometer) methods.
8. Passive (Pan evaporation) methods.

Of all the above methods, direct soil water measurement is most commonly performed technique but very labour intensive and time consuming if gravimetric sampling is resorted to. The invention of modern instruments like neutron probe and TDR though removed the drudgery, the cost of these instruments and their maintenance makes it prohibitive. For a vast and developing country like India, direct measurement of PET across locations is cost prohibitive and an indirect method using meteorological data remains a better alternative.

Empirical estimation of PET

A number of empirical formulae/approaches have been used for the determination of PET from meteorological data. Availability of climatic data and accurately converting them in terms of water requirement are of great constraints. Judging the accuracy of different PET estimation methods is a difficult task. Jensen *et.al.* (1990) evaluated about 20 equations, 9 of which are combination equations, against measured ET values. Their study showed that Penman-Monteith and Kimberly Penman (Wright, 1982) were the two best relations in terms of accuracy of estimation and standard deviation of estimates. The FAO-PPP-17 Penman (Frere and Popov, 1979) and 1963 Penman equation (Penman, 1963) were the next best performing relations. The FAO radiation method was the best of the non combination equation methods. The FAO-Penman method was poorly ranked due to its chronic over estimation. Several limitations are there in data availability for the Indian conditions. Nevertheless, the PET needs to be estimated to determine the crop water requirements using crop specific coefficients.

The objective of the present study is to identify suitable relation(s) to be used at different locations across India in estimating PET. The FAO Penman-Monteith method is considered as a standard reference for PET estimation in this investigation across the locations. The findings are expected to narrow down the errors associated in PET estimation across the locations and the relations and calibration coefficients suggested in this study could be used by researchers in their water requirement studies in future.

Methodology

The All India Coordinated Research Project on Agrometeorology (AICRPAM) and All India Coordinated Research Project on Dryland Agriculture (AICRPDA) are conducting research in different aspects of Agrometeorology and Dryland farming, respectively each at 25 centres located across the country. Both the projects have 12 centers in common. The meteorological data utilized in the present study is collected from these 37 centres and 14 more centers, whose data is available with Agromet Databank, CRIDA and the details of the data utilized are presented in Table 1. The geographical locations of these 51centres are depicted in Fig 1. The following empirical/ combination methods are used for estimating the PET. The data requirements in employing different formulae are presented in Table 2. Once the PET is estimated on a daily basis, average values were derived for annual and for Southwest monsoon (June - September), Northeast monsoon (October - December), Winter (January - February) and Summer (March - May) seasons.

Fig 1: Geographical location of the stations considered for the present study

Table 1 : Details of the stations with period of data analyzed

Sl No.	Station	Latitude	Longitude	Altitude (m)	Data available for the period
1	Agra	27°12'N	78°18'E	170	Jan 70 to Dec 87
2	Akola	20°42' N	77°02' E	282	Jan 70 to Nov 73, Mar 76 to Nov 77, May 78 to Jul 84, Jul 86 to Apr 04, Apr 05 to Dec 10
3	Anakapalle	17°41'N	83°03'E	34	Jan 81 to Dec 2011
4	Anand	22°33' N	72°58' E	45	Jan 80 to Jun 02, Dec 02 Dec 10
5	Anantapur	14°41' N	77°37' E	350	Mar 79 to Dec 10
6	Arjia	25°33'N	74°41'E	597	Jan 96 to Sep 2005
7	Avikanagar	26°18'N	75°25'E	230	Jan 98 to Dec 2000
8	Bangalore	12°58' N	77°35' E	930	Jan 77 to Dec 77, Jan 80 to Dec 81, Jan 83 to Dec 96, Jan 98 to Dec 01, Jan 03 to Dec 10
9	Barrackpore	23°46'N	88°22'E	14	Jan 99 to Feb 2011
10	Bellary	15°9'N	77°56'E	444	Jan 57 to Dec 87
11	Bharathpur	27°13'N	77°29'E	182	Jan 88 to Feb 2007

Sl No	Station	Latitude	Longitude	Altitude (m)	Data available for the period
12	Bhubaneswar	20°15' N	85°50' E	25	Jan 69 to Jan 70, Feb 71 to Mar 75, Mar 76 to May 76, Jan 78 to May 79, Dec 79 to Dec 94, Aug 01 to Jan 07, Apr 07 to Oct 09, Jul 10 to Dec 10
13	Bijapur	16°49' N	75°43' E	594	Dec 90, Jan 97 to Feb 97, Jan 98 to Jan 99, Mar 99 to Apr 03, Oct 03 to Dec 10
14	Coimbatore	11°01'N	76°57'E	420	Jan 82 to Dec-2009
15	Cuttack	21°30'N	86°50'E	36	Jan 60 to May 2010
16	Dantiwada	24°21'N	72°21'E	55	Jan 82 to Dec 2009
17	Dapoli	17°46' N	73°12' E	250	Jan 85 to Dec 93, Aug 94 to Dec 10
18	Dehradun	30°19'N	78°2'E	656	Jan 90 to Dec 2000
19	Faizabad	26°47' N	82°08' E	133	Sep 93 to Dec 96, Aug 99 to Jul 06
20	Hisar	29°10' N	75°44' E	215	Jan 70 to Dec 10
21	Hyderabad	17°23'N	78°29'E	536	Jan 76 to Dec 81, Jan 83 to Dec 83, Jan 85 to Jan 11
22	Jabalpur	23°09' N	79°58' E	393	Jan 72 to Jan 91, Oct 93 to Feb 96, Jun 02 to Dec 10
23	Jodhpur	26°15'N	73°01'E	254	Jan 63 to Dec 2011
24	Jorhat	26°47' N	94°12' E	86	Mar 77 Dec 79, Jan 81 to Mar 81, Jul 95 to Aug 95,Jan 97 to Dec 10
25	Kanpur	26°26' N	80°22' E	126	Apr 04 to to Dec 10
26	Karnal	30°41'N	77°59'E	227	Jan 81 to Dec 2010
27	Kovilpatti	9°10' N	77°52' E	90	Jan 73 to Apr 81, Apr 82 to Dec 10
28	Lembuchera	24°48'N	91°18'E	18	Jan 99 to Dec 2006
29	Lucknow	27°51'N	81°55'E	130	Jan 80 Dec 2009
30	Ludhiana	30°56' N	75°52' E	247	Jan 70 to to Apr 89,Jun 90 to Dec 10
31	Madurai	9°55'N	78°07'E	151	Jan-75 to Dec 2010
32	Maruteru	16°37'N	81°48'E	14	Jan-98 to Dec 2010
33	Mohanpur	21°52' N	87°26' E	10	Sep 96 to Mar 08
34	Nagpur	21°9'N	79°6'E	303	Mar 96 to Dec 2001, Jan 2004 to Dec 2005
35	New Delhi	29°36'N	77°12'E	210	Apr 83 to Dec 2010
36	Palampur	32°06' N	76°03' E	1291	Jan 83 to Dec 83, Jan 86 to Dec 10
37	Parbhani	19°08' N	76°50' E	423	Jan 70 to Dec 10
38	Puttur	13°46'N	75°13'E	86	Jan 91 to Dec 2008
39	Raipur	21°14' N	81°39' E	298	Jan 71 to Jul 71, Feb 80 to Dec 10
40	Rajamundry	17°59'N	82°47'E	13	Jan 60 to Mar 2011
41	Rakh Dhiansar	32°39' N	74°58' E	332	Oct 03 to Dec 03, Jul 04 to Dec 10
42	Ranchi	23°17' N	85°19' E	625	Apr 57 to Sep 57, Jan 58 to Apr 61, Sep 61 to Dec 65, Feb 75 to Dec 78, Feb 79 to Sep 81, Sep 03 to Nov 10
43	Ranichauri	30°52' N	78°02' E	1600	Aug 93 to Aug 95, Oct 97 to Apr 08, Apr 99 to Dec 10
44	Samastipur	25°53' N	85°48' E	52	Dec 03 to Jul 06, Jan 07 to Mar 07, Jan 08 to Dec 10

Sl No	Station	Latitude	Longitude	Altitude (m)	Data available for the period
45	Sirsa	30°32'N	75°1'E	204	Jan 90 to Dec 90, Mar 94 to Jun 99, Oct 99 to Dec 2002, Feb 2004 to Jul 2009
46	Solapur	17°41' N	75°56' E	25	Jan 70 to Dec 10
47	Targhadia	22°18'N	71°54'E	168	Jan 92 to Dec 2009
48	Thrissur	10°31' N	76°13' E	26	Jan 84 to Dec 10
49	Udaipur	25°21' N	74°38' E	433	Jan 82 to Dec 10
50	Umiam	26°36'N	92°54'E	1451	Jan 2001 to Dec 2005
51	Varanasi	25°20'N	83°7'E	76	Jan 80 to Dec 82, Jan 85 to Dec 2008

Table 2 : Input data requirements of different PET estimation methods

Sl. No	PET estimating method	Input data requirement	
		Estimated/ Derived	Measured
1	Thornthwaite (1948) Method		Air temperature
2	Hargreaves (1985) Method	Extra- terrestrial radiation	Air temperature
3	Turc (1961) Method	Solar radiation	Air temperature, hours of bright sun shine
4	Christiansen Pan Evaporation (1968) Method		Open pan evaporation, air temperature, wind speed, relative humidity
5	FAO-24 Blaney-Criddle (1977) Method		Air temperature, wind speed, relative humidity, hours of bright sun shine
6	FAO-24 Modified Penman (1977) Method	Solar radiation	Air temperature, wind speed, relative humidity, hours of bright sun shine
7	FAO-24 Open pan (1977) Method		Open pan evaporation, wind speed, relative humidity
8	FAO Penman – Monteith (1991) Method	Solar radiation	Air temperature, wind speed, relative humidity, hours of bright sun shine

A) Thornthwaite (1948) Method

$$PET = 1.6\, l\, (10\, T_m / I)^a \qquad \text{.... (Eq.1)}$$

Where,

PET = adjusted potential evapotranspiration in cm (12 hrs, day time)

T_m = mean temperature in °C

I = annual heat index = $\Sigma\, (t_1/5)^{1.514}$

T_i = temperature in °C of the i^{th} month

a = an empirical exponent = $6.75 \times 10^{-7} I^3 - 7.71 \times 10^{-5} I^2 + 1.792 \times 10^{-2} I + 0.49239$ *l* is day length factor, which is computed as

l = $\left(\frac{n}{12}\right)\left(\frac{D}{30}\right)$, where D is no. of days in a month

B) Hargreaves *et. al.*(1985) Method

$PET = 0.0023 R_A T_D^{0.5} (T_m+17.8)$ …. (Eq.2)

Where,

R_A = extra-terrestrial radiation (mm day^{-1})

T_D = difference between maximum and minimum temperature (°C)

T_m = mean temperature (°C)

The value of R_A on any given day can be deduced from the Table 2 of Doorenbos and Pruitt (1977) or by using the relation presented under Turc (1961) method.

C) Turc (1961) Method

$PET = 0.40\, T_m (R_s+50) / (T+15)$ …. (Eq.3)

Where,

T_m = mean air temperature (°C)

R_s = solar radiation in langleys

The solar radiation (R_s) is in turn computed from the following expression

$R_s = [0.25 + 0.5\,(n/N)]\, R_A$

Where,

R_A = extra-terrestrial radiation (MJ m^{-2} day^{-1})

n = actual hours of bright sunshine (hrs)

N = maximum possible hours of sunshine (hrs)

The extra-terrestrial radiation (R_A) is computed after Duffie and Beckman (1991) as

$$R_A = \frac{24 \text{ x } 60}{\pi} GS_c[dr\,[Ws \sin(LAT) \sin d + \cos(LAT) \cos(d) \sin Ws]]$$

Where,

GS_c = solar constant (0.82 MJ m^{-2} min^{-1})

dr = relative distance of the earth from the sun

d = solar declination in radiance

The distance from the earth to sun is calculated as

$dr = 1 + 0.033 \cos(2\pi\, i / 365)$

Where,

i = julian day

Solar declination (d) is computed as

$d = 0.4093 \sin(2\pi\,(284+ i) /365)$

The sunset hour angle, Ws, in radians is calculated as

$Ws = \arccos(-\tan(LAT) \tan d)$

The maximum possible hours of sunshine (N) is simulated using the following function

$N = 2/15 \cos^{-1}(-\tan LAT \tan d)$

Where,

$d = 23.45 \sin(360\,(284 + i)/365)$

LAT is latitude of the station

D) Christiansen (1968) Pan Evaporation Method

$$PET = 0.755\, E_o C_{T2}\, C_{W2}\, C_{H2} C_{S2} \quad \text{.... (Eq.4)}$$

Where,

E_o = open pan evaporation (mm)

$C_{T2} = 0.862 + 0.179\,(T_m/20) - 0.041\,(T_m/20)^2$

Where, T_m is the mean temperature in °C

$C_{w2} = 1.189 - 0.240\,(W/6.7) + 0.051\,(W/6.7)^2$

Where,

W = mean wind speed 2 m above ground level in km per hour

$C_{H2} = 0.499 + 0.620\,(H_m/0.60) - 0.119\,(H_m/0.60)^2$

Where,

H_m = mean relative humidity, expressed decimally

$C_{S2} = 0.904 + 0.0080\,(S/0.8) + 0.088\,(S/0.8)^2$

Where, S is the percentage of possible sunshine, expressed decimally.

E) FAO-24 Blaney-Criddle (1977) Method

$$PET = a + bf \quad \text{.... (Eq.5)}$$

$f = p\,(0.46\,T + 8.13)$

$a = 0.0043\, RH_{min} - n/N - 1.41$

$b = a_o + a_1 RH_{min} + a_2 n/N + a_3 U_d + a_4 RH_{min} n/N + a_5 RH_{min} U_d$

Where,

p = mean daily per cent of annual daytime hours (monthly p/(days/mo))

T_m = mean air temperature (°C)

n/N = ratio of possible to actual sunshine hours

RH_{min} = minimum daily relative humidity in percentage

U_d = daytime wind at 2 m height (ms^{-1})

a_0 = 0.81917

a_1 = 0.0040922

a_2 = 1.0705

a_3 = 0.065649

a_4 = 0.0059684

a_5 = 0.0005967

F) FAO-24 Modified Penman (1977) Method

$PET = [WR_n + (1\text{-}w)\, f(u)(e_a\text{-}e_d)]\ c$ …. (Eq.6)

Where,

PET	=	potential evapotranspiration (mm day^{-1})
W	=	temperature related weighing factor
R_n	=	net radiation (mm day^{-1})
f(u)	=	wind related function
$(e_a\text{-}e_d)$	=	difference between S.V.P. at mean air temperature and mean actual vapor pressure of air (mb)
c	=	correction factor

The saturation vapour pressure (e_a) is estimated as a function of temperature using the equation

$$e_a = e^{(54.88-5.03 \log (Tm +273) - 6791/Tm +273)}$$

Where,

T_m = daily mean air temperature (°C)

The vapour pressure is simulated as a function of this saturation value and relative humidity as

$$e_d = e_a[RH/100]$$

Where,

RH = relative humidity (per cent)

The temperature related weighing factor (W) is computed from the slope of saturation vapour pressure curve (d) and psychrometric constant (t_c) as

$$W = d/ (d + t_c)$$

The slope of the saturation vapour pressures curve is estimated with the following equation

$$d = (e_a/T_m + 273)\ (6791/(T_m+273)-5.03)$$

The psychrometric constant is computed with the following equation

$$t_c = (6.6 \times 10^{-4})\ Pb$$

Where,

Pb = barometric pressure (mb)

The barometric pressure is estimated as a function of station elevation by using the equation

$$Pb = (101.3-0.01152\ Elev + 5.44 \times 10^{-1}\ Elev^2)\ 10$$

Where,

Elev = elevation of the location (m)

The wind related function (Fu) is computed using the expression

$$F(u) = 0.27\ ((1+U_3 0.93)/100))$$

Where,

U_3 = wind speed at 3 m height in km day^{-1}, which is converted to wind speed at 2m height with the coefficient of 0.93.

The net radiation (R_n) is computed with the expression

$$R_n = (R_{ns} - R_{nl})\ 0.4081632$$

Where,

R_{ns} = net short wave radiation (MJ m^{-2} day^{-1})

R_{nl} = net long wave radiation (MJ m^{-2} day^{-1})

The factor 0.4081632 converted MJ m^{-2} day^{-1} into mm of water per day. The net short wave radiation (R_{ns}) is computed as

$$R_{ns} = (1-\alpha)\ R_s$$

Where,

α = albedo (0.26)

R_s = solar radiation (MJ m^{-2} day^{-1})

The correction factor 'c' in the above relation is derived after Frevert *et.al.* (1983) as

$$c = a_0 + a_1 RH_{max} + a_2 R_s + a_3 U_d + a_4 DN_r + a_5 U_d DN_r + a_6 RH_{Max} R_s U_d + a_7 RH_{max} R_S DN_r$$

Where,

a_0 = 0.6817006

a_1 = 0.0027864

a_2 = 0.0181768

a_3 = -0.0682501

a_4 = 0.0126514

a_5 = 0.0097297

a_6 = 0.000043025

a_7 = -0.00000092118

DN_r = ratio of day time tonight time wind speed

$$Ud = \left[\frac{DN_r\ U_2}{1+DN_r}\right]\left[\frac{1000}{12.36}\right]$$

U_2 = wind speed at 2 m height (km/day)

G) FAO-24 Open pan (1977) method

$$PET = K_p E_p \qquad \text{.... (Eq. 7)}$$

Where,

K_p = pan coefficient

E_p = measured open pan evaporation (mm)

Pan coefficient as computed by Allen and Pruitt (1991) for green and dry fetch is adopted in this study which is:

Green Fetch

$$K_p = 0.108 - 0.000331 U_2 + 0.0422 \ln(Fetch) + 0.1434 \ln(RH_{mean}) - 0.000631\ [\ln(Fetch)]^2 [\ln(RH_{mean})]$$

Dry Fetch

K_p = $0.61+0.00341\ RH_{mean}-0.00000187\ U_2RH_{mean}$
$-0.000000111\ U_2(\text{Fetch}) +0.0000378\ U_2\ln(\text{Fetch})$
$-0.0000332\ U_2\ln(U_2)-0.0106\ [\ln(U_2)][\ln(\text{Fetch})]$
$+0.00063\ [\ln(\text{Fetch})]^2\ [\ln(U_2)]$

In the present study, green fetch coefficients were used during Southwest monsoon and Northeast monsoon seasons and dry fetch coefficients during winter and summer periods. A fetch of 10 m during Southwest monsoon and Northeast monsoon periods and 100 m during winter and summer periods were assumed.

H) FAO Penman–Monteith (1991) Method

$$PET = \frac{0.408\Delta(R_n-G)+\gamma\frac{900}{T+273}U_2(e_a-e_d)}{\Delta+\gamma\ (1+0.34U_2)} \quad \text{.... (Eq. 8)}$$

Where,

PET = potential evapotranspiration [mm d^{-1}]
R_n = net radiation at crop surface (MJ m^{-2} d^{-1}]
G = soil heat flux (MJ m^{-2} d^{-1}]
T = average temperature at 2 m height(°C)
U_2 = windspeed measured at 2 m height [m s^{-1}]
(e_a-e_d) = vapour pressure deficit for measurement at 2 m height [k Pa]
Δ = slope vapour pressure curve [k pa°C^{-1}]
γ = psychrometric constant [k pa°C^{-1}]
900 = coefficient for the reference crop [l J^{-1} kg K d^{-1}]
0.34 = wind coefficient for the reference crop [s m^{-1}]

The various components of the above relation are derived as:

i) When solar radiation is available

$$R_n = 0.77\ R_s - \left(a_c\frac{R_s}{R_{so}} + b_c\right)(a_1 + b_1\sqrt{e_d})\sigma\frac{(T_{kx}^4 + T_{kn}^4)}{2}$$

Where T_{kx} and T_{kn} are both set equal to mean hourly air temperature for hourly calculations. This is not employed in the present study as very few stations have the data on solar radiation.

ii) When only sunshine data is available

$$R_n = 0.77\ (0.25 + 0.50\ \frac{n}{N} + R_s)$$
$$-2.45\ x\ 10^{-9}\left(0.9\ \frac{n}{N} + 0.1\right)(0.34 - 0.14\sqrt{e_d})(T_{kx}^4 + T_{kn}^4)$$

$G = 0.38\ (T_{day\ i} - T_{day\ i-1})$

Where,

T_{dayi} = mean daily air temperature
$T_{day\ i-1}$ = mean daily air temperature of preceding day

iii) Vapour Pressure Deficit (VPD)

$$VPD = (e_a - e_d) = \frac{e^o(T_{max}) + e^o(T_{min})}{2} - e_d$$

Where,

VPD = vapour pressure deficit [kPa]

$e^o(T_{max})$ = saturation vapour pressure at Tmax [kPa]

$e^o(_{Tmin})$ = saturation vapour pressure at Tmin [kPa]

e_d = actual vapour pressure [kPa]

$$e_a = e^o\ (T) = 0.611 \exp\left(\frac{17.27\ T}{T + 237.3}\right)$$

Where,

e_a = saturation vapour pressure [kPa]

$e_o(T)$ = saturation vapour pressure function [kPa]

T = air temperature [°C]

$$e_d = e^o(T_{min})\frac{RH_{max}}{100}$$

iv) Δ is slope of vapour pressure, computed as

$$\Delta = (e_a/T_m + 273)\ (6791/(T_m + 273) - 5.03)$$

Statistical Analyses

After computing PET by different methods, the data were separated into four seasons namely Southwest monsoon (June-Sept), Northeast monsoon (Oct-Dec), Winter (Jan-Feb) and Summer (Mar-May). The accuracy of each method in comparison with Penman-Monteith method was analyzed statistically by using root mean square (RMSE), mean bias (MBE) and mean percentage (MPE) error values as

$$RMSE = [\Sigma\ (PET_e - PET_p)^2/n]^{0.5} \quad \text{….. (Eq. 9)}$$

$$MBE = [\Sigma\ (PET_e - PET_p)]/n \quad \text{…. (Eq. 10)}$$

$$MPE = \{\Sigma\ (PET_p - PET_e)/PET_p]100\}/n \quad \text{…. (Eq. 11)}$$

Where,

n = number of observations

PET_p = PET as estimated by Penman-Monteith method

PET_e = PET as estimated by empirical relation in question

While determining MPE value, the sign of the errors were neglected and the percentage errors were added to calculate the mean.

Annual PET across the country

The annual PET as estimated by Penman-Monteith method at different locations of the country is presented in Fig 2. The normal rainfall on annual basis at these stations is indicated in Fig 3. The deficit between what is received through rainfall by a particular station and what is lost to the atmosphere by PET is expressed in terms of I_m and the values of I_m computed at different locations are presented in Fig 4 and isolines are drawn.

The daily PET values on annual basis presented in table 3a indicated that highest evaporation loss occurs from Jodhpur region (9.10 mm/day) which experiences arid conditions. This is followed by Coimbatore (6.78 mm/day) and Bellary (6.26 mm/day). The semi-arid locations of Anantapur (5.81 mm/day) is next in that order. Least evaporation losses are observed from Sirsa (2.76 mm/day) and Ranichauri (2.87 mm/day) (Table 3a). Stations like Umiam (3.04 mm/day) and Jorhat (3.09 mm/day) in the northeast region are the stations with low annual PET values.

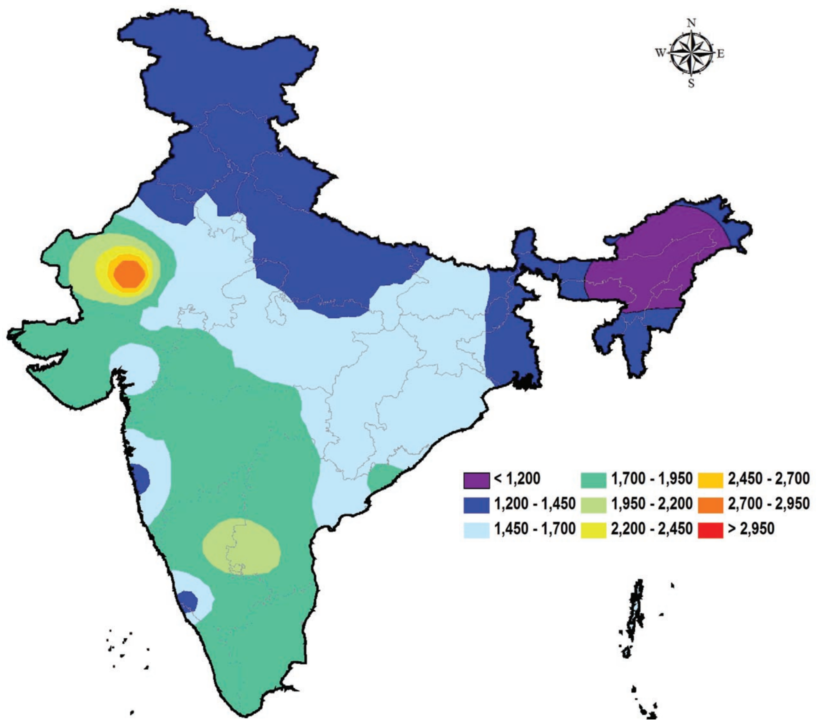

Fig 2: Spatial variation in the PET (mm) estimated by Penman-Montieth method

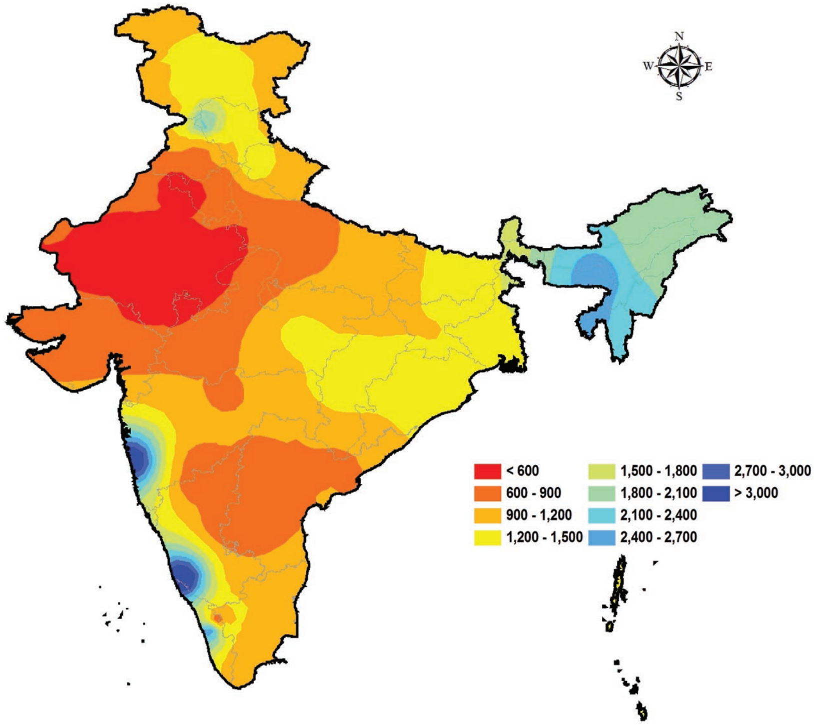

Fig 3: Spatial variation in the mean annual rainfall (mm)

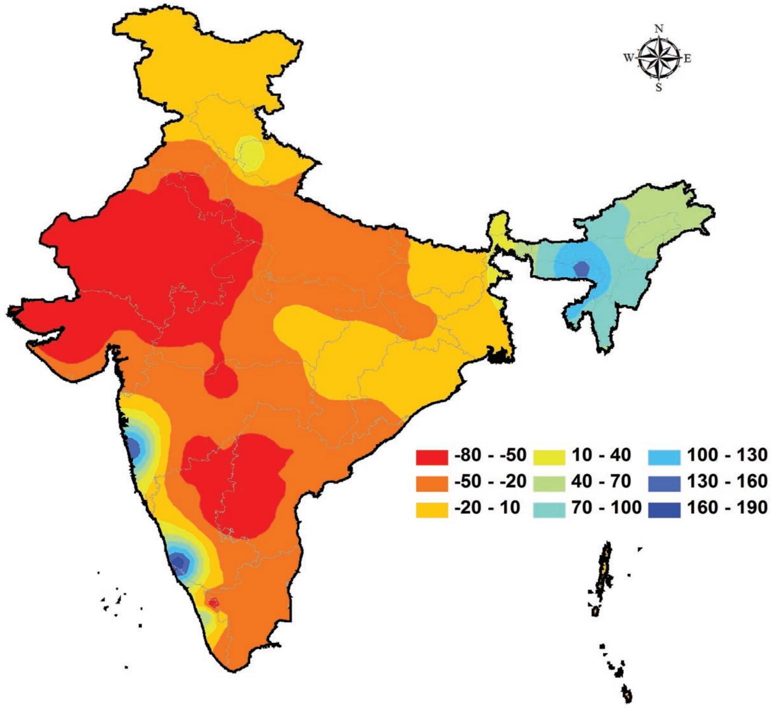

Fig 4: Spatial variation of Moisture Index (Im)

Seasonal PET Values

To understand the influence of PET on crop water use, the PET need to be estimated on seasonal basis. Hence, the mean daily PET values for southwest monsoon (June-September), northeast monsoon (October-December), winter (January-February) and summer (March-May) seasons are computed and presented in Table 3 (b) to (e). During monsoon season highest PET values were observed at Jodhpur (9.58 mm /day) followed by Coimbatore (7.47 mm/day). The arid / semi - arid locations like Bellary (6.43 mm/day), Kovilpatti (6.26 mm/day) and Anantapur (6.14 mm/day) are next in that order. During this season, Puttur (2.85 mm/day), Dapoli (3.08 mm/day) and Umiam (3.21 mm/day) recorded low PET values. During northeast monsoon Ranchi (1.78 mm/day) and Sirsa (1.86 mm/day) recorded lowest PET values whereas Jodhpur again recorded (6.33 mm/day) highest PET values followed by Coimbatore (4.68 mm/day) and Bellary (4.19 mm/day). During summer season also the arid region of Jodhpur recorded highest (12.89 mm/day) PET values followed by Bellary (8.31 mm/day) and Coimbatore (8.10 mm/day). The advective energy during the summer season in the arid and semi - arid tracts of Jodhpur, Bellary and Coimbatore might be influencing the PET. Closely following the summer values, Coimbatore (3.57 mm/day), Jodhpur (6.34 mm/day), Bellary (6.03 mm/day) stations recorded highest PET values during winter season. Least PET during winter season was observed at Rakh Dhiansar (1.52 mm/day), Sirsa (1.59 mm/day) and Ranichauri (1.72 mm/day).

Open pan evaporation

The Open pan evaporation data, which is the loss of water from an open water body,is widely used in hydrological studies and to estimate PET using a simple proportional relationship (pan coefficient). The mean average open pan evaporation data was highest at Bellary (8.33 mm/day) followed by Jodhpur (8.15 mm/day). The lowest Open pan values were recorded on annual basis in the eastern parts of India at Jorhat (2.36 mm/day) and Ranichauri (2.50 mm/day). During the monsoon season also Bellary recorded highest evaporation values (9.23 mm/day) closely followed by semi-arid location of Kovilpatti (9.02 mm/day). Umiam in Meghalaya (2.64 mm/day) recorded the lowest evaporation values closely followed by Puttur (2.65 mm/day). During the northeast monsoon season Targhadia in Gujarat recorded highest pan evaporation (6.06 mm/day) closely followed by Arjia in Rajasthan (5.65 mm/day). During this season Jorhat (1.70 mm/day) in the northeast and Raipur (1.72 mm/day) in the central parts of India recorded the lowest Open pan values. During summer season highest open pan evaporation was recorded at Akola in the Deccan plateau (12.98 mm/day) followed by Jodhpur in Rajasthan (11.77 mm/day) lowest values during the summer season were recorded in the north eastern parts of India at station like Jorhat (2.85 mm/day) and Ranichauri (3.45 mm/day). During winter season highest open pan was recorded in the arid /semi-arid tracks of Anantapur (7.22 mm/day) and Bellary (7.09 mm/day) and least evaporation were recorded at Dehradun (1.44 mm/day) and Rakh Dhiansar (1.45 mm/day).

PET estimation by different methods

Availability of daily data continuously without missing points at all the locations is the prime limitation in employing the Penman-Monteith method, though considered to be the best available method as on today. This has promoted the investigators to employ different PET estimating methods and to study the suitability of each of them for different locations covering various ecological conditions. The PET was estimated using seven methods apart from Penman-Monteith method. The PET values thus estimated along with observed open pan evaporation data are presented in tables 3 (a) to (e) for the annual and seasonal periods. From the annual data it could be noticed that differences exists between Penman-Monteith method estimates and estimates from other relations. This has compelled us to employ statistical parameters like MBE, MPE and RMSE to quantify the magnitude and nature of differences. The mean bias error of different relations in different seasons are presented in table 4 (a).

The MBE annual values (Table 4a) indicate that all methods except Christiansen pan and PET from open pan methods are over-estimating PET at all the locations compared to Penman-Monteith method. On the other hand, PET derived from open pan evaporation and Christiansen pan are under-estimating at majority of the locations. During SW monsoon season on an average, Turc method and Thornthwaite methods over-estimated largely. Whereas, Blaney-Criddle method, Christiansen pan evaporation method and PET derived from open pan have under-estimated. The Hargreaves method under-estimated largely at Jodhpur, Coimbatore and Bellary and over-estimated in most of the remaining centres. When the MBE values are segregated season wise, the magnitude of the errors are large in all the seasons with Turc, Thornthwaite and Blaney-Criddle methods (Table 5a). The Blaney-Criddle method which under-estimated during monsoon season was found to over-estimate during the remaining three seasons at majority of the locations. Hargreaves method performed better during northeast monsoon season compared to other three seasons. Modified Penman method over-estimated mostly during summer. Turc method over-estimated during northeast monsoon season.

The RMSE values on annual basis (Table 4b and 5b) indicate higher errors associated with Turc, Thornthwaite and Blaney-Criddle methods in that order. Least RMSE values were noticed with modified Penman method at all the locations. On seasonal basis RMSE values of Turc method are large during northeast and southwest monsoon seasons and Blaney-Criddle method during summer season.

The MPE values on annual basis (Table 4c and 5c) were highest with Turc (258.5%) followed by Thornthwaite (183.0%), Blaney-Criddle (83.5%), Pan evaporation data (38.5%), Christiansen pan (28.7%), PET derived from Open pan (28.5%), Hargreaves (28.4%), and modified Penman (16.5%). During SW monsoon season modified Penman method resulted in 15.9 per cent error followed by Hargreaves (24.6%), Christiansen (32.0%), PET from open pan (32.1%) and Open pan evaporation data (38.6%). During

NE monsoon season Hargreaves method resulted in more errors (35.9%) when compared to Christiansen pan method (28.6%) and PET from Open pan (27.6%). In summer modified Penman (15.6%), Hargreaves (21.4%), PET from Open pan (25.6%) and Christiansen method (25.7%) were the best to adopt. In winter season modified Penman method (18.0%), PET from Open pan (28.5%) and Christiansen pan (28.8%) were the best methods. Hargreaves method surprisingly resulted in more errors during winter season (31.9%) compared to summer.

Calibration / adjustment coefficients

Majority of the Indian locations have only rainfall and air temperature data. This necessitates the application of temperature based or other simple methods in the PET estimation. However, these simple methods do not account for major weather parameters which affect the value of PET. Hence, local calibration is necessary. The FAO also recommended that empirical methods be calibrated or validated for new locations using the standard FAO Penman-Monteith method (Smith *et.al.,* 1991). It is also suggested that the calibrations should be done at the closest location having sufficient and valid data to apply the Penman-Monteith equation.

Allen *et.al.* (1994) suggested the use of following relation at locations with limited data to marginalize errors as:

$PET_{pm} = b\ PET_e$ or $PET_{pm} = a + b\ PET_e$

Where,

PET_{pm} is Penman Monteith estimated PET,

PET_e is PET estimated by temperature or any simple method.

This concept of using one equation to calibrate or validate a second, more empirical equation has been widely used. Gunston and Batchelor (1983) used the modified Penman method to calibrate coefficients for a Priestly-Taylor equation for tropical regions. Likewise, Allen and Brockway (1983) used the 1972 Kimberly Penman equation to develop adjustment factors for the FAO Blaney-Criddle equation at 5 locations. The adjustment factors and Blaney-Criddle equation were then applied to 100 air temperature stations in Idaho, USA. The utility of this method in narrowing down the errors in PET estimation by different approaches for a coastal location of Andhra Pradesh was demonstrated in an earlier study by Rambabu and Rao (1999).

In order to improve the predictability of each of the seven methods tested, calibration/ adjustment coefficients were evolved by linear regression technique with Penman-Monteith estimate as dependent variable. The regression coefficients thus derived for different stations are presented in Table 6.1 to 6.51. The coefficient “a” values indicate whether a given method is underestimating or overestimating and coefficient “b” values (slope values) indicate whether the PET estimate by the method in question is nearer to Penman-Monteith estimates or not. The correlation coefficient (r) and coefficient of determination (R^2) values also indicate the accuracy of the relation in question. For example, at Anand the modified Penman method was the best followed by Blaney-Criddle for the SW monsoon season. During the northeast monsoon season and summer seasons Thornthwaite and during winter PET from open pan are the next best methods. The modified Penman is slightly underestimating in northeast monsoon season. The evaporation from open pan was the third approximation in all the seasons. This type of inferences can be drawn for other stations from the regression coefficients, r and R^2 values.

Reduction of errors in PET estimation

The errors in PET estimation by different methods can be reduced by employing the calibration / adjustment coefficients for each station and season in question, whose values are presented in the Table 6.1 to 6.51. The efficiency of these calibration coefficients in reducing the errors in each relation was determined using a sample data of 100 days selected randomly during the year 2011. This is done by multiplying the PET as estimated by the relation with coefficient "b" and then adjusting the product by intercept i.e., "a" value. The resultant PET estimated for these 100 days were again subjected to statistical analysis. The MBE, RMSE and MPE values before applying the calibration coefficients and those after applying the calibration coefficients are presented in Table 7 (a) to (c) and 8 (a) to (c), respectively. The errors were minimized to a great extent by applying the calibration coefficients. This analysis indicated the applicability of the calibration coefficients in reducing the errors in PET estimation by a method other than Penman-Monteith method.

Maps indicating the distribution of calibration coefficients "a and b" for estimating PET from open pan evaporation data were prepared using GIS software, depicting their distribution across the country and presented in Fig 5 and Fig 6, respectively. This spatial distribution facilitates any user to estimate PET of a station interspersed two PET isolines. Likewise, maps for the distribution of calibration coefficients for other methods can be prepared as well. We believe that application of these coefficients will narrow down the errors in PET estimation by a method other than Penman-Monteith. A station close by the 51 stations studied or *per se* climatologically analogous can employ the calibration coefficients, specific for the season and method used for PET estimation in question, directly.

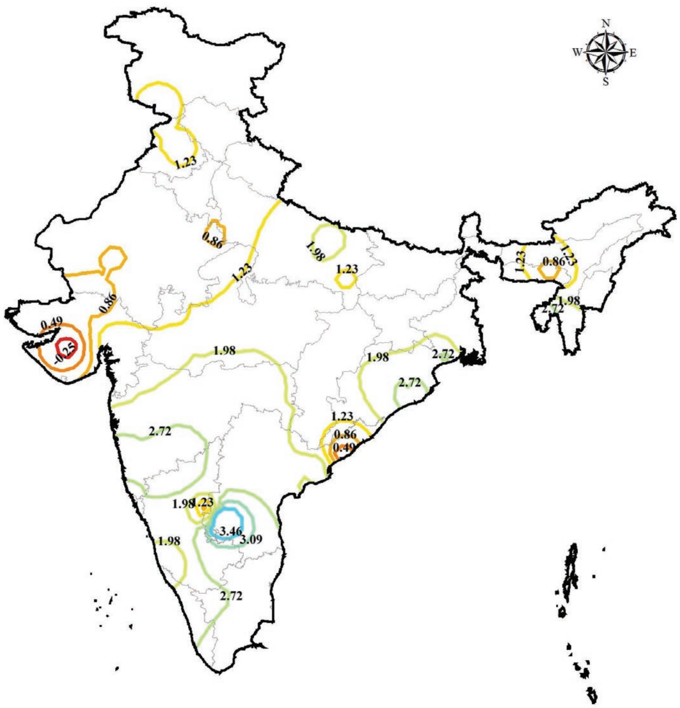

Fig 5: Spatial distribution of calibration coefficient 'a' for open pan evaporation

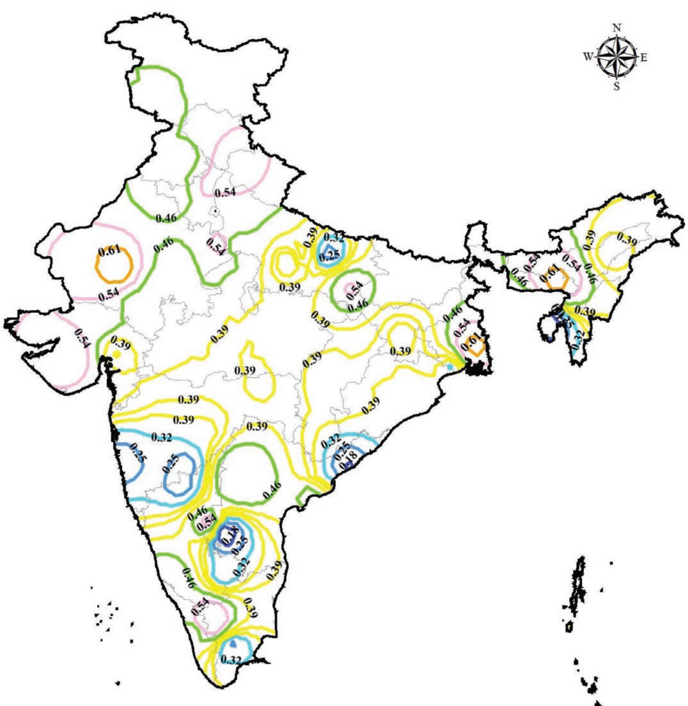

Fig 6: Spatial distribution of calibration coefficient 'b' for open pan evaporation

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Table 3 : PET as estimated by different methods

3 (a) : Mean daily PET (mm) on annual basis

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	3.76	4.88	3.81	4.33	11.82	9.77	3.11	3.96	3.62
Akola	4.19	7.51	6.02	5.32	12.75	11.93	6.18	4.89	4.60
Anakapalle	4.99	4.54	4.44	4.85	12.94	11.31	4.89	3.67	3.41
Anand	4.32	5.43	4.99	5.08	12.75	11.54	5.59	4.26	3.76
Anantapur	5.81	6.97	6.89	5.22	13.00	12.17	6.45	4.94	4.41
Arjia	4.48	7.23	4.74	4.89	12.08	10.10	5.78	5.02	4.81
Avikanagar	4.47	6.54	4.93	5.18	12.26	10.13	5.88	4.60	4.43
Bangalore	4.49	5.63	5.04	4.56	12.18	8.96	4.88	4.23	3.85
Barrackpore	3.53	2.98	3.75	4.22	12.40	11.02	4.31	2.42	2.27
Bellary	6.26	8.33	6.79	5.17	12.75	10.78	6.86	6.12	5.12
Bharathpur	4.34	5.28	4.49	4.74	12.35	10.66	5.21	3.89	3.63
Bhubaneswar	3.74	4.76	4.81	4.51	12.90	12.78	5.01	3.88	3.39
Bijapur	4.39	6.63	5.18	5.14	12.62	10.51	5.40	4.89	4.45
Coimbatore	6.78	5.44	5.57	4.72	12.81	10.68	5.55	4.26	3.68
Cuttack	4.10	3.94	4.49	4.34	12.83	12.59	5.27	3.19	2.87
Dantiwada	4.78	6.69	5.10	5.02	12.49	11.11	6.04	4.80	4.40
Dapoli	3.61	4.05	3.95	4.51	12.45	10.01	4.05	3.47	3.06
Dehradun	3.11	2.96	3.21	4.24	11.27	8.92	4.05	2.20	2.23
Faizabad	3.15	4.37	4.08	4.59	12.28	10.80	4.46	3.51	3.15
Hisar	4.35	5.73	4.85	4.88	11.96	10.14	4.96	4.06	3.76
Hyderabad	4.85	6.85	5.63	4.91	12.64	10.80	5.75	5.08	4.46
Jabalpur	3.79	5.05	4.49	4.68	12.34	10.54	5.15	3.62	3.37
Jodhpur	9.10	8.15	6.38	5.04	12.74	11.21	6.78	5.49	4.95
Jorhat	3.09	2.36	3.13	3.76	12.13	9.98	3.29	2.11	1.88
Kanpur	4.27	4.90	4.51	4.68	12.39	11.27	4.88	3.66	3.37
Karnal	3.74	3.80	3.84	4.18	11.61	9.34	4.31	2.78	2.66
Kovilpatti	5.14	6.65	5.97	5.63	13.12	12.10	5.62	5.02	4.45
Lembuchera	3.63	3.87	3.99	4.00	12.38	9.82	3.91	3.03	2.88
Lucknow	3.67	4.03	3.90	4.43	11.97	10.30	4.67	2.87	2.79
Ludhiana	3.94	4.75	4.38	4.41	11.82	9.98	4.91	3.60	3.25
Madurai	4.61	5.62	5.51	4.89	13.15	12.39	5.74	4.33	3.96
Maruteru	4.12	3.72	4.14	4.07	12.80	10.61	4.24	3.06	2.86
Mohanpur	3.96	2.68	3.84	4.47	12.68	11.70	4.23	2.47	2.14
Nagpur	4.82	5.40	5.17	5.00	12.49	10.52	6.29	3.76	3.49
New Delhi	3.88	4.97	4.06	4.41	11.81	9.88	4.61	3.57	3.44
Palampur	3.40	3.47	3.90	3.39	10.79	7.73	3.79	2.40	2.30
Parbhani	4.95	6.80	5.78	5.40	12.66	10.45	6.20	4.71	4.32

Station	FAO	Open Pan	Penman	Hargreaves	Turc	Thornthwaite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Puttur	3.61	3.89	4.09	4.90	12.93	10.97	5.64	3.15	2.98
Raipur	4.40	5.58	4.90	4.91	12.62	11.02	5.53	3.95	3.67
Rajamundry	3.98	5.34	4.72	4.81	12.86	12.46	5.17	4.22	3.83
Rakh Dhiansar	3.19	3.61	3.66	4.47	11.83	10.06	4.31	2.88	2.61
Ranchi	3.85	5.43	3.99	4.40	11.96	9.42	6.14	4.05	3.75
Ranichauri	2.87	2.50	3.22	3.05	9.62	6.50	2.88	1.88	1.79
Samastipur	4.16	3.54	4.21	4.26	12.32	10.84	4.41	2.82	2.53
Sirsa	2.76	3.23	3.74	4.43	11.74	9.74	4.19	2.23	2.26
Solapur	5.18	7.58	5.88	5.36	12.83	11.89	5.90	5.36	4.90
Targhadia	4.96	7.27	5.63	5.11	12.64	11.12	6.14	5.31	4.70
Thrissur	4.03	4.59	4.83	4.43	12.98	11.92	5.14	3.74	3.30
Udaipur	4.17	5.52	4.80	4.70	12.09	10.04	5.29	3.88	3.60
Umiam	3.04	2.85	3.22	3.57	11.14	7.74	3.40	2.16	2.12
Varanasi	4.08	4.13	4.31	4.47	12.19	10.52	4.91	3.00	2.86

3 (b) : Mean daily PET (mm) during southwest monsoon season

Station	FAO	Open Pan	Penman	Hargreaves	Turc	Thornthwaite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	4.57	5.80	4.96	5.08	13.29	13.07	2.97	4.81	4.29
Akola	4.35	6.36	5.87	5.02	13.07	12.86	3.34	4.50	4.11
Anakapalle	4.76	4.26	4.42	4.98	13.26	12.67	2.74	3.43	3.22
Anand	4.52	5.13	5.06	4.73	13.27	13.00	3.07	4.14	3.70
Anantapur	6.14	6.99	7.74	5.20	13.14	12.68	4.32	4.86	4.27
Arjia	5.20	7.34	5.86	5.46	13.28	12.95	4.98	5.45	5.01
Avikanagar	5.41	7.45	6.14	5.70	13.45	12.64	5.44	5.64	5.17
Bangalore	4.33	5.21	4.99	4.41	12.25	9.18	2.64	3.84	3.56
Barrackpore	3.68	3.02	3.93	4.41	13.18	13.11	2.20	2.54	2.40
Bellary	6.43	9.23	8.22	5.23	13.01	11.60	4.30	7.22	5.37
Bharathpur	4.90	5.84	5.36	5.15	13.40	13.34	3.50	4.59	4.10
Bhubaneswar	3.84	4.26	4.55	4.48	13.24	13.96	2.47	3.53	3.16
Bijapur	4.31	5.70	5.19	4.87	12.76	10.96	2.31	4.21	3.89
Coimbatore	7.47	6.16	6.38	4.65	12.89	11.18	3.93	4.83	3.94
Cuttack	4.66	3.47	4.32	4.31	13.20	13.84	2.11	2.86	2.59
Dantiwada	4.99	6.92	5.49	5.12	13.33	13.45	3.05	5.41	4.72
Dapoli	3.08	2.81	3.44	3.68	12.66	10.63	0.95	2.38	2.17
Dehradun	3.93	3.56	4.12	4.97	12.97	12.48	3.27	2.84	2.81
Faizabad	3.86	4.76	4.63	4.84	13.33	13.28	3.27	4.01	3.58
Hisar	5.69	7.41	6.36	5.82	13.44	13.35	5.08	5.34	4.87
Hyderabad	4.73	6.37	5.62	4.76	12.82	11.64	2.78	4.96	4.20

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Jabalpur	4.08	4.99	4.70	4.52	13.08	12.26	2.66	3.73	3.47
Jodhpur	9.58	8.78	7.28	5.61	13.51	13.77	5.78	6.70	5.59
Jorhat	3.69	2.85	3.82	4.36	13.10	12.31	2.67	2.58	2.28
Kanpur	4.53	6.36	5.14	5.03	13.40	13.79	3.67	4.86	4.46
Karnal	4.78	5.01	5.12	5.07	13.28	12.95	4.58	3.95	3.63
Kovilpatti	6.26	9.02	7.48	6.09	13.43	13.03	5.79	6.31	5.65
Lembuchera	4.02	3.61	4.50	4.40	13.10	11.65	2.37	2.93	2.69
Lucknow	4.10	4.03	4.46	4.95	13.32	13.52	3.44	3.15	2.98
Ludhiana	5.11	5.90	5.65	5.26	13.33	13.21	5.27	4.66	4.13
Madurai	4.17	4.63	4.57	4.82	13.10	12.50	2.89	3.61	3.32
Maruteru	4.23	4.24	4.22	4.05	13.05	11.70	2.46	3.46	3.22
Mohanpur	3.77	2.67	4.00	4.61	13.28	13.38	2.33	2.51	2.19
Nagpur	4.56	4.52	4.99	5.10	12.98	11.84	3.43	3.48	3.10
New Delhi	4.83	6.20	5.31	5.30	13.42	13.55	4.52	4.69	4.35
Palampur	3.81	3.56	4.20	4.16	12.15	9.97	2.78	2.74	2.54
Parbhani	4.90	5.93	5.74	5.22	12.95	11.22	3.23	4.35	3.95
Puttur	2.85	2.65	3.10	4.04	12.75	10.76	0.90	2.19	2.15
Raipur	4.35	5.12	4.82	4.69	13.04	12.15	2.35	3.76	3.50
Rajamundry	4.43	5.15	4.89	4.82	13.26	13.87	2.70	4.10	3.67
Rakh Dhiansar	4.20	4.91	4.66	5.45	13.24	13.13	4.68	4.07	3.62
Ranchi	3.86	4.86	4.66	4.39	12.79	11.13	10.89	4.09	3.55
Ranichauri	3.25	2.85	3.54	3.66	11.31	8.71	2.05	2.34	2.18
Samastipur	4.30	4.06	4.92	4.47	13.36	13.44	3.63	3.32	2.97
Sirsa	3.59	4.48	4.81	5.58	13.54	13.73	3.64	3.28	3.22
Solapur	4.88	6.63	5.59	5.21	12.98	12.43	2.70	4.91	4.47
Targhadia	4.75	6.52	5.19	4.89	13.14	12.59	2.31	5.21	4.46
Thrissur	3.33	3.18	3.62	3.94	12.78	11.54	1.68	2.79	2.50
Udaipur	4.59	5.41	5.22	4.68	12.99	12.00	3.42	4.08	3.72
Umiam	3.21	2.64	3.43	4.18	12.31	9.93	1.29	2.09	2.07
Varanasi	4.62	4.99	5.00	4.92	13.36	13.43	3.47	3.92	3.63

3 (c) : Mean daily PET (mm) during northeast monsoon season

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	2.46	3.54	2.49	3.31	11.34	8.91	2.52	2.92	2.81
Akola	2.88	4.75	4.01	4.38	12.10	10.52	5.52	3.54	3.24
Anakapalle	4.12	3.84	3.70	4.02	12.57	9.73	5.11	3.11	2.95
Anand	3.31	4.16	3.92	4.44	12.37	10.79	5.69	3.38	2.96
Anantapur	4.11	5.50	4.57	4.17	12.51	11.09	4.65	4.27	3.83

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Arjia	2.89	5.65	3.17	3.96	11.58	9.20	5.08	3.93	3.98
Avikanagar	3.08	4.56	3.77	4.49	11.84	9.01	5.48	3.21	3.19
Bangalore	3.51	4.56	3.91	3.74	11.79	8.36	3.58	3.57	3.27
Barrackpore	2.74	2.16	2.92	3.47	12.07	10.51	4.09	1.73	1.68
Bellary	4.19	5.52	4.59	4.21	12.32	10.04	5.18	4.20	3.79
Bharathpur	2.98	3.97	3.26	3.80	12.03	10.16	4.94	2.95	2.84
Bhubaneswar	2.90	3.47	3.56	3.71	12.41	11.73	4.91	2.97	2.61
Bijapur	3.35	5.15	3.86	4.30	12.12	9.61	5.09	4.14	3.70
Coimbatore	4.68	3.77	4.13	3.91	12.53	9.65	4.09	3.01	2.77
Cuttack	3.87	2.98	3.38	3.47	12.34	11.57	6.02	2.38	2.27
Dantiwada	3.51	5.04	3.90	4.34	12.20	10.65	6.21	3.51	3.42
Dapoli	3.25	3.89	3.46	4.43	12.34	9.97	4.73	3.43	2.98
Dehradun	1.94	1.84	2.14	3.27	10.77	8.12	3.65	1.41	1.48
Faizabad	2.19	2.84	2.62	3.48	11.53	9.28	3.71	2.46	2.19
Hisar	2.54	3.32	2.86	3.50	11.05	8.36	4.22	2.57	2.35
Hyderabad	3.53	4.57	4.14	3.94	12.07	8.83	5.75	3.50	3.22
Jabalpur	2.63	3.04	3.07	3.72	11.59	9.06	5.02	2.53	2.25
Jodhpur	6.33	5.47	4.42	3.90	12.16	8.70	6.69	3.53	3.42
Jorhat	2.38	1.70	2.29	3.00	11.74	9.39	3.74	1.58	1.40
Kanpur	3.80	4.16	4.26	4.60	12.78	11.33	3.47	3.40	3.02
Karnal	2.18	2.18	2.46	3.18	11.11	8.44	3.37	1.61	1.63
Kovilpatti	2.30	2.74	2.60	3.10	10.94	8.29	3.77	2.21	1.99
Lembuchera	2.86	3.77	3.19	3.31	12.21	9.77	4.23	2.92	2.89
Lucknow	2.28	2.36	2.56	3.48	11.40	9.24	3.86	1.76	1.78
Ludhiana	3.24	1.73	2.86	3.65	12.23	10.82	4.13	1.65	1.45
Madurai	3.79	3.98	4.55	3.90	12.84	11.15	4.12	3.17	2.92
Maruteru	3.30	2.72	3.36	3.38	12.46	9.24	3.72	2.24	2.15
Mohanpur	2.52	2.62	2.92	2.38	10.08	6.71	4.18	1.79	1.74
Nagpur	3.62	3.41	3.78	3.84	11.90	9.47	5.12	2.52	2.38
New Delhi	2.36	3.32	2.68	3.40	11.24	8.80	3.76	2.38	2.43
Palampur	3.64	4.80	4.14	4.35	12.02	9.28	5.73	3.71	3.30
Parbhani	3.04	3.37	3.35	3.82	11.97	9.73	5.18	2.79	2.48
Puttur	3.36	3.26	3.70	4.47	12.86	11.01	5.38	2.62	2.52
Raipur	1.99	1.72	2.21	2.12	8.69	5.31	2.38	1.27	1.24
Rajamundry	3.55	4.38	3.80	4.03	12.54	11.88	4.59	3.41	3.20
Rakh Dhiansar	1.98	1.78	2.05	2.85	10.82	8.21	3.04	1.51	1.38
Ranchi	1.78	2.16	2.15	2.95	10.88	8.30	3.44	1.80	1.64
Ranichauri	3.19	2.18	2.77	3.29	11.81	9.86	3.43	1.84	1.64
Samastipur	3.94	5.64	4.42	4.38	12.31	10.81	5.45	4.27	3.87

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Sirsa	1.86	2.38	2.84	3.36	11.19	8.63	3.70	1.59	1.66
Solapur	3.57	4.32	4.71	4.02	12.90	11.85	5.23	3.45	3.06
Targhadia	3.56	6.06	4.36	4.40	12.45	10.93	6.00	4.19	4.06
Thrissur	2.74	3.47	3.17	3.89	11.33	8.63	4.85	2.68	2.43
Udaipur	2.74	3.60	2.61	3.31	11.10	7.98	3.48	2.86	2.66
Umiam	2.34	2.40	2.50	2.89	10.83	7.44	3.50	1.82	1.82
Varanasi	2.78	2.40	3.02	3.48	11.77	9.75	4.23	1.80	1.78

3 (d) : Mean daily PET (mm) during summer season

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	5.14	7.61	5.56	6.18	12.76	11.55	5.03	6.00	5.36
Akola	5.99	12.98	9.09	7.14	13.53	14.00	10.44	7.44	7.25
Anakapalle	6.42	5.99	5.59	5.78	13.29	12.51	6.90	4.87	4.39
Anand	5.79	7.96	6.63	6.66	13.23	12.65	8.65	5.97	5.26
Anantapur	7.51	8.26	8.76	6.52	13.59	13.79	10.18	5.49	5.00
Arjia	7.03	10.94	6.96	6.56	13.04	12.09	8.32	7.16	6.75
Avikanagar	5.67	10.52	6.61	6.85	13.19	12.07	8.41	7.02	6.77
Bangalore	5.75	7.29	6.32	5.68	12.75	10.07	7.78	5.40	4.85
Barrackpore	4.71	4.52	5.16	5.42	13.11	12.64	6.16	3.70	3.34
Bellary	8.31	11.49	8.76	6.53	13.39	12.41	9.67	7.91	6.76
Bharathpur	5.87	8.14	6.47	6.60	13.17	12.45	8.00	5.65	5.26
Bhubaneswar	4.97	7.28	6.94	5.70	13.40	14.16	7.58	5.65	4.87
Bijapur	5.97	9.68	7.01	6.55	13.32	12.15	8.28	6.69	6.15
Coimbatore	8.10	6.45	6.25	5.71	13.17	11.74	8.04	5.02	4.40
Cuttack	5.89	5.72	6.21	5.53	13.33	13.89	6.93	4.64	3.97
Dantiwada	6.61	10.04	7.09	6.71	13.22	12.82	9.00	7.00	6.32
Dapoli	4.76	5.78	5.26	5.51	12.68	10.48	6.15	4.87	4.26
Dehradun	4.16	5.01	4.68	6.06	12.03	10.14	6.83	3.50	3.49
Faizabad	4.03	6.74	5.94	6.42	12.96	12.09	7.71	4.89	4.46
Hisar	5.80	8.11	6.41	6.40	12.58	11.06	6.98	5.33	5.04
Hyderabad	6.66	10.20	7.53	6.35	13.29	12.65	9.07	7.13	6.29
Jabalpur	5.39	8.67	6.64	6.66	13.14	12.28	8.82	5.44	5.26
Jodhpur	12.89	11.77	8.35	6.45	13.32	12.93	8.96	7.19	6.69
Jorhat	3.57	2.85	3.69	4.28	12.24	10.00	3.48	2.49	2.22
Kanpur	6.14	6.64	6.39	6.39	13.09	12.67	8.72	4.57	4.25
Karnal	5.26	6.27	5.67	5.97	12.52	10.93	7.06	4.27	4.07
Kovilpatti	5.53	7.01	6.36	6.38	13.36	12.70	7.21	5.49	4.81
Lembuchera	4.66	4.30	5.09	4.83	12.84	10.69	4.93	3.43	3.11

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Lucknow	5.34	7.16	6.00	6.24	12.95	12.31	7.90	4.72	4.57
Ludhiana	5.34	7.05	5.97	5.91	12.41	10.83	7.26	4.90	4.51
Madurai	5.22	6.60	6.18	5.76	13.42	13.33	7.34	5.12	4.65
Maruteru	5.22	4.60	5.18	5.09	13.11	11.60	6.78	3.80	3.50
Mohanpur	5.32	4.17	5.19	5.58	13.18	12.82	6.60	3.73	3.18
Nagpur	7.03	9.73	7.68	6.93	13.45	12.89	10.18	6.24	5.85
New Delhi	5.38	7.69	5.87	6.19	12.79	11.72	7.44	5.28	5.04
Palampur	4.60	5.10	5.38	4.33	11.28	8.29	5.63	3.22	3.17
Parbhani	6.97	10.77	8.19	7.14	13.39	12.12	10.00	6.63	6.28
Puttur	4.59	5.35	5.11	5.81	13.29	11.92	7.37	4.34	4.03
Raipur	6.56	9.27	7.25	6.78	13.32	12.69	9.66	5.84	5.59
Rajamundry	5.77	7.01	6.14	5.95	13.38	13.96	7.35	5.54	4.91
Rakh Dhiansar	4.17	4.56	4.84	5.87	12.40	10.82	6.29	3.32	3.07
Ranchi	5.56	8.70	5.29	6.11	12.77	10.93	5.01	5.81	5.61
Ranichauri	3.99	3.45	4.52	3.97	10.27	7.10	5.18	2.39	2.30
Samastipur	5.72	5.32	5.70	5.69	12.89	11.93	7.07	4.03	3.63
Sirsa	3.86	3.93	5.05	6.24	12.74	11.53	5.84	2.53	2.59
Solapur	7.24	11.32	8.18	6.90	13.50	13.69	9.66	7.38	6.85
Targhadia	7.86	10.49	8.25	6.87	13.34	12.83	9.77	7.74	6.41
Thrissur	4.91	5.46	5.58	5.28	13.30	12.76	6.73	4.58	3.96
Udaipur	5.99	9.17	6.95	6.28	12.85	11.51	8.64	5.71	5.49
Umiam	3.84	3.62	4.25	4.40	11.64	8.44	4.38	2.71	2.59
Varanasi	5.76	6.76	6.36	6.33	13.05	12.37	8.16	4.52	4.32

3 (e) : Mean daily PET (mm) during winter season

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	2.04	2.58	2.24	2.76	9.87	5.53	1.94	2.09	2.03
Akola	3.13	5.63	4.63	4.59	11.84	8.81	6.50	3.81	3.57
Anakapalle	4.59	4.00	3.88	4.48	12.33	9.23	5.74	3.20	3.00
Anand	3.23	4.06	3.92	4.31	11.56	8.04	5.79	3.22	2.83
Anantapur	5.17	7.22	5.81	4.87	12.54	10.24	7.94	5.32	4.73
Arjia	2.81	4.98	2.98	3.58	10.42	6.16	4.75	3.52	3.50
Avikanagar	2.73	3.62	3.18	3.70	10.55	6.82	4.20	2.55	2.60
Bangalore	4.45	5.66	4.97	4.44	11.82	7.82	7.17	4.29	3.84
Barrackpore	2.67	2.22	2.97	3.57	11.23	7.85	4.79	1.73	1.68
Bellary	6.03	7.09	5.59	4.73	12.26	9.05	8.30	5.15	4.56
Bharathpur	2.76	3.19	2.86	3.41	10.80	6.71	4.40	2.39	2.31
Bhubaneswar	2.93	3.94	4.03	4.00	12.21	9.96	6.34	3.30	2.86

Station	FAO	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Bijapur	3.76	6.02	4.47	4.79	12.13	8.73	7.21	4.61	4.10
Coimbatore	6.57	4.98	5.08	4.61	12.51	9.61	7.30	3.84	3.45
Cuttack	4.03	3.57	3.81	3.88	12.04	9.60	8.10	2.83	2.62
Dantiwada	3.57	4.76	3.92	3.92	11.21	7.51	5.88	3.26	3.15
Dapoli	3.48	4.22	3.79	4.82	11.82	8.06	6.11	3.64	3.15
Dehradun	1.63	1.44	1.89	2.65	9.29	4.94	2.46	1.06	1.12
Faizabad	1.87	2.48	2.51	3.11	10.23	6.05	3.23	2.05	1.86
Hisar	2.16	2.34	2.42	2.78	9.37	4.92	2.77	1.81	1.68
Hyderabad	4.11	5.76	4.72	4.34	12.00	8.72	7.21	4.28	3.87
Jabalpur	2.59	3.03	3.10	3.62	10.86	6.79	5.06	2.45	2.19
Jodhpur	6.34	5.27	4.40	3.40	11.11	6.97	5.63	3.26	3.21
Jorhat	2.21	1.62	2.21	2.92	10.68	6.38	3.49	1.44	1.29
Kanpur	2.92	1.98	2.77	3.10	10.45	6.46	3.52	1.56	1.44
Karnal	1.92	1.74	2.10	2.51	9.52	5.05	2.24	1.30	1.31
Kovilpatti	4.29	5.07	4.92	5.13	12.65	10.43	6.13	4.17	3.62
Lembuchera	2.66	3.79	3.19	3.47	11.36	7.18	4.11	2.85	2.83
Lucknow	2.33	2.57	2.60	3.03	10.20	6.13	3.50	1.86	1.85
Ludhiana	1.92	2.04	2.19	2.43	9.25	4.81	2.43	1.63	1.50
Madurai	4.49	5.17	5.31	4.37	12.70	10.81	6.78	4.17	3.67
Maruteru	3.50	2.87	3.58	3.60	12.33	8.95	4.83	2.39	2.27
Mohanpur	3.40	1.89	2.93	3.73	11.39	7.98	4.63	1.73	1.50
Nagpur	3.88	3.94	4.22	4.14	11.63	7.87	6.42	2.81	2.63
New Delhi	2.22	2.65	2.36	2.75	9.78	5.45	2.71	1.92	1.95
Palampur	2.08	2.08	2.56	1.95	8.38	3.90	2.41	1.38	1.38
Parbhani	4.00	5.51	4.66	4.69	11.92	8.08	7.08	4.06	3.61
Puttur	3.95	4.30	4.43	5.29	12.84	10.18	8.92	3.46	3.23
Raipur	3.30	4.02	3.70	4.10	11.67	8.06	6.03	3.12	2.79
Rajamundry	3.72	4.82	4.03	4.44	12.27	10.12	6.06	3.82	3.53
Rakh Dhiansar	1.52	1.45	1.79	2.32	9.30	4.89	1.58	1.19	1.11
Ranchi	2.92	4.24	2.84	3.45	10.46	6.08	3.10	3.09	2.95
Ranichauri	1.72	1.47	2.04	1.73	6.54	2.84	1.63	1.03	1.04
Samastipur	2.97	1.80	2.58	3.00	10.47	6.40	3.04	1.47	1.33
Sirsa	1.59	2.14	2.27	2.55	9.51	5.07	3.56	1.53	1.58
Solapur	4.52	6.80	5.20	4.83	12.30	9.70	7.47	4.89	4.42
Targhadia	3.86	6.00	4.71	4.26	11.63	8.13	6.47	4.09	3.86
Thrissur	4.83	6.53	6.37	4.78	13.06	11.54	9.64	4.85	4.28
Udaipur	2.70	3.31	3.14	3.58	10.27	5.96	4.71	2.49	2.27
Umiam	2.37	2.75	2.71	2.82	9.76	5.14	4.43	2.02	2.02
Varanasi	2.63	2.37	2.88	3.15	10.57	6.52	3.79	1.76	1.73

Table 4 (a) : Mean Bias Error (MBE) in the estimation of daily PET on annual basis

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	1.39	0.27	0.76	8.34	6.63	-0.56	0.42	0.05
Akola	2.18	0.76	0.03	7.36	6.25	1.47	-0.47	-0.74
Anakapalle	-0.44	-0.55	-0.13	7.95	6.32	-0.09	-1.31	-1.58
Anand	1.10	0.66	0.81	8.39	6.90	1.57	-0.05	-0.54
Anantapur	1.07	0.82	-0.71	7.05	6.04	0.87	-0.93	-1.45
Arjia	2.74	0.40	0.56	7.82	6.13	1.16	0.57	0.15
Avikanagar	2.36	0.70	0.87	8.02	6.12	1.46	0.38	0.16
Bangalore	1.14	0.53	0.04	7.64	4.34	0.73	-0.25	-0.64
Barackpore	-0.50	0.28	0.75	9.01	7.87	0.55	-1.06	-1.21
Bellary	2.26	0.74	-1.05	6.55	4.73	0.25	0.04	-1.07
Bharathpur	1.26	0.40	0.61	8.56	7.21	1.53	-0.03	-0.34
Bhubaneswar	0.40	0.44	0.14	8.48	8.11	1.00	-0.47	-0.96
Bijapur	2.08	0.57	0.55	8.02	5.80	1.20	0.36	-0.10
Coimbatore	-1.34	-1.21	-2.06	6.03	3.90	-1.23	-2.52	-3.10
Cuttack	-1.23	-0.57	-0.85	7.66	5.69	0.44	-1.94	-2.30
Dantiwada	2.10	0.45	0.34	7.89	6.82	1.03	0.20	-0.25
Dapoli	0.47	0.29	0.91	8.68	6.09	0.79	-0.12	-0.56
Dehradun	0.01	0.27	1.31	8.46	6.42	0.98	-0.76	-0.75
Faizabad	0.70	0.43	0.97	8.52	6.68	0.98	-0.14	-0.47
Hisar	1.25	0.46	0.58	7.56	5.37	0.71	-0.28	-0.56
Hyderabad	2.00	0.78	0.06	7.78	5.95	0.89	0.23	-0.39
Jabalpur	0.91	0.63	-0.13	6.21	6.49	3.97	-0.55	-0.46
Jodhpur	-0.94	-2.72	-4.06	3.64	2.11	-2.32	-3.61	-4.15
Jorhat	-0.60	0.16	0.80	9.09	6.67	0.50	-0.83	-1.06
Kanpur	0.74	0.52	0.74	8.38	6.86	1.08	-0.39	-0.66
Karnal	0.35	0.35	0.66	8.18	6.27	0.79	-0.73	-0.88
Kovilpatti	1.18	0.62	0.41	7.92	6.74	0.51	-0.29	-0.86
Lembuchera	0.38	0.53	0.52	8.96	6.59	0.25	-0.46	-0.62
Ludhiana	2.55	0.45	0.57	7.67	5.54	0.80	0.82	0.45
Lukhnow	0.50	0.41	0.94	8.59	7.30	1.01	-0.67	-0.76
Madurai	1.01	0.90	0.28	8.54	7.78	1.13	-0.28	-0.65
Maruteru	-0.40	0.02	-0.05	8.68	6.48	0.11	-1.06	-1.26
Mohanpur	-0.84	0.29	0.94	9.07	7.79	0.96	-1.05	-1.37
Nagpur	0.71	0.45	0.32	7.85	6.19	1.25	-0.93	-1.23
New Delhi	1.06	0.35	0.39	7.73	6.18	1.57	-0.41	-0.72
Palampur	0.11	0.53	-0.02	7.24	3.99	0.52	-0.95	-1.02
Parbhani	1.72	0.65	0.32	7.54	5.14	1.47	-0.34	-0.74
Puttur	0.06	0.34	1.24	9.33	7.44	1.18	-0.65	-0.79

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Raipur	0.89	0.57	0.27	7.96	6.13	1.89	-0.74	-1.03
Rajamundry	2.08	0.43	0.27	8.43	8.17	1.14	0.76	0.22
Rakh Dhiansar	0.35	0.44	1.23	8.54	6.38	1.09	-0.33	-0.56
Ranchi	1.67	0.32	1.04	8.42	5.66	3.94	0.79	0.35
Ranichauri	-0.37	0.34	0.13	6.46	3.26	0.07	-0.98	-1.05
Samastipur	-0.28	0.38	0.50	8.52	6.77	0.68	-0.95	-1.22
Sirsa	0.73	1.32	2.09	9.43	7.81	1.43	-0.30	-0.27
Solapur	2.47	0.72	0.21	7.65	6.54	1.19	0.24	-0.22
Targhadia	2.32	0.70	0.20	7.82	6.59	0.84	0.42	-0.22
Thrissur	0.71	0.91	0.33	8.84	7.76	1.65	-0.25	-0.71
Udaipur	1.33	0.61	0.60	7.85	5.51	1.38	-0.27	-0.53
Umiam	-0.19	0.27	0.64	8.11	4.96	0.06	-0.91	-0.95
Varanasi	0.73	0.49	0.65	8.37	7.07	1.40	-0.63	-0.77

4 (b) : Root Mean Square Error (RMSE) in the estimation of daily PET on annual basis

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	2.26	0.37	1.04	8.38	6.92	1.14	1.40	1.20
Akola	2.93	0.98	1.28	7.49	6.38	3.20	1.20	1.23
Anakapalle	5.33	1.00	1.42	8.09	6.57	3.42	4.67	4.94
Anand	1.61	0.69	1.17	8.43	6.97	2.91	0.88	0.93
Anantapur	3.16	0.87	1.26	7.13	6.14	3.16	2.48	2.51
Arjia	3.57	0.49	0.97	7.89	6.36	2.02	1.60	1.76
Avikanagar	3.05	0.74	1.49	8.07	6.41	2.40	1.51	1.44
Bangalore	1.61	0.56	0.61	7.68	4.42	2.78	1.02	1.13
Barackpore	0.66	0.32	0.83	9.03	8.06	1.88	1.11	1.28
Bellary	2.47	0.88	1.43	6.67	4.82	2.43	0.44	1.27
Bharathpur	1.46	0.43	0.76	8.60	7.35	2.62	0.29	0.51
Bhubaneswar	1.45	0.82	1.01	8.54	8.19	2.91	1.27	1.46
Bijapur	2.64	0.63	1.00	8.08	5.88	3.50	1.45	1.27
Coimbatore	2.13	1.61	2.86	6.42	4.40	4.03	3.04	3.65
Cuttack	2.41	1.07	1.78	7.91	6.07	15.46	2.74	3.03
Dantiwada	2.39	0.47	0.67	7.96	7.03	2.64	0.57	0.43
Dapoli	1.31	0.34	1.13	8.70	6.15	2.44	1.03	1.05
Dehradun	0.78	0.33	1.40	8.49	6.71	2.00	0.84	0.84
Faizabad	2.22	0.48	1.22	8.56	6.80	2.57	1.63	1.58
Hisar	2.01	0.53	1.08	7.65	5.54	2.70	1.00	1.04
Hyderabad	2.93	0.84	1.10	7.89	6.10	3.54	1.41	1.26
Jabalpur	1.14	1.02	1.88	6.42	6.61	4.77	1.29	0.93

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Jodhpur	2.13	3.37	5.23	5.20	3.82	4.32	4.37	4.91
Jorhat	1.12	0.29	1.11	9.13	6.76	2.74	1.20	1.35
Kanpur	1.97	0.57	1.12	8.43	6.99	3.13	1.52	1.52
Karnal	1.14	0.40	0.78	8.23	6.55	1.61	0.90	1.03
Kovilpatti	2.11	0.68	1.22	8.00	6.82	2.86	1.31	1.43
Lembuchera	1.34	0.55	0.64	8.97	6.70	1.73	1.21	1.34
Ludhiana	3.51	0.52	1.02	7.75	5.71	2.35	1.78	1.54
Lukhnow	1.61	0.47	1.04	8.64	7.61	2.49	1.09	1.15
Madurai	2.23	0.93	1.03	8.60	7.89	2.94	1.48	1.55
Maruteru	1.43	0.55	1.17	8.78	6.64	2.84	1.66	1.86
Mohanpur	1.35	0.34	1.18	9.09	7.86	2.64	1.43	1.65
Nagpur	1.94	0.52	0.64	7.92	6.32	3.12	1.18	1.38
New Delhi	2.04	0.41	0.62	7.79	6.46	2.30	1.14	1.34
Palampur	0.97	0.58	0.60	7.30	4.13	2.72	1.20	1.25
Parbhani	2.45	0.70	1.14	7.64	5.28	3.34	1.28	1.36
Puttur	0.54	0.36	1.29	9.35	7.48	3.14	0.73	0.84
Raipur	1.84	0.72	0.91	8.04	6.23	4.11	1.26	1.42
Rajamundry	2.53	0.46	0.54	8.45	8.26	2.43	1.26	0.91
Rakh Dhiansar	1.31	0.50	1.42	8.58	6.52	2.96	1.00	1.06
Ranchi	2.09	0.40	1.25	8.46	5.79	6.13	1.29	1.00
Ranichauri	0.80	0.38	0.46	6.56	3.42	1.75	1.23	1.29
Samastipur	1.09	0.50	0.93	8.56	6.88	2.58	1.26	1.45
Sirsa	1.42	1.45	2.34	9.51	8.30	2.58	0.91	0.90
Solapur	3.21	0.77	1.14	7.75	6.66	3.35	1.67	1.57
Targhadia	2.63	0.75	0.99	7.99	6.79	2.73	1.05	1.23
Thrissur	1.40	0.98	0.94	8.89	7.80	3.72	0.89	1.06
Udaipur	1.94	0.66	1.18	7.92	5.64	2.77	0.84	0.90
Umiam	0.53	0.30	0.96	8.29	5.32	1.90	1.06	1.10
Varanasi	1.35	0.55	0.78	8.42	7.32	2.40	0.78	0.91

4 (c) : Mean Percent Error (MPE) in the estimation of daily PET on annual basis

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Agra	205.00	138.90	166.59	611.85	511.46	99.32	151.54	129.83
Akola	45.07	16.59	23.32	190.03	154.78	63.27	20.37	21.14
Anakapalle	36.76	24.66	24.47	215.82	176.05	86.39	32.40	31.04
Anand	31.19	16.87	28.53	229.74	181.34	71.26	16.98	18.12
Anantapur	45.75	13.58	16.15	140.60	117.58	51.71	28.33	28.19
Arjia	70.43	36.48	27.10	173.39	135.94	44.90	37.46	36.69

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Avikanagar	223.94	144.96	153.12	493.37	403.29	181.02	130.14	119.87
Bangalore	30.83	12.12	11.95	188.03	107.65	57.90	18.63	20.50
Barackpore	38.73	59.47	78.43	422.44	374.98	86.60	30.27	27.05
Bellary	24.02	28.42	45.73	33.43	17.32	34.54	34.52	45.89
Bharathpur	117.22	82.66	91.31	409.18	355.18	140.94	66.58	54.67
Bhubaneswar	26.24	15.24	21.52	229.22	213.66	68.14	24.13	28.34
Bijapur	51.85	13.32	21.31	200.86	142.79	74.21	26.79	22.90
Coimbatore	28.70	24.07	25.81	101.71	68.17	61.13	35.31	42.21
Cuttack	77.71	75.64	64.78	386.80	312.06	168.61	56.93	45.87
Dantiwada	122.13	69.60	65.43	308.87	274.51	111.67	64.68	50.95
Dapoli	29.94	8.34	30.63	258.89	182.74	65.78	23.37	24.52
Dehradun	116.13	126.20	195.05	671.40	535.48	177.80	75.68	73.99
Faizabad	35.85	13.59	40.36	316.21	224.04	73.89	28.08	28.12
Hisar	34.42	12.51	30.43	266.53	162.42	67.95	21.22	22.72
Hyderabad	122.38	80.55	57.42	302.27	243.87	134.40	71.11	54.45
Jabalpur	32.31	15.01	32.68	271.29	190.27	93.73	18.66	22.04
Jodhpur	44.85	31.64	33.27	70.24	55.28	35.85	41.64	39.83
Jorhat	31.69	9.67	40.28	375.55	262.40	94.84	34.63	39.57
Kanpur	46.35	15.17	35.09	302.81	223.25	82.23	37.75	37.67
Karnal	135.75	130.24	144.93	562.71	456.21	159.01	86.87	77.58
Kovilpatti	31.08	11.93	22.47	181.84	151.96	52.10	20.21	23.48
Lembuchera	20.49	25.72	21.18	256.63	188.94	35.25	24.85	25.75
Ludhiana	29.75	12.64	27.21	303.09	187.37	74.88	22.90	26.58
Lukhnow	46.80	35.33	28.29	111.06	89.92	47.51	50.01	51.18
Madurai	50.81	33.43	22.20	205.69	188.02	75.52	33.96	30.35
Maruteru	32.93	31.54	27.75	269.97	206.55	91.35	30.68	30.03
Mohanpur	34.60	9.55	36.70	306.05	250.25	76.84	37.22	43.80
Nagpur	47.57	31.58	26.66	91.70	66.59	47.40	44.98	47.47
New Delhi	44.32	35.94	30.56	89.14	70.28	34.49	44.27	45.13
Palampur	23.75	18.09	15.65	270.85	137.60	83.80	32.63	33.96
Parbhani	39.23	13.22	20.58	180.48	120.03	68.28	19.53	20.65
Puttur	27.54	18.98	25.21	232.00	183.59	81.99	30.94	31.07
Raipur	30.97	14.62	24.79	239.60	176.96	92.73	17.42	20.90
Rajamundry	81.72	36.60	31.57	258.15	251.02	70.59	47.36	36.16
Rakh Dhiansar	33.29	17.43	53.62	403.76	259.69	101.05	29.06	31.03
Ranchi	48.53	21.23	24.31	255.94	160.30	235.85	29.84	25.12
Ranichauri	23.77	13.12	15.55	278.28	128.39	60.49	37.32	38.92
Samastipur	26.07	13.90	27.93	300.04	219.36	69.72	32.22	37.56
Sirsa	155.47	200.86	260.97	825.72	701.44	225.68	80.02	81.43

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Solapur	54.76	14.41	19.89	177.05	147.69	63.71	26.69	24.34
Targhadia	55.28	30.74	20.53	166.27	140.53	60.34	31.73	24.25
Thrissur	26.27	21.46	22.21	242.21	211.99	82.23	17.51	21.39
Udaipur	34.90	15.71	31.49	245.89	160.40	72.85	16.57	18.94
Umiam	43.00	65.64	87.27	461.14	303.30	86.82	19.87	17.51
Varanasi	122.15	107.77	114.79	465.63	406.36	155.25	70.71	64.32

Table 5 (a) : Average Mean Bias Error (MBE) values in the estimation of PET by different methods

Season	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Annual	1.01	0.57	0.51	7.77	6.08	1.36	-0.42	-0.76
Winter	0.63	0.45	0.58	7.78	4.16	2.07	-0.22	-0.52
Summer	1.75	0.72	0.36	7.19	6.08	2.26	-0.51	-0.92
SW Monsoon	0.65	0.56	0.15	8.18	7.73	-0.92	-0.55	-0.86
NE Monsoon	0.64	0.36	0.71	8.70	6.48	1.55	-0.07	-0.37

5 (b) : Average Root Mean Square Error (RMSE) values in the estimation of PET by different methods

Season	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Annual	2.01	0.89	1.23	9.08	6.25	3.22	1.26	1.46
Winter	1.31	0.51	0.89	7.83	4.26	3.04	0.93	0.95
Summer	2.93	0.81	1.27	7.27	6.24	3.63	1.68	1.72
SW Monsoon	2.01	0.73	1.24	8.29	7.80	3.14	1.61	1.62
NE Monsoon	1.31	0.44	0.96	8.73	6.60	2.68	0.97	0.98

5 (c) : Average Mean Percent Error (MPE) values in the estimation of PET by different methods

Season	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Annual	38.56	16.54	28.44	258.45	183.00	83.54	28.77	28.45
Winter	33.39	15.87	30.41	302.00	151.53	93.26	25.59	27.28
Summer	38.79	13.44	19.97	147.92	118.14	59.79	22.44	24.35
SW Monsoon	35.20	13.76	23.16	229.11	203.18	78.20	28.77	30.85
NE Monsoon	33.17	14.42	34.41	337.74	243.14	88.67	25.30	26.41

Table 6 : Calibration coefficients to be employed to minimize errors at different stations in different seasons

6.1 Agra

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.38	0.46	0.84	0.70	0.88	2.54	0.35	0.86	0.75	0.51	1.91	0.16	0.38	0.14	0.74	1.87	0.06	0.22	0.05	0.41	2.04	0.41	0.82	0.67	0.73
Penman	0.16	0.89	1.00	0.99	0.17	0.47	0.83	0.99	0.98	0.15	-0.06	1.02	0.99	0.98	0.11	0.26	0.79	0.98	0.96	-0.01	0.07	0.91	0.99	0.99	0.15
Hargreaves	-0.17	0.87	0.91	0.82	0.68	1.19	0.67	0.78	0.61	0.63	-0.09	0.72	0.80	0.65	0.48	1.14	0.32	0.40	0.16	0.39	0.10	0.82	0.79	0.62	0.79
Turc	-7.33	0.92	0.86	0.74	0.82	-26.61	2.35	0.82	0.67	0.58	-4.47	0.61	0.91	0.82	0.34	-1.97	0.41	0.73	0.53	0.29	-11.53	1.31	0.91	0.83	0.53
Thornthwaite	-0.74	0.43	0.87	0.76	0.79	-5.43	0.77	0.82	0.67	0.59	-0.83	0.37	0.94	0.88	0.28	0.00	0.37	0.75	0.56	0.28	-0.26	0.47	0.92	0.85	0.50
Blaney-Criddle	1.37	0.75	0.83	0.69	0.89	2.77	0.61	0.90	0.81	0.45	0.72	0.70	0.91	0.82	0.34	1.11	0.47	0.87	0.75	0.21	1.93	0.64	0.89	0.79	0.58
Christiansen Pan	1.36	0.58	0.81	0.66	0.94	2.49	0.43	0.81	0.65	0.60	1.83	0.22	0.43	0.18	0.73	1.86	0.01	0.23	0.05	0.41	2.47	0.45	0.69	0.48	0.93
PET from Open pan	1.31	0.65	0.79	0.62	0.99	2.40	0.51	0.80	0.65	0.61	1.93	0.19	0.36	0.13	0.75	1.90	0.01	0.18	0.03	0.42	2.27	0.54	0.71	0.50	0.91

6.2 Akola

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.10	0.43	0.77	0.60	0.90	2.83	0.41	0.88	0.78	0.93	1.68	0.43	0.64	0.41	0.71	1.52	0.45	0.74	0.55	0.71	2.39	0.42	0.81	0.66	1.25
Penman	0.26	0.85	0.93	0.86	0.55	0.61	0.78	0.96	0.92	0.58	-0.21	0.97	0.88	0.77	0.45	-0.15	0.90	0.95	0.90	0.34	0.80	0.77	0.92	0.85	0.82
Hargreaves	-0.86	1.13	0.61	0.38	1.17	-2.35	1.51	0.80	0.64	1.19	0.10	0.87	0.56	0.32	0.76	0.00	0.87	0.58	0.33	0.87	-1.21	1.27	0.49	0.25	1.84
Turc	-20.68	1.99	0.61	0.38	1.11	-48.22	4.10	0.82	0.63	1.10	-4.59	0.69	0.52	0.27	0.79	-4.21	0.70	0.42	0.18	0.97	-25.70	2.47	0.67	0.45	1.57
Thornthwaite	-3.10	0.68	0.62	0.41	1.09	-11.62	1.32	0.84	0.70	1.08	0.28	0.33	0.52	0.28	0.78	0.47	0.40	0.43	0.18	0.96	-1.55	0.67	0.68	0.46	1.54
Blaney-Criddle	2.66	0.38	0.69	0.48	1.07	3.46	0.46	0.81	0.66	1.17	2.00	0.30	0.61	0.37	0.73	1.90	0.33	0.69	0.48	0.77	3.29	0.43	0.64	0.41	1.61
Christiansen Pan	2.09	0.65	0.69	0.48	1.04	2.39	0.66	0.84	0.70	1.09	1.70	0.57	0.59	0.34	0.75	1.41	0.68	0.63	0.39	0.83	2.87	0.67	0.71	0.50	1.49
PET from Open pan	1.70	0.74	0.71	0.51	1.01	2.24	0.77	0.84	0.70	1.09	1.66	0.64	0.59	0.35	0.74	1.38	0.74	0.67	0.45	0.79	1.51	0.81	0.74	0.55	1.41

6.3 Anakapalle

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE
Open pan	4.66	0.07	0.21	0.05	1.70	2.20	0.60	0.70	0.48	1.25	4.11	0.00	0.00	0.00	1.21	1.38	0.80	0.58	0.33	1.15	3.29	0.52	0.62	0.27	1.29
Penman	-0.61	1.26	0.90	0.80	0.77	-0.94	1.29	0.93	0.86	0.70	-0.51	1.25	0.81	0.65	0.72	-1.45	1.56	0.76	0.58	0.91	-0.75	1.28	0.86	0.74	0.76
Hargreaves	0.21	0.98	0.58	0.34	1.42	0.58	0.83	0.48	0.23	1.53	0.69	0.86	0.44	0.19	1.09	-0.31	1.09	0.52	0.27	1.20	3.65	0.48	0.23	0.05	1.47
Turc	-16.64	0.87	0.52	0.27	1.49	-52.78	4.34	0.77	0.59	1.12	0.59	0.28	0.10	0.01	1.20	-15.63	1.64	0.45	0.20	1.25	-25.78	2.42	0.59	0.34	1.22
Thornthwaite	-0.24	0.46	0.49	0.24	1.51	-10.57	1.21	0.73	0.53	1.19	3.36	0.08	0.07	0.01	1.20	-2.58	0.78	0.47	0.22	1.24	-0.94	0.59	0.51	0.26	1.30
Blaney -Criddle	3.87	0.23	0.52	0.27	1.49	3.84	0.32	0.66	0.44	1.31	3.31	0.16	0.50	0.25	1.04	4.28	0.05	0.12	0.01	1.40	4.97	0.21	0.51	0.26	1.30
Criastansen Pan	4.68	0.08	0.20	0.04	1.71	2.30	0.71	0.67	0.45	1.29	4.12	0.00	0.00	0.00	1.21	1.92	0.83	0.49	0.24	1.22	3.49	0.60	0.51	0.26	1.30
PET from Open pan	4.78	0.06	0.15	0.02	1.72	1.45	0.72	0.62	0.38	1.37	4.12	0.00	0.02	0.00	1.21	2.18	0.80	0.41	0.17	1.28	4.09	0.53	0.38	0.14	1.40

6.4 Anand

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.13	0.41	0.74	0.55	0.58	2.77	0.42	0.85	0.71	0.63	1.57	0.42	0.71	0.50	0.52	1.61	0.41	0.73	0.53	0.41	2.58	0.41	0.68	0.46	0.77
Penman	-0.22	0.91	0.98	0.96	0.18	0.31	0.85	0.99	0.99	0.14	-0.36	0.93	0.97	0.94	0.18	-0.01	0.85	0.98	0.95	0.15	-0.80	1.00	0.98	0.95	0.23
Hargreaves	0.78	0.71	0.63	0.41	0.67	0.21	1.00	0.78	0.61	0.73	0.39	0.66	0.66	0.43	0.55	0.90	0.55	0.60	0.36	0.48	1.64	0.63	0.47	0.22	0.93
Turc	-15.48	1.53	0.72	0.54	0.57	-37.45	3.20	0.82	0.67	0.68	-6.98	0.83	0.79	0.62	0.45	-2.37	0.49	0.48	0.23	0.52	-15.10	1.58	0.80	0.64	0.63
Thornthwaite	-2.30	0.56	0.74	0.57	0.55	-8.89	1.07	0.82	0.68	0.67	-0.85	0.39	0.81	0.65	0.43	0.75	0.31	0.50	0.25	0.52	-0.20	0.48	0.83	0.68	0.59
Blaney-Criddle	2.51	0.30	0.65	0.44	0.64	3.60	0.35	0.85	0.71	0.63	1.81	0.26	0.53	0.28	0.62	1.65	0.27	0.62	0.39	0.47	2.99	0.33	0.60	0.36	0.84
Christiansen Pan	2.18	0.51	0.69	0.48	0.63	2.70	0.54	0.77	0.59	0.75	1.55	0.52	0.71	0.50	0.52	1.76	0.46	0.62	0.38	0.47	2.69	0.53	0.66	0.43	0.79
PET from Open pan	2.17	0.60	0.70	0.49	0.63	2.65	0.62	0.78	0.60	0.74	1.52	0.61	0.70	0.49	0.52	2.00	0.56	0.66	0.42	0.45	2.52	0.63	0.67	0.44	0.78

6.5 Anantapur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	5.33	0.11	0.26	0.10	1.06	6.75	0.00	0.15	0.02	1.40	2.36	0.32	0.55	0.30	0.69	4.27	0.13	0.29	0.08	0.87	7.94	0.00	0.06	0.00	1.29
Penman	0.29	0.85	0.98	0.96	0.21	0.67	0.77	0.98	0.96	0.29	0.00	0.91	0.98	0.96	0.17	0.18	0.87	0.98	0.96	0.18	0.32	0.85	0.99	0.97	0.22
Hargreaves	1.09	0.93	0.55	0.31	0.92	0.85	1.15	0.57	0.32	1.16	1.14	0.71	0.55	0.30	0.70	0.89	0.89	0.67	0.45	0.68	1.49	0.96	0.42	0.17	1.17
Turc	-20.81	2.05	0.54	0.30	0.92	-40.94	3.63	0.63	0.40	1.09	-6.64	0.86	0.42	0.17	0.75	-11.84	1.36	0.57	0.33	0.75	-23.83	2.33	0.53	0.28	1.09
Thornthwaite	-2.67	0.71	0.54	0.30	0.90	-9.44	1.28	0.63	0.40	1.09	-0.12	0.37	0.42	0.18	0.75	-1.12	0.62	0.57	0.32	0.75	-0.01	0.57	0.55	0.30	1.00
Blaney-Criddle	4.14	0.26	0.64	0.42	0.86	5.41	0.27	0.59	0.35	1.13	3.10	0.22	0.76	0.57	0.54	2.75	0.31	0.74	0.54	0.62	5.29	0.24	0.48	0.23	1.13
Christiansen Pan	5.63	0.09	0.20	0.08	1.08	7.01	0.00	0.08	0.06	1.40	2.62	0.35	0.48	0.23	0.73	4.80	0.01	0.13	0.02	0.91	8.08	-0.01	0.12	0.01	1.28
PET from Open pan	5.67	0.12	0.21	0.06	1.08	7.20	0.00	0.06	0.00	1.40	2.61	0.39	0.46	0.21	0.74	4.70	0.11	0.15	0.02	0.90	8.17	-0.01	0.15	0.02	1.27

6.6 Arjia

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.14	0.46	0.80	0.64	1.15	3.27	0.28	0.68	0.46	1.00	1.72	0.21	0.51	0.26	0.66	2.34	-0.09	0.33	0.11	0.52	1.75	0.42	0.73	0.54	1.18
Penman	0.13	0.89	1.00	0.99	0.18	0.43	0.84	1.00	0.99	0.14	0.14	0.88	0.96	0.91	0.23	0.19	0.87	0.97	0.94	0.14	0.03	0.91	0.99	0.99	0.19
Hargreaves	-1.78	0.12	0.92	0.86	0.73	-1.00	1.13	0.78	0.61	0.85	-0.57	0.88	0.94	0.89	0.26	-0.10	0.80	0.90	0.81	0.25	-4.41	1.63	0.86	0.73	0.89
Turc	-10.70	1.23	0.83	0.69	1.06	-40.99	3.48	0.88	0.77	0.65	-5.48	0.73	0.93	0.87	0.28	-4.29	0.68	0.86	0.74	0.28	-21.49	2.13	0.89	0.79	0.79
Thornthwaite	-1.24	0.54	0.84	0.71	1.03	-9.78	1.16	0.88	0.77	0.65	-0.68	0.39	0.95	0.89	0.25	-0.52	0.53	0.87	0.75	0.28	-1.61	0.65	0.89	0.79	0.80
Blaney-Criddle	1.27	0.57	0.72	0.52	1.32	2.89	0.49	0.82	0.67	0.79	0.89	0.41	0.84	0.70	0.41	1.05	0.36	0.79	0.63	0.34	1.73	0.56	0.78	0.60	1.09
Christiansen Pan	0.95	0.69	0.79	0.62	1.18	3.17	0.39	0.64	0.41	1.04	1.87	0.27	0.46	0.22	0.68	2.19	0.17	0.39	0.15	0.51	2.55	0.53	0.62	0.39	1.36
PET from Open pan	1.02	0.71	0.73	0.53	1.31	3.36	0.39	0.56	0.32	1.12	2.00	0.23	0.40	0.16	0.70	2.32	0.13	0.31	0.10	0.53	2.52	0.57	0.56	0.51	1.44

6.7 Avikanagar

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.50	0.43	0.87	0.76	0.78	2.68	0.37	0.94	0.89	0.31	0.27	0.63	0.82	0.67	0.50	0.97	0.48	0.62	0.38	0.49	2.10	0.34	0.69	0.48	0.97
Penman	-0.14	0.89	0.99	0.99	0.18	0.57	0.79	0.98	0.97	0.16	-0.15	0.88	0.98	0.96	0.16	-0.62	1.05	0.98	0.97	0.11	-0.50	0.93	0.99	0.99	0.15
Hargreaves	0.36	0.77	0.66	0.44	1.21	1.99	0.63	0.54	0.29	0.77	0.14	0.71	0.49	0.24	0.76	1.89	0.18	0.59	0.36	0.50	3.13	0.38	0.27	0.08	1.29
Turc	-7.84	0.99	0.80	0.65	0.96	-4.26	0.73	0.43	0.19	0.82	-2.96	0.53	0.58	0.33	0.71	0.10	0.23	0.63	0.40	0.48	-9.00	1.10	0.65	0.42	1.02
Thornthwaite	-0.02	0.42	0.74	0.55	1.07	4.15	0.10	0.24	0.06	0.88	1.34	0.20	0.45	0.21	0.77	1.77	0.12	0.56	0.32	0.51	1.74	0.32	0.54	0.29	1.13
Blaney-Criddle	2.43	0.34	0.43	0.18	1.45	4.12	0.24	0.38	0.14	0.84	0.11	0.62	0.60	0.36	0.70	2.02	0.13	0.61	0.37	0.49	5.62	0.08	0.10	0.01	1.34
Christiansen Pan	1.87	0.53	0.73	0.53	1.11	3.30	0.41	0.66	0.44	0.68	0.81	0.81	0.54	0.29	0.73	2.16	0.15	0.58	0.34	0.50	3.85	0.26	0.36	0.13	1.25
PET from Open pan	1.90	0.55	0.68	0.46	1.18	3.35	0.43	0.60	0.36	0.73	0.85	0.79	0.48	0.23	0.76	2.12	0.17	0.55	0.31	0.52	4.52	0.17	0.23	0.05	1.30

6.8 Bangalore

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.72	0.32	0.53	0.28	0.68	2.30	0.38	0.57	0.33	0.79	2.17	0.30	0.50	0.25	0.60	2.51	0.35	0.56	0.31	0.61	3.90	0.25	0.47	0.22	0.73
Penman	-0.05	0.90	0.98	0.96	0.16	0.01	0.85	0.98	0.96	0.20	-0.18	0.95	0.98	0.96	0.13	0.00	0.90	0.98	0.97	0.17	-0.01	0.92	0.98	0.97	0.15
Hargreaves	-0.01	0.99	0.67	0.45	0.60	-1.28	1.27	0.72	0.51	0.68	0.23	0.89	0.65	0.43	0.52	0.67	0.86	0.70	0.50	0.52	0.32	0.95	0.60	0.36	0.66
Turc	-10.08	1.21	0.42	0.21	0.71	-27.48	2.62	0.65	0.43	0.73	-0.74	0.36	0.20	0.04	0.68	-3.36	0.75	0.41	0.17	0.67	-8.74	1.14	0.44	0.19	0.74
Thornthwaite	-0.84	0.59	0.41	0.19	0.71	-8.10	1.35	0.65	0.42	0.74	1.75	0.21	0.19	0.04	0.68	0.92	0.45	0.41	0.17	0.67	2.09	0.36	0.37	0.14	0.77
Blaney-Criddle	3.25	0.24	0.83	0.69	0.45	3.52	0.29	0.86	0.74	0.50	2.77	0.21	0.84	0.71	0.37	2.75	0.24	0.82	0.68	0.42	3.98	0.23	0.80	0.65	0.49
Christiansen Pan	3.00	0.36	0.45	0.20	0.72	2.45	0.48	0.53	0.28	0.82	2.31	0.34	0.47	0.22	0.61	2.88	0.37	0.44	0.20	0.66	4.37	0.26	0.35	0.12	0.77
PET from Open pan	3.03	0.39	0.41	0.17	0.73	2.56	0.49	0.46	0.22	0.86	2.35	0.36	0.42	0.18	0.63	2.83	0.43	0.43	0.19	0.66	4.36	0.29	0.34	0.12	0.78

6.9 Barrackpore

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.14	0.79	0.92	0.84	0.38	1.92	0.57	0.84	0.71	0.25	0.68	0.96	0.78	0.60	0.31	0.56	0.97	0.88	0.77	0.26	2.69	0.45	0.66	0.43	0.43
Penman	0.05	0.91	0.99	0.98	0.12	0.50	0.80	0.97	0.95	0.11	-0.35	1.06	0.98	0.96	0.09	-0.11	0.95	0.99	0.99	0.06	0.10	0.90	0.97	0.95	0.13
Hargreaves	-0.77	1.01	0.92	0.85	0.36	0.70	0.67	0.71	0.51	0.33	-1.95	1.35	0.83	0.68	0.28	-0.56	0.91	0.87	0.76	0.26	-0.04	0.88	0.59	0.34	0.47
Turc	-6.68	0.81	0.77	0.59	0.61	-36.73	3.06	0.82	0.67	0.27	-4.11	0.57	0.82	0.67	0.28	-4.39	0.63	0.75	0.56	0.36	-9.85	1.11	0.75	0.56	0.38
Thornthwaite	0.16	0.30	0.71	0.51	0.67	0.71	0.23	0.36	0.13	0.44	0.15	0.25	0.80	0.64	0.30	0.24	0.31	0.62	0.39	0.43	1.41	0.26	0.68	0.46	0.42
Blaney-Criddle	2.65	0.22	0.46	0.21	0.85	2.82	0.38	0.87	0.75	0.23	2.08	0.16	0.38	0.15	0.46	1.64	0.23	0.79	0.63	0.33	3.71	0.16	0.49	0.24	0.50
Christiansen Pan	1.18	0.95	0.93	0.87	0.35	1.83	0.72	0.85	0.73	0.25	0.86	1.10	0.81	0.66	0.29	0.67	1.17	0.89	0.80	0.25	2.64	0.57	0.72	0.51	0.40
PET from Open pan	1.00	1.09	0.91	0.83	0.39	1.69	0.82	0.82	0.67	0.27	0.96	1.07	0.73	0.54	0.34	0.54	1.29	0.85	0.73	0.29	2.83	0.57	0.61	0.37	0.46

6.10 Bellary

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	0.73	0.65	0.97	0.94	0.43	0.95	0.65	0.94	0.89	0.35	1.66	0.47	0.78	0.61	0.44	1.21	0.56	0.96	0.92	0.23	-0.51	0.75	0.89	0.79	0.46
Penman	0.46	0.83	0.98	0.96	0.33	0.56	0.78	0.98	0.96	0.20	0.16	0.90	0.95	0.90	0.22	0.08	0.91	0.99	0.99	0.09	-0.01	0.92	1.00	0.99	0.10
Hargreaves	-2.43	1.67	0.90	0.82	0.74	-5.45	2.36	0.83	0.69	0.58	-1.39	1.35	0.79	0.62	0.43	-1.32	1.37	0.91	0.83	0.32	-9.03	2.62	0.68	0.47	0.74
Turc	-30.41	2.86	0.89	0.79	0.80	-59.77	5.12	0.81	0.65	0.61	-9.20	1.10	0.60	0.36	0.56	-19.02	1.97	0.82	0.68	0.44	-35.20	3.23	0.75	0.56	0.67
Thornthwaite	-5.16	1.04	0.85	0.72	0.92	-16.49	2.02	0.81	0.65	0.62	-0.88	0.52	0.60	0.36	0.56	-4.30	1.05	0.83	0.68	0.44	-2.18	0.83	0.77	0.59	0.65
Blaney-Criddle	4.39	0.29	0.44	0.19	1.56	4.83	0.49	0.66	0.43	0.78	3.39	0.17	0.39	0.15	0.65	0.64	0.55	0.86	0.74	0.40	2.23	0.61	0.57	0.32	0.83
Christiansen Pan	0.33	0.94	0.97	0.94	0.42	0.83	0.84	0.92	0.86	0.40	1.19	0.73	0.81	0.65	0.41	0.24	0.96	0.95	0.90	0.25	0.78	0.92	0.94	0.89	0.33
PET from Open pan	-0.50	1.30	0.94	0.88	0.59	-0.54	1.39	0.88	0.77	0.50	1.21	0.80	0.74	0.55	0.47	0.09	1.12	0.95	0.90	0.25	-2.05	1.50	0.83	0.69	0.56

6.11 Bharathpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	0.70	0.65	0.95	0.90	0.52	1.72	0.55	0.94	0.88	0.39	1.08	0.48	0.84	0.71	0.41	1.03	0.50	0.84	0.70	0.33	0.01	0.73	0.96	0.92	0.41
Penman	-0.05	0.92	1.00	0.99	0.14	0.29	0.86	0.99	0.98	0.14	-0.31	1.01	0.98	0.97	0.14	0.03	0.89	0.99	0.98	0.08	-0.26	0.96	1.00	0.99	0.13
Hargreaves	-1.12	1.11	0.95	0.91	0.49	-1.10	1.17	0.95	0.91	0.34	-0.54	0.93	0.88	0.78	0.36	-0.28	0.85	0.97	0.94	0.15	-2.79	1.33	0.90	0.81	0.64
Turc	-11.26	1.23	0.81	0.66	0.97	-52.19	4.26	0.94	0.88	0.40	-6.16	0.76	0.88	0.77	0.37	-3.38	0.56	0.86	0.73	0.32	-24.19	2.28	0.92	0.85	0.57
Thornthwaite	-1.41	0.51	0.82	0.68	0.93	-13.20	1.36	0.93	0.87	0.41	-1.22	0.41	0.91	0.84	0.31	-0.43	0.46	0.87	0.76	0.30	-1.98	0.63	0.93	0.86	0.54
Blaney-Criddle	2.58	0.33	0.50	0.25	1.43	3.43	0.42	0.75	0.56	0.76	1.02	0.39	0.67	0.45	0.57	1.34	0.28	0.87	0.76	0.30	2.78	0.39	0.49	0.24	1.28
Christiansen Pan	0.35	0.96	0.95	0.91	0.50	1.27	0.80	0.93	0.86	0.43	1.09	0.64	0.87	0.75	0.38	1.00	0.68	0.84	0.70	0.33	-0.60	1.14	0.94	0.89	0.49
PET from Open pan	0.10	1.11	0.94	0.89	0.54	0.99	0.96	0.92	0.84	0.45	0.97	0.70	0.85	0.73	0.40	0.90	0.74	0.82	0.68	0.35	-1.25	1.36	0.94	0.88	0.50

6.12 Bhubaneswar

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.80	0.32	0.47	0.23	0.89	2.76	0.31	0.49	0.24	1.12	2.53	0.26	0.26	0.07	0.75	2.20	0.38	0.56	0.31	0.65	3.70	0.33	0.56	0.31	1.02
Penman	0.89	0.73	0.80	0.64	0.59	0.88	0.70	0.83	0.69	0.71	0.69	0.77	0.71	0.51	0.53	0.60	0.77	0.82	0.67	0.45	1.40	0.68	0.84	0.71	0.67
Hargreaves	1.60	0.61	0.43	0.20	0.91	1.48	0.58	0.43	0.18	1.16	1.39	0.55	0.38	0.14	0.70	0.94	0.69	0.56	0.32	0.65	2.58	0.62	0.36	0.16	1.13
Turc	-15.32	1.50	0.51	0.27	0.86	-31.47	2.68	0.55	0.30	1.07	-2.50	0.48	0.36	0.13	0.70	-5.57	0.76	0.52	0.27	0.67	-21.74	2.08	0.60	0.36	0.99
Thornthwaite	-1.80	0.47	0.51	0.27	0.86	-7.64	0.84	0.54	0.30	1.08	1.10	0.20	0.37	0.13	0.70	-0.11	0.38	0.53	0.28	0.67	-0.55	0.47	0.60	0.36	0.99
Blaney-Criddle	3.22	0.22	0.57	0.34	0.80	3.28	0.32	0.78	0.61	0.81	2.79	0.13	0.44	0.19	0.67	2.66	0.16	0.49	0.24	0.69	4.17	0.26	0.56	0.31	1.02
Christiansen Pan	2.93	0.36	0.41	0.18	0.91	2.72	0.38	0.46	0.21	1.14	2.53	0.30	0.27	0.07	0.72	2.30	0.43	0.49	0.24	0.69	4.17	0.34	0.43	0.19	1.11
PET from Open pan	2.93	0.41	0.39	0.16	0.92	2.75	0.42	0.43	0.19	1.16	2.66	0.29	0.22	0.05	0.73	2.27	0.50	0.49	0.24	0.69	4.05	0.42	0.43	0.18	1.11

6.13 Bijapur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.82	0.26	0.49	0.26	0.85	2.62	0.33	0.56	0.31	0.98	2.62	0.17	0.34	0.12	0.61	2.06	0.31	0.64	0.41	0.60	3.97	0.24	0.43	0.18	1.23
Penman	-0.07	0.89	0.97	0.94	0.23	-0.03	0.88	0.98	0.97	0.21	-0.11	0.94	0.97	0.94	0.16	0.43	0.79	0.95	0.90	0.25	-0.56	0.98	0.98	0.96	0.28
Hargreaves	-0.73	1.01	0.67	0.45	0.74	-0.83	1.10	0.71	0.51	0.83	-0.22	0.87	0.68	0.46	0.47	-0.15	0.85	0.71	0.51	0.55	-1.72	1.23	0.58	0.34	1.11
Turc	-16.61	1.65	0.52	0.28	0.82	-34.04	3.02	0.66	0.44	0.88	-2.50	0.49	0.37	0.14	0.60	-5.85	0.81	0.51	0.26	0.67	-24.03	2.28	0.55	0.30	1.14
Thornthwaite	-2.49	0.66	0.53	0.29	0.82	-9.24	1.26	0.65	0.42	0.90	1.05	0.25	0.38	0.14	0.60	-0.09	0.46	0.52	0.27	0.67	-1.68	0.66	0.57	0.33	1.12
Blaney-Criddle	3.47	0.21	0.66	0.44	0.73	3.77	0.33	0.82	0.67	0.68	2.80	0.14	0.59	0.35	0.52	2.70	0.17	0.70	0.49	0.56	4.63	0.20	0.51	0.26	1.17
Christiansen Pan	3.27	0.27	0.37	0.15	0.91	2.94	0.37	0.47	0.22	1.04	2.78	0.17	0.29	0.08	0.62	2.23	0.36	0.51	0.26	0.67	5.13	0.18	0.21	0.05	1.33
PET from Open pan	3.22	0.31	0.37	0.15	0.92	3.04	0.38	0.42	0.18	1.07	2.82	0.18	0.26	0.07	0.63	2.18	0.42	0.52	0.27	0.66	4.84	0.24	0.26	0.07	1.32

6.14 Coimbatore

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE
Openpan	2.29	0.83	0.73	0.53	1.61	3.07	0.71	0.64	0.42	1.81	2.62	0.55	0.53	0.28	1.23	2.36	0.84	0.67	0.45	1.32	3.85	0.66	0.61	0.37	1.44
Penmann	1.01	1.20	0.90	0.82	1.01	1.12	0.99	0.89	0.79	1.08	-0.87	1.34	0.93	0.86	0.57	-1.88	1.66	0.93	0.86	0.66	-1.09	1.47	0.88	0.77	0.88
Hargreaves	0.03	1.43	0.56	0.32	1.94	5.09	0.51	0.15	0.02	2.34	0.28	1.13	0.48	0.23	1.34	-0.87	1.61	0.65	0.42	1.36	-1.06	1.61	0.53	0.28	1.55
Turc	-29.29	2.81	0.45	0.21	2.09	-40.89	3.75	0.36	0.13	2.21	0.57	0.33	0.07	0.00	1.53	-3.06	0.77	0.14	0.02	1.76	-9.50	1.34	0.18	0.03	1.80
Thornthwite	-4.25	1.03	0.50	0.25	2.03	-10.09	1.57	0.37	0.16	1.17	2.82	0.19	0.09	0.01	1.53	2.05	0.47	0.19	0.04	1.75	5.35	0.24	0.09	0.01	1.82
Blaney-Criddle	5.29	0.27	0.51	0.26	2.02	6.54	0.24	0.41	0.17	2.16	3.57	0.27	0.66	0.43	1.16	4.31	0.31	0.68	0.46	1.31	6.21	0.24	0.57	0.33	1.50
Criastansen Pan	2.54	1.00	0.69	0.48	1.71	3.66	0.77	0.59	0.34	1.92	2.65	0.67	0.52	0.27	1.31	2.37	1.09	0.64	0.41	1.37	4.02	0.81	0.57	0.33	1.50
PET from Open pan	2.84	1.07	0.57	0.32	1.93	4.68	0.71	0.37	0.14	2.20	3.06	0.58	0.40	0.16	1.41	2.88	1.06	0.53	0.28	1.51	4.54	0.81	0.47	0.22	1.61

6.15 Cuttack

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.48	0.41	0.63	0.40	0.93	2.95	0.27	0.59	0.34	0.52	2.92	0.07	0.13	0.02	0.46	2.77	0.17	0.37	0.14	0.56	5.12	0.11	0.32	0.10	0.75
Penman	0.20	0.87	0.96	0.93	0.32	0.22	0.85	0.99	0.98	0.09	-0.54	1.10	0.99	0.97	0.08	1.99	0.36	0.60	0.36	0.48	0.14	0.90	0.99	0.98	0.11
Hargreaves	5.28	-0.27	0.21	0.04	1.17	3.90	0.00	0.00	0.00	0.65	3.55	0.09	0.16	0.03	0.46	3.72	-0.07	0.11	0.01	0.60	5.61	0.03	0.04	0.00	0.79
Turc	-13.74	1.39	0.73	0.54	0.81	-42.28	3.50	0.88	0.78	0.31	-5.67	0.71	0.83	0.68	0.26	-9.80	1.10	0.73	0.54	0.41	-31.15	2.77	0.87	0.76	0.39
Thornthwaite	-1.23	0.42	0.68	0.46	0.88	-11.36	1.10	0.89	0.79	0.30	-0.36	0.30	0.84	0.70	0.26	-1.99	0.56	0.74	0.55	0.41	-2.15	0.57	0.86	0.75	0.40
Blaney-Criddle	3.99	0.02	0.13	0.02	1.19	3.08	0.40	0.85	0.71	0.35	3.11	0.01	0.02	0.00	0.47	3.37	0.00	0.04	0.00	0.60	2.62	0.45	0.72	0.52	0.55
Christiansen Pan	2.43	0.52	0.65	0.42	0.91	2.94	0.33	0.57	0.33	0.53	2.77	0.15	0.22	0.05	0.46	2.71	0.24	0.41	0.16	0.55	5.08	0.14	0.33	0.11	0.75
PET from Open pan	2.48	0.56	0.58	0.33	0.98	3.02	0.34	0.50	0.25	0.56	2.90	0.10	0.14	0.02	0.46	2.84	0.21	0.32	0.10	0.57	5.23	0.13	0.25	0.06	0.77

6.16 Dantiwada

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	0.73	0.59	0.98	0.95	0.36	1.22	0.54	0.97	0.94	0.33	0.34	0.63	0.87	0.76	0.37	0.94	0.55	0.91	0.83	0.22	0.35	0.62	0.95	0.90	0.35
Penman	-0.28	0.97	1.00	0.99	0.13	-0.10	0.92	0.99	0.99	0.14	-0.41	1.00	0.99	0.99	0.09	-0.26	0.98	0.99	0.99	0.06	-1.01	1.08	1.00	0.99	0.11
Hargreaves	-1.39	1.20	0.95	0.89	0.52	-2.48	1.46	0.96	0.91	0.40	-0.29	0.87	0.92	0.85	0.30	0.47	0.79	0.85	0.72	0.28	-2.12	1.30	0.80	0.65	0.65
Turc	-11.73	1.30	0.75	0.56	1.07	-59.12	4.81	0.92	0.85	0.53	-9.29	1.05	0.92	0.85	0.29	-4.64	0.73	0.70	0.49	0.38	-24.08	2.32	0.94	0.89	0.37
Thornthwaite	-0.71	0.47	0.72	0.52	1.11	-16.90	1.63	0.92	0.85	0.53	-1.65	0.48	0.93	0.87	0.28	-0.15	0.49	0.74	0.55	0.36	-1.18	0.61	0.94	0.89	0.36
Blaney-Criddle	3.06	0.30	0.53	0.28	1.36	3.66	0.43	0.80	0.63	0.83	0.94	0.41	0.90	0.80	0.34	1.30	0.38	0.89	0.79	0.24	3.53	0.34	0.35	0.12	1.03
Christiansen Pan	0.83	0.79	0.98	0.95	0.35	0.95	0.75	0.97	0.95	0.31	0.44	0.87	0.89	0.79	0.35	1.16	0.73	0.92	0.84	0.21	1.75	0.69	0.96	0.92	0.3
PET from Open pan	0.28	0.99	0.98	0.95	0.36	0.55	0.94	0.96	0.93	0.36	0.20	0.97	0.86	0.75	0.39	0.82	0.87	0.91	0.83	0.22	0.41	0.98	0.94	0.89	0.36

6.17 Dapoli

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.63	0.26	0.53	0.28	0.54	2.24	0.30	0.60	0.36	0.75	2.63	0.17	0.42	0.18	0.46	2.37	0.28	0.55	0.30	0.42	3.29	0.27	0.54	0.29	0.52
Penman	0.07	0.91	0.97	0.94	0.16	-0.07	0.92	0.98	0.95	0.20	-0.01	0.96	0.95	0.90	0.16	-0.07	0.92	0.97	0.94	0.13	0.45	0.84	0.97	0.95	0.14
Hargreaves	-0.51	0.54	0.52	0.30	0.53	-0.04	0.83	0.62	0.39	0.73	1.12	0.49	0.51	0.25	0.44	0.55	0.62	0.72	0.52	0.35	-3.68	0.21	0.21	0.04	0.61
Turc	-8.51	0.97	0.47	0.23	0.55	-26.41	2.33	0.62	0.38	0.73	-1.77	0.41	0.36	0.13	0.48	-1.19	0.40	0.38	0.14	0.46	-4.66	0.75	0.53	0.28	0.53
Thornthwaite	-0.72	0.43	0.48	0.24	0.55	-7.58	1.00	0.61	0.38	0.74	1.32	0.20	0.36	0.13	0.48	1.51	0.25	0.38	0.15	0.46	1.86	0.29	0.56	0.32	0.51
Blaney-Criddle	2.71	0.25	0.76	0.59	0.36	2.70	0.41	0.95	0.90	0.29	2.62	0.14	0.62	0.39	0.40	2.23	0.21	0.68	0.46	0.37	3.30	0.25	0.78	0.61	0.39
Christiansen Pan	2.71	0.28	0.49	0.25	0.55	2.23	0.36	0.61	0.37	0.74	2.63	0.20	0.44	0.19	0.46	2.52	0.28	0.46	0.21	0.44	3.47	0.29	0.47	0.22	0.55
PET from Open pan	2.74	0.31	0.47	0.23	0.56	2.26	0.38	0.58	0.34	0.76	2.67	0.21	0.40	0.16	0.47	2.53	0.32	0.46	0.21	0.44	3.49	0.32	0.45	0.21	0.55

6.18 Dehradun

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.02	0.67	0.92	0.85	0.51	2.30	0.46	0.96	0.92	0.18	0.07	1.01	0.95	0.90	0.22	0.39	0.85	0.87	0.76	0.18	1.59	0.52	0.95	0.90	0.30
Penman	-0.03	0.93	0.99	0.98	0.17	0.81	0.76	0.99	0.99	0.07	-0.42	1.10	0.99	0.98	0.10	-0.33	1.03	0.99	0.98	0.06	0.06	0.89	1.00	0.99	0.09
Hargreaves	-0.39	0.79	0.96	0.92	0.37	1.02	0.59	0.97	0.95	0.14	-0.95	0.88	0.95	0.91	0.21	-0.70	0.87	0.96	0.92	0.10	-0.15	0.72	0.97	0.95	0.22
Turc	-5.73	0.76	0.88	0.77	0.63	-32.16	2.78	0.85	0.72	0.34	-4.73	0.62	0.96	0.92	0.20	-3.15	0.51	0.78	0.60	0.23	-8.35	1.04	0.96	0.92	0.27
Thornthwaite	-0.48	0.38	0.87	0.75	0.66	-8.94	1.03	0.85	0.72	0.33	-1.26	0.39	0.97	0.95	0.16	-0.95	0.52	0.77	0.60	0.23	-0.09	0.42	0.97	0.94	0.25
Blaney-Criddle	1.57	0.38	0.67	0.45	0.97	3.00	0.29	0.90	0.80	0.28	0.47	0.40	0.85	0.72	0.37	0.75	0.36	0.80	0.65	0.22	1.29	0.43	0.93	0.86	0.37
Christiansen Pan	0.73	1.01	0.96	0.92	0.37	1.99	0.69	0.97	0.94	0.16	0.19	1.23	0.97	0.93	0.18	0.41	1.13	0.88	0.78	0.17	1.25	0.84	0.97	0.94	0.24
PET from Open pan	0.62	1.05	0.96	0.92	0.38	1.88	0.73	0.96	0.93	0.17	0.06	1.26	0.96	0.92	0.20	0.36	1.12	0.86	0.74	0.19	1.20	0.86	0.96	0.92	0.27

6.19 Faizabad

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.37	0.27	0.54	0.31	0.85	2.44	0.37	0.60	0.36	1.04	1.03	0.45	0.66	0.44	0.55	1.28	0.36	0.58	0.34	0.60	4.73	-0.08	0.33	0.11	1.21
Penman	-0.09	0.93	0.98	0.97	0.19	0.23	0.86	0.99	0.97	0.22	-0.34	1.01	0.97	0.95	0.17	-0.13	0.92	0.99	0.98	0.11	-0.14	0.91	0.98	0.96	0.25
Hargreaves	-0.09	0.82	0.77	0.60	0.65	0.64	0.74	0.71	0.51	0.91	-0.88	0.92	0.83	0.69	0.41	-0.41	0.83	0.84	0.71	0.40	0.28	0.78	0.71	0.50	0.90
Turc	-13.30	1.31	0.74	0.55	0.67	-35.73	3.00	0.72	0.52	0.90	-4.12	0.56	0.83	0.69	0.41	-2.62	0.47	0.66	0.43	0.55	-10.73	1.24	0.76	0.58	0.83
Thornthwaite	-2.37	0.53	0.75	0.57	0.66	-9.00	0.99	0.72	0.52	0.90	-0.59	0.31	0.85	0.73	0.38	-0.23	0.40	0.66	0.43	0.55	0.35	0.41	0.78	0.60	0.81
Blaney-Criddle	2.27	0.27	0.76	0.59	0.62	3.07	0.34	0.90	0.81	0.57	1.45	0.23	0.65	0.43	0.55	1.36	0.25	0.84	0.70	0.40	3.20	0.27	0.67	0.45	0.95
Christiansen Pan	2.45	0.35	0.50	0.27	0.88	2.59	0.40	0.48	0.23	1.13	1.04	0.52	0.70	0.48	0.53	1.36	0.40	0.53	0.28	0.62	4.79	0.10	0.28	0.08	1.23
PET from Open pan	2.45	0.39	0.49	0.25	0.89	2.61	0.44	0.49	0.23	1.14	1.04	0.58	0.66	0.44	0.55	1.37	0.44	0.51	0.26	0.63	4.78	0.11	0.29	0.08	1.23

6.20 Hisar

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.61	0.48	0.85	0.72	0.70	2.55	0.42	0.86	0.73	0.92	0.81	0.52	0.85	0.72	0.55	0.97	0.51	0.79	0.62	0.44	2.11	0.45	0.89	0.79	0.87
Penman	0.02	0.91	0.99	0.98	0.20	0.24	0.86	0.99	0.98	0.23	-0.20	0.96	0.99	0.97	0.18	-0.07	0.92	0.98	0.97	0.13	0.11	0.89	0.99	0.98	0.25
Hargreaves	-0.53	0.97	0.80	0.65	0.81	-0.54	1.09	0.76	0.58	1.16	-0.58	0.89	0.85	0.73	0.54	-0.29	0.88	0.80	0.64	0.43	-0.73	1.02	0.81	0.66	1.12
Turc	-14.08	1.47	0.74	0.56	0.87	-41.70	3.53	0.76	0.58	1.16	-4.12	0.60	0.81	0.66	0.61	1.21	0.36	0.58	0.33	0.58	-11.69	1.39	0.81	0.66	1.13
Thornthwaite	-2.70	0.63	0.76	0.59	0.83	-10.01	1.18	0.77	0.59	1.15	-0.76	0.40	0.85	0.72	0.55	0.32	0.37	0.59	0.35	0.58	-0.35	0.56	0.84	0.70	1.05
Blaney-Criddle	2.73	0.27	0.63	0.41	1.08	4.38	0.26	0.57	0.32	1.48	1.17	0.33	0.75	0.56	0.69	1.48	0.24	0.71	0.50	0.50	3.92	0.27	0.50	0.25	1.66
Christiansen Pan	0.98	0.70	0.79	0.63	0.82	2.12	0.67	0.79	0.63	1.09	-0.80	0.68	0.82	0.68	0.59	0.96	0.66	0.75	0.56	0.47	1.65	0.78	0.81	0.65	1.14
PET from Open pan	1.38	0.76	0.80	0.65	0.79	2.15	0.73	0.80	0.64	1.08	0.74	0.77	0.82	0.68	0.59	0.95	0.72	0.74	0.55	0.48	1.68	0.82	0.84	0.71	1.03

6.21 Hyderabad

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.84	0.43	0.85	0.73	0.93	2.38	0.37	0.72	0.52	1.12	2.00	0.33	0.66	0.43	0.58	1.82	0.82	0.80	0.64	1.07	3.13	0.35	0.80	0.63	0.86
Penman	-0.17	0.89	0.99	0.98	0.22	-0.10	0.86	0.99	0.98	0.25	-0.06	0.87	0.99	0.98	0.10	-0.13	0.90	0.99	0.97	0.14	-0.12	0.90	0.99	0.98	0.21
Hargreaves	-0.73	1.14	0.78	0.61	1.09	-0.41	1.08	0.63	0.40	1.26	0.50	0.77	0.58	0.34	0.63	0.52	0.83	0.67	0.45	0.66	1.47	0.82	0.48	0.23	1.26
Turc	-19.64	1.94	0.75	0.57	1.15	-34.25	3.04	0.70	0.49	1.15	-4.27	0.65	0.43	0.19	0.70	-9.65	1.15	0.67	0.45	0.66	-22.30	2.18	0.67	0.46	1.05
Thornthwaite	-2.09	0.64	0.76	0.58	1.14	-7.27	1.03	0.73	0.53	1.11	0.78	0.33	0.45	0.20	0.69	-1.44	0.64	0.73	0.53	0.61	-1.24	0.62	0.67	0.45	1.05
Blaney-Criddle	3.38	0.26	0.62	0.39	1.37	3.83	0.34	0.78	0.60	1.02	2.53	0.17	0.71	0.50	0.55	2.37	0.49	0.71	0.51	0.62	4.46	0.24	0.67	0.44	1.04
Christiansen Pan	1.82	0.60	0.81	0.66	1.01	2.40	0.47	0.70	0.49	1.15	1.99	0.44	0.64	0.41	0.59	1.67	0.57	0.76	0.57	0.58	3.32	0.47	0.74	0.55	0.94
PET from Open pan	1.64	0.72	0.79	0.62	1.07	2.43	0.55	0.63	0.40	1.23	2.03	0.46	0.58	0.34	0.63	1.61	0.65	0.73	0.53	0.60	3.01	0.58	0.71	0.50	1.00

6.22 Jabalpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.68	0.45	0.79	0.63	0.65	2.09	0.42	0.85	0.73	0.84	1.10	0.54	0.70	0.49	0.54	1.26	0.46	0.75	0.56	0.45	2.29	0.39	0.86	0.73	0.78
Penman	-0.08	0.89	0.99	0.97	0.18	0.15	0.85	0.99	0.98	0.21	-0.30	0.99	0.98	0.96	0.14	-0.07	0.87	0.98	0.96	0.14	-0.08	0.87	0.99	0.98	0.22
Hargreaves	-0.04	0.82	0.73	0.53	0.77	0.25	0.87	0.81	0.65	0.96	-0.18	0.79	0.72	0.51	0.52	0.07	0.72	0.74	0.55	0.45	-0.30	0.90	0.65	0.42	1.15
Turc	-13.54	1.36	0.74	0.56	0.70	-34.74	2.98	0.87	0.75	0.81	-4.52	0.63	0.76	0.58	0.49	-1.99	0.43	0.56	0.32	0.56	-12.91	1.41	0.77	0.60	0.96
Thornthwaite	-2.47	0.56	0.76	0.59	0.68	-8.57	1.04	0.86	0.74	0.82	-0.48	0.36	0.78	0.61	0.47	-0.38	0.34	0.59	0.35	0.55	-0.45	0.50	0.81	0.65	0.90
Blaney-Criddle	2.60	0.24	0.70	0.50	0.78	3.18	0.37	0.86	0.74	0.83	1.76	0.20	0.65	0.42	0.58	1.76	0.18	0.72	0.52	0.47	3.71	0.22	0.58	0.34	1.23
Christiansen Pan	1.35	0.68	0.77	0.59	0.71	1.66	0.67	0.82	0.68	0.92	1.02	0.68	0.73	0.54	0.51	1.17	0.62	0.73	0.54	0.46	1.57	0.75	0.78	0.61	0.94
PET from Open pan	1.44	0.72	0.76	0.58	0.70	1.75	0.70	0.82	0.68	0.92	1.03	0.76	0.70	0.49	0.54	1.18	0.68	0.71	0.51	0.48	1.81	0.73	0.82	0.67	0.87

6.23 Jodhpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE
Open pan	1.67	0.91	0.90	0.81	1.87	1.99	0.87	0.88	0.78	1.92	1.14	0.95	0.80	0.64	1.39	2.42	0.75	0.74	0.55	1.42	3.21	0.82	0.82	0.68	2.24
Penmann	-1.28	1.63	0.96	0.92	1.21	-2.40	1.65	0.96	0.94	1.01	-1.90	1.86	0.93	0.86	0.88	-0.88	1.64	0.93	0.87	0.75	-2.59	1.86	0.96	0.93	1.04
Hargreaves	-1.38	2.08	0.75	0.56	2.84	-5.69	2.72	0.73	0.54	2.77	3.27	0.79	0.33	0.11	2.20	3.76	0.76	0.25	0.05	2.04	-1.21	2.19	0.62	0.38	3.10
Turc	-20.49	2.32	0.61	0.37	3.40	-101.02	8.17	0.77	0.59	2.62	-7.82	1.16	0.45	0.20	2.08	-2.49	0.79	0.30	0.09	2.01	-35.94	3.67	0.64	0.42	3.01
Thornthwite	-0.79	0.88	0.68	0.46	3.17	-16.28	1.88	0.75	0.56	2.72	1.32	0.58	0.46	0.22	2.06	2.22	0.59	0.35	0.12	1.98	-1.70	1.13	0.68	0.46	2.88
Blaney-Criddle	4.22	0.72	0.58	0.33	3.52	5.45	0.72	0.70	0.49	2.92	3.58	0.41	0.43	0.18	2.11	4.10	0.39	0.40	0.16	1.93	8.42	0.50	0.39	0.15	3.62
Criastansen Pan	2.48	1.21	0.83	0.69	2.39	2.05	1.12	0.84	0.70	2.23	1.67	1.32	0.73	0.53	1.60	2.74	1.10	0.64	0.41	1.61	5.41	1.04	0.74	0.55	2.64
PET from Open pan	1.23	1.59	0.85	0.72	2.26	1.28	1.48	0.82	0.67	2.36	1.31	1.47	0.72	0.51	1.63	2.50	1.20	0.64	0.41	1.61	3.20	1.45	0.76	0.58	2.56

6.24 Jorhat

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.97	0.40	0.48	0.23	0.73	2.76	0.30	0.39	0.15	0.91	1.49	0.45	0.49	0.24	0.61	1.35	0.45	0.54	0.29	0.50	2.29	0.41	0.49	0.24	0.88
Penman	-0.16	1.00	0.95	0.90	0.23	-0.16	0.99	0.98	0.97	0.18	-0.17	1.05	0.94	0.89	0.23	-0.01	0.94	0.90	0.80	0.26	-0.28	1.01	0.97	0.94	0.26
Hargreaves	0.60	0.64	0.56	0.33	0.68	1.69	0.44	0.38	0.14	0.91	-0.34	0.87	0.68	0.46	0.52	0.10	0.67	0.67	0.45	0.44	0.95	0.58	0.53	0.28	0.86
Turc	-8.62	0.92	0.52	0.28	0.70	-20.38	1.83	0.47	0.22	0.87	-4.12	0.54	0.67	0.45	0.52	-2.70	0.45	0.44	0.19	0.53	-7.28	0.88	0.51	0.26	0.87
Thornthwaite	-0.99	0.40	0.51	0.27	0.70	-4.77	0.68	0.46	0.21	0.88	0.46	0.29	0.68	0.47	0.51	-0.15	0.35	0.44	0.19	0.53	0.48	0.30	0.47	0.22	0.90
Blaney-Criddle	2.16	0.21	0.78	0.63	0.46	2.89	0.27	0.93	0.87	0.36	1.66	0.16	0.63	0.39	0.55	1.52	0.15	0.71	0.51	0.42	2.59	0.25	0.87	0.75	0.50
Christiansen Pan	1.92	0.47	0.50	0.25	0.72	2.70	0.35	0.41	0.17	0.90	1.46	0.51	0.53	0.28	0.60	1.32	0.52	0.55	0.30	0.50	2.21	0.50	0.51	0.26	0.87
PET from Open pan	2.00	0.49	0.45	0.21	0.74	2.81	0.35	0.36	0.13	0.92	1.51	0.54	0.48	0.23	0.62	1.36	0.55	0.50	0.25	0.51	2.32	0.51	0.46	0.21	0.90

6.25 Kanpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.26	0.35	0.60	0.36	0.93	2.26	0.36	0.65	0.42	1.21	1.36	0.35	0.62	0.38	0.71	1.57	0.42	0.55	0.31	0.74	3.85	0.27	0.59	0.35	1.05
Penman	-0.09	0.91	0.99	0.98	0.16	0.09	0.87	0.99	0.99	0.19	-0.23	0.95	0.99	0.98	0.14	-0.11	0.91	0.99	0.98	0.12	-0.10	0.90	0.99	0.98	0.20
Hargreaves	0.01	0.85	0.74	0.55	0.78	-0.16	0.93	0.76	0.58	1.03	-0.35	0.80	0.74	0.55	0.60	-0.45	0.93	0.79	0.62	0.55	0.99	0.72	0.68	0.46	0.95
Turc	-15.73	1.49	0.73	0.53	0.78	-43.29	3.57	0.80	0.64	0.95	-4.22	0.57	0.70	0.48	0.65	-3.86	0.51	0.68	0.46	0.65	-11.55	1.31	0.75	0.56	0.87
Thornthwaite	-2.97	0.58	0.74	0.56	0.77	-11.08	1.13	0.80	0.64	0.95	-0.57	0.31	0.72	0.52	0.63	-0.77	0.49	0.70	0.48	0.64	0.52	0.40	0.76	0.58	0.85
Blaney-Criddle	2.59	0.25	0.76	0.59	0.75	3.41	0.31	0.83	0.69	0.89	1.54	0.25	0.79	0.63	0.55	1.47	0.27	0.86	0.74	0.46	3.93	0.19	0.55	0.30	1.09
Christiansen Pan	2.41	0.41	0.52	0.27	1.00	2.47	0.43	0.52	0.27	1.36	1.47	0.39	0.57	0.32	0.74	1.64	0.48	0.50	0.25	0.77	4.05	0.34	0.50	0.25	1.13
PET from Open pan	2.40	0.45	0.52	0.27	1.00	2.49	0.46	0.52	0.27	1.35	1.47	0.43	0.55	0.30	0.75	1.65	0.52	0.48	0.23	0.78	3.99	0.38	0.52	0.27	1.11

6.26 Karnal

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.13	0.64	0.94	0.88	0.59	2.51	0.45	0.95	0.90	0.30	0.35	0.84	0.92	0.85	0.26	0.44	0.82	0.90	0.81	0.20	2.12	0.48	0.89	0.80	0.60
Penman	-0.04	0.92	1.00	1.00	0.12	0.49	0.84	1.00	0.99	0.09	-0.23	0.98	0.99	0.98	0.09	-0.06	0.93	0.99	0.98	0.07	-0.04	0.92	1.00	0.99	0.09
Hargreaves	-0.76	1.02	0.97	0.94	0.42	0.01	0.94	0.95	0.91	0.30	-0.44	0.82	0.96	0.92	0.20	-0.39	0.91	0.93	0.87	0.17	-0.79	1.00	0.94	0.88	0.46
Turc	-7.79	0.97	0.87	0.75	0.86	-43.01	3.60	0.88	0.77	0.46	-4.51	0.60	0.95	0.89	0.22	-4.06	0.62	0.82	0.67	0.27	-12.62	1.42	0.96	0.91	0.39
Thornthwaite	-0.93	0.47	0.87	0.76	0.85	-11.30	1.24	0.89	0.79	0.45	-0.95	0.37	0.96	0.92	0.19	-1.26	0.62	0.82	0.67	0.27	-0.64	0.53	0.96	0.93	0.35
Blaney-Criddle	1.12	0.58	0.84	0.70	0.93	2.97	0.39	0.87	0.75	0.49	0.81	0.41	0.84	0.71	0.37	1.08	0.36	0.84	0.71	0.25	1.39	0.53	0.88	0.77	0.63
ChristiansenPan	0.89	0.95	0.95	0.91	0.52	2.19	0.65	0.93	0.86	0.36	0.41	1.10	0.94	0.89	0.23	0.45	1.08	0.91	0.82	0.19	1.86	0.77	0.88	0.78	0.62
PET from Open pan	0.74	1.05	0.95	0.90	0.54	2.08	0.74	0.93	0.86	0.37	0.28	1.17	0.93	0.87	0.25	0.39	1.12	0.88	0.77	0.22	1.78	0.83	0.87	0.76	0.65

6.27 Kovilpatti

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.78	0.38	0.73	0.54	0.81	3.09	0.38	0.74	0.55	1.01	2.15	0.41	0.76	0.58	0.81	2.52	0.38	0.73	0.53	0.60	3.37	0.34	0.70	0.49	0.82
Penman	0.19	0.87	0.99	0.97	0.20	0.51	0.80	0.99	0.97	0.26	0.10	0.88	0.99	0.98	0.18	-0.12	0.93	0.99	0.98	0.14	0.25	0.86	0.98	0.97	0.21
Hargreaves	1.00	0.76	0.52	0.31	1.00	3.46	0.50	0.20	0.04	1.48	-0.82	1.02	0.73	0.54	0.85	0.33	0.80	0.71	0.50	0.63	1.02	0.74	0.43	0.18	1.04
Turc	-23.90	2.21	0.54	0.29	1.00	-42.21	3.63	0.56	0.31	1.25	-21.87	2.01	0.61	0.37	0.99	-10.62	1.19	0.46	0.21	0.78	-20.88	1.99	0.53	0.28	0.97
Thornthwaite	-4.59	0.80	0.53	0.28	1.01	-9.99	1.27	0.55	0.30	1.26	-5.92	0.86	0.62	0.39	0.97	-1.23	0.54	0.46	0.21	0.79	-1.22	0.55	0.48	0.23	1.01
Blaney-Criddle	3.63	0.27	0.78	0.62	0.75	5.00	0.26	0.68	0.46	1.11	2.75	0.32	0.82	0.66	0.72	2.91	0.25	0.87	0.75	0.44	3.88	0.26	0.77	0.59	0.73
Christiansen Pan	2.89	0.46	0.66	0.44	0.90	3.35	0.50	0.65	0.43	1.14	2.16	0.50	0.69	0.48	0.90	2.51	0.46	0.71	0.50	0.63	3.55	0.40	0.60	0.35	0.92
PET from Open pan	2.86	0.53	0.65	0.42	0.91	3.26	0.58	0.62	0.39	1.18	2.15	0.57	0.68	0.46	0.91	2.51	0.53	0.69	0.47	0.64	3.52	0.46	0.59	0.35	0.92

6.28 Lembuchera

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	3.07	0.12	0.13	0.02	0.93	4.22	-0.06	0.13	0.02	0.42	3.03	-0.09	0.15	0.02	0.50	1.93	0.18	0.33	0.11	0.52	4.40	0.02	0.06	0.00	0.58
Penman	-0.39	0.97	0.99	0.98	0.14	0.07	0.87	0.99	0.97	0.07	-0.65	1.06	0.96	0.93	0.14	-0.37	0.93	0.94	0.88	0.19	-0.33	0.95	0.97	0.94	0.14
Hargreaves	-1.35	1.21	0.92	0.86	0.36	0.10	0.89	0.82	0.67	0.24	-1.44	1.26	0.74	0.54	0.34	-1.37	1.14	0.95	0.90	0.18	-0.22	0.98	0.49	0.24	0.50
Turc	-8.86	0.99	0.82	0.68	0.53	-26.76	2.35	0.72	0.52	0.30	-5.50	0.67	0.95	0.90	0.16	-7.36	0.88	0.90	0.82	0.24	-15.00	1.52	0.73	0.53	0.40
Thornthwaite	-0.53	0.40	0.78	0.60	0.59	-6.40	0.89	0.71	0.51	0.30	-0.59	0.34	0.95	0.90	0.16	-1.76	0.61	0.91	0.82	0.23	-0.44	0.46	0.77	0.59	0.37
Blaney-Criddle	3.40	0.03	0.06	0.00	0.94	3.28	0.31	0.71	0.50	0.30	2.98	-0.06	0.14	0.02	0.51	1.26	0.32	0.82	0.67	0.32	3.81	0.14	0.31	0.10	0.55
Christiansen Pan	2.79	0.24	0.23	0.05	0.91	4.19	-0.07	0.12	0.01	0.42	2.75	-0.01	0.02	0.00	0.51	1.95	0.23	0.40	0.16	0.50	4.29	0.06	0.12	0.01	0.57
PET from Open pan	3.32	0.07	0.06	0.00	0.94	4.30	-0.11	0.18	0.03	0.42	2.93	-0.08	0.12	0.02	0.51	2.05	0.19	0.31	0.09	0.52	4.48	0.00	0.01	0.00	0.58

6.29 Lucknow

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.65	0.48	0.84	0.70	0.80	2.90	0.29	0.70	0.50	0.55	0.38	0.80	0.84	0.71	0.38	0.73	0.62	0.93	0.87	0.21	3.66	0.23	0.62	0.38	0.75
Penman	0.02	0.89	1.00	0.99	0.15	0.51	0.80	0.99	0.97	0.13	-0.29	1.00	0.99	0.98	0.10	-0.14	0.94	0.99	0.99	0.07	-0.03	0.90	0.99	0.98	0.14
Hargreaves	-0.80	0.97	0.95	0.90	0.46	0.43	0.74	0.84	0.70	0.42	-1.11	0.97	0.93	0.87	0.25	-0.93	1.07	0.94	0.89	0.20	0.20	0.82	0.80	0.64	0.57
Turc	-6.84	0.86	0.79	0.62	0.90	-35.11	2.94	0.85	0.72	0.41	-5.03	0.64	0.90	0.82	0.30	-4.88	0.70	0.86	0.74	0.30	-6.94	0.95	0.68	0.46	0.70
Thornthwaite	-0.33	0.36	0.77	0.59	0.94	-8.36	0.92	0.83	0.69	0.43	-0.95	0.35	0.92	0.84	0.28	-1.37	0.60	0.87	0.75	0.30	1.64	0.30	0.69	0.48	0.68
Blaney-Criddle	2.09	0.34	0.71	0.50	1.03	3.03	0.31	0.86	0.74	0.39	1.42	0.22	0.80	0.63	0.42	1.49	0.24	0.78	0.61	0.37	3.58	0.22	0.72	0.52	0.66
Christiansen Pan	1.36	0.77	0.85	0.72	0.78	2.78	0.41	0.68	0.46	0.57	0.41	1.06	0.89	0.79	0.31	0.67	0.89	0.95	0.90	0.19	3.69	0.35	0.56	0.32	0.79
PET from Open pan	1.34	0.80	0.83	0.69	0.81	2.82	0.43	0.65	0.42	0.58	0.28	1.12	0.86	0.74	0.35	0.58	0.94	0.94	0.88	0.21	3.69	0.36	0.56	0.31	0.79

6.30 Ludhiana

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.78	0.44	0.77	0.59	0.74	2.80	0.39	0.76	0.57	1.05	0.97	0.50	0.75	0.57	0.60	1.03	0.45	0.70	0.50	0.44	2.31	0.43	0.86	0.74	0.89
Penman	0.03	0.90	0.99	0.98	0.18	0.25	0.86	0.99	0.97	0.26	-0.17	0.96	0.99	0.98	0.14	-0.07	0.92	0.99	0.97	0.11	0.10	0.88	0.99	0.98	0.22
Hargreaves	-0.21	0.91	0.85	0.72	0.64	-0.08	0.99	0.82	0.67	0.92	-0.32	0.85	0.88	0.77	0.44	-0.16	0.86	0.84	0.70	0.34	-0.27	0.95	0.87	0.75	0.88
Turc	-12.74	1.30	0.73	0.55	0.77	-35.58	3.05	0.74	0.54	1.09	-3.68	0.55	0.82	0.67	0.52	-1.10	0.33	0.54	0.29	0.52	-10.59	1.28	0.84	0.70	0.96
Thornthwaite	-2.34	0.57	0.75	0.58	0.74	-8.75	1.05	0.74	0.55	1.08	-0.63	0.35	0.85	0.72	0.48	0.28	0.34	0.55	0.30	0.51	-0.28	0.52	0.86	0.74	0.89
Blaney-Criddle	2.25	0.29	0.77	0.60	0.76	3.43	0.32	0.85	0.72	0.86	1.17	0.30	0.78	0.61	0.57	1.39	0.22	0.74	0.55	0.41	2.99	0.32	0.73	0.53	1.20
Christiansen Pan	1.52	0.63	0.76	0.58	0.77	2.33	0.60	0.74	0.55	1.08	0.93	0.63	0.76	0.58	0.59	0.99	0.58	0.72	0.51	0.43	1.82	0.72	0.83	0.69	0.98
PET from Open pan	1.59	0.68	0.74	0.55	0.79	2.48	0.64	0.72	0.51	1.12	0.95	0.69	0.73	0.54	0.62	1.00	0.62	0.69	0.47	0.45	1.94	0.76	0.84	0.70	0.97

6.31 Madurai

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE
Open pan	3.06	0.28	0.60	0.36	0.89	3.49	0.21	0.51	0.26	0.95	2.88	0.23	0.51	0.26	0.74	2.98	0.29	0.54	0.29	0.73	3.76	0.22	0.49	0.24	0.89
Penman	-0.24	0.88	0.99	0.98	0.16	-0.34	0.89	0.99	0.98	0.15	-0.07	0.85	0.99	0.98	0.12	-0.28	0.90	0.99	0.98	0.11	-0.46	0.92	0.99	0.97	0.17
Hargreaves	1.48	0.64	0.55	0.31	0.93	1.96	0.55	0.28	0.08	1.06	2.15	0.42	0.36	0.13	0.80	1.60	0.66	0.51	0.26	0.75	1.64	0.62	0.38	0.15	0.94
Turc	-13.17	1.35	0.49	0.24	0.97	-25.25	2.25	0.44	0.19	0.99	-7.92	0.91	0.32	0.10	0.81	-6.58	0.87	0.25	0.06	0.84	-11.95	1.28	0.36	0.13	0.95
Thornthwite	-0.14	0.38	0.49	0.24	0.97	-3.18	0.60	0.42	0.18	0.99	0.38	0.31	0.29	0.09	0.82	0.39	0.38	0.28	0.08	0.83	0.85	0.33	0.32	0.10	0.96
Blaney-Criddle	3.21	0.24	0.75	0.57	0.74	3.65	0.23	0.71	0.50	0.77	2.87	0.22	0.85	0.72	0.46	2.88	0.24	0.77	0.59	0.56	3.46	0.24	0.75	0.56	0.68
Criastansen Pan	2.99	0.37	0.62	0.38	0.88	3.41	0.30	0.53	0.28	0.93	2.84	0.30	0.54	0.29	0.73	2.97	0.36	0.56	0.31	0.72	3.70	0.30	0.51	0.26	0.87
PET from Open pan	3.18	0.36	0.52	0.28	0.95	3.66	0.27	0.41	0.17	1.00	2.98	0.28	0.45	0.20	0.77	3.25	0.34	0.43	0.18	0.79	4.04	0.25	0.38	0.14	0.94

6.32 Maruteru

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE	a	b	R	R^2	SEE
Open pan	1.91	0.60	0.60	0.36	1.23	2.05	0.52	0.50	0.25	1.59	2.44	0.32	0.27	0.07	0.81	2.54	0.33	0.32	0.10	0.63	2.77	0.53	0.57	0.32	1.09
Penman	-0.69	1.16	0.94	0.89	0.51	-1.02	1.24	0.99	0.87	0.66	-0.14	1.02	0.94	0.89	0.28	-0.08	1.00	0.92	0.85	0.25	-1.40	0.13	0.92	0.84	0.53
Hargreaves	0.37	0.92	0.65	0.42	1.16	0.92	0.82	0.49	0.24	1.60	0.89	0.71	0.57	0.32	0.70	1.61	0.52	0.53	0.28	0.56	0.31	0.97	0.60	0.36	1.06
Turc	-19.84	1.87	0.60	0.36	1.23	-35.56	3.05	0.59	0.35	1.47	-3.83	0.57	0.25	0.07	0.82	-7.77	0.91	0.45	0.21	0.59	-20.46	1.96	0.57	0.33	1.08
Thornthwite	-1.80	0.56	0.60	0.36	1.23	-7.37	0.99	0.59	0.35	1.48	1.31	0.22	0.23	0.05	0.82	-0.71	0.47	0.51	0.26	0.56	-1.51	0.58	0.58	0.33	1.08
Blaney-Criddle	2.94	0.28	0.65	0.42	1.16	3.35	0.36	0.71	0.50	1.30	2.46	0.23	0.82	0.67	0.49	2.57	0.19	0.74	0.54	0.45	3.45	0.26	0.60	0.36	1.05
Criastansen Pan	1.91	0.72	0.60	0.36	1.23	2.10	0.62	0.48	0.23	1.60	2.33	0.43	0.32	0.10	0.80	2.57	0.38	0.33	0.11	0.62	2.77	0.65	0.57	0.32	1.09
PET from Open pan	2.12	0.70	0.51	0.26	1.32	2.52	0.53	0.36	0.13	1.70	2.72	0.27	0.18	0.03	0.83	2.83	0.29	0.23	0.05	0.64	3.13	0.60	0.45	0.20	1.18

6.33 Mohanpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.57	0.36	0.48	0.25	0.72	3.25	0.21	0.28	0.08	1.02	1.93	0.43	0.51	0.26	0.65	1.65	0.48	0.68	0.46	0.45	3.45	0.32	0.47	0.22	0.77
Penman	-0.13	0.96	0.98	0.96	0.15	0.12	0.92	0.99	0.97	0.17	-0.42	1.08	0.98	0.97	0.13	-0.01	0.87	0.98	0.96	0.12	-0.21	0.96	0.98	0.95	0.19
Hargreaves	0.30	0.74	0.65	0.44	0.63	0.42	0.74	0.57	0.33	0.87	-1.05	1.02	0.76	0.57	0.49	-0.04	0.69	0.80	0.65	0.37	1.89	0.51	0.46	0.21	0.80
Turc	-14.47	1.38	0.68	0.46	0.61	-36.07	3.00	0.63	0.40	0.82	-5.67	0.68	0.72	0.52	0.52	-3.61	0.54	0.69	0.48	0.44	-12.52	1.31	0.67	0.45	0.67
Thornthwaite	-2.67	0.51	0.69	0.48	0.60	-9.54	1.00	0.62	0.38	0.83	-0.79	0.32	0.74	0.54	0.51	-0.15	0.34	0.70	0.49	0.44	-0.20	0.39	0.72	0.51	0.63
Blaney-Criddle	2.45	0.24	0.75	0.58	0.49	2.99	0.36	0.96	0.91	0.31	1.89	0.19	0.59	0.35	0.61	1.61	0.20	0.78	0.62	0.38	3.32	0.22	0.66	0.44	0.68
Christiansen Pan	2.54	0.40	0.50	0.27	0.72	3.20	0.25	0.30	0.09	1.01	1.90	0.47	0.55	0.30	0.63	1.62	0.53	0.69	0.48	0.44	3.45	0.35	0.45	0.20	0.81
PET from Open pan	2.61	0.43	0.45	0.23	0.74	3.33	0.22	0.23	0.06	1.03	1.94	0.51	0.51	0.26	0.65	1.64	0.60	0.65	0.43	0.47	3.54	0.38	0.41	0.17	0.82

6.34 Nagpur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.21	0.47	0.95	0.90	0.52	2.68	0.41	0.91	0.82	0.55	1.83	0.51	0.66	0.43	0.47	1.74	0.53	0.92	0.84	0.29	2.90	0.41	0.89	0.79	0.52
Penman	0.21	0.87	1.00	1.00	0.11	0.20	0.87	1.00	0.99	0.13	-0.13	0.97	0.99	0.98	0.10	0.17	0.87	0.99	0.98	0.09	0.20	0.87	0.99	0.99	0.11
Hargreaves	-1.02	1.14	0.95	0.90	0.53	-2.65	1.41	0.91	0.82	0.55	-0.68	1.10	0.85	0.72	0.33	-0.21	0.97	0.93	0.86	0.27	-1.31	1.18	0.81	0.66	0.66
Turc	-15.80	1.63	0.83	0.68	0.94	-39.71	3.41	0.94	0.88	0.46	-4.15	0.65	0.61	0.37	0.49	-10.72	1.25	0.89	0.79	0.34	-21.11	2.08	0.92	0.84	0.45
Thornthwaite	-2.02	0.62	0.81	0.66	0.97	-10.08	1.24	0.94	0.88	0.45	0.46	0.33	0.60	0.36	0.50	-2.26	0.78	0.89	0.78	0.34	-0.45	0.57	0.91	0.83	0.46
Blaney-Criddle	2.95	0.31	0.71	0.50	1.17	3.81	0.22	0.62	0.38	1.03	2.73	0.16	0.70	0.50	0.44	1.30	0.39	0.92	0.84	0.29	2.47	0.44	0.80	0.64	0.67
ChristiansenPan	1.78	0.78	0.94	0.88	0.58	2.46	0.60	0.88	0.77	0.62	1.65	0.76	0.76	0.57	0.41	1.40	0.86	0.93	0.87	0.27	2.49	0.71	0.81	0.66	0.65
PET from Open pan	1.78	0.85	0.94	0.88	0.58	2.40	0.69	0.88	0.77	0.63	1.62	0.82	0.69	0.48	0.45	1.40	0.91	0.92	0.84	0.29	2.51	0.75	0.82	0.67	0.64

6.35 New Delhi

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	0.98	0.55	0.88	0.77	0.83	2.44	0.38	0.81	0.66	0.66	1.39	0.29	0.54	0.29	0.64	1.18	0.35	0.57	0.32	0.45	1.83	0.45	0.76	0.58	0.82
Penman	-0.08	0.92	1.00	0.99	0.15	0.27	0.86	0.99	0.99	0.13	-0.19	0.95	0.98	0.96	0.16	-0.15	0.96	0.99	0.98	0.07	-0.23	0.95	0.99	0.98	0.16
Hargreaves	-0.82	1.01	0.95	0.90	0.53	-0.42	0.99	0.88	0.77	0.54	-0.54	0.85	0.91	0.83	0.31	-0.55	0.97	0.90	0.80	0.24	-0.61	0.96	0.87	0.76	0.62
Turc	-7.60	0.95	0.84	0.71	0.92	-40.66	3.39	0.81	0.66	0.66	-4.48	0.61	0.88	0.77	0.37	-4.32	0.66	0.82	0.67	0.31	-11.62	1.32	0.86	0.74	0.65
Thornthwaite	-0.73	0.44	0.84	0.71	0.92	-9.86	1.08	0.82	0.67	0.65	-0.81	0.36	0.89	0.80	0.34	-1.17	0.60	0.81	0.65	0.32	0.07	0.45	0.86	0.74	0.64
Blaney-Criddle	1.52	0.49	0.76	0.57	1.12	3.09	0.38	0.74	0.55	0.76	1.23	0.30	0.86	0.75	0.38	1.30	0.30	0.86	0.74	0.28	1.77	0.48	0.74	0.55	0.85
Christiansen Pan	0.79	0.81	0.88	0.78	0.81	2.10	0.58	0.78	0.61	0.70	1.30	0.44	0.59	0.35	0.62	1.14	0.50	0.58	0.34	0.44	1.80	0.67	0.72	0.51	0.88
PET from Open pan	0.75	0.86	0.84	0.71	0.92	2.25	0.59	0.73	0.53	0.78	1.43	0.37	0.51	0.26	0.66	1.31	0.41	0.48	0.23	0.48	2.07	0.65	0.65	0.42	0.96

6.36 Palampur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.48	0.53	0.76	0.58	0.61	2.05	0.49	0.79	0.62	0.80	0.95	0.58	0.76	0.58	0.47	0.98	0.52	0.66	0.44	0.44	1.93	0.52	0.83	0.68	0.73
Penman	-0.06	0.87	0.98	0.97	0.16	0.24	0.85	0.99	0.99	0.16	-0.25	0.93	0.97	0.94	0.18	0.00	0.81	0.98	0.96	0.12	-0.25	0.90	0.99	0.98	0.17
Hargreaves	-0.01	1.00	0.82	0.67	0.56	-0.45	1.02	0.78	0.60	0.82	0.12	0.99	0.88	0.77	0.35	-0.06	1.03	0.77	0.60	0.38	0.33	0.98	0.85	0.72	0.69
Turc	-7.22	0.92	0.72	0.53	0.66	-20.70	2.02	0.63	0.40	1.01	-2.54	0.50	0.82	0.67	0.42	-0.36	0.29	0.60	0.36	0.47	-5.30	0.88	0.82	0.68	0.74
Thornthwaite	-1.26	0.56	0.74	0.56	0.64	-5.94	0.98	0.65	0.42	0.99	-0.26	0.41	0.84	0.71	0.39	0.58	0.38	0.62	0.38	0.46	0.60	0.48	0.84	0.71	0.70
Blaney-Criddle	2.33	0.24	0.77	0.60	0.56	2.88	0.32	0.93	0.86	0.49	1.55	0.22	0.74	0.55	0.49	1.70	0.15	0.62	0.39	0.46	3.19	0.25	0.79	0.63	0.79
Christiansen Pan	1.53	0.74	0.69	0.49	0.68	1.93	0.68	0.71	0.51	0.91	1.09	0.78	0.74	0.55	0.49	1.12	0.68	0.55	0.31	0.49	1.99	0.81	0.77	0.59	0.83
PET from Open pan	1.47	0.79	0.70	0.49	0.68	1.94	0.73	0.72	0.51	0.91	1.00	0.85	0.73	0.54	0.50	1.08	0.71	0.56	0.31	0.49	1.88	0.86	0.78	0.60	0.82

6.37 Parbhani

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.40	0.39	0.67	0.46	0.92	2.39	0.45	0.75	0.57	1.19	2.21	0.32	0.55	0.30	0.66	1.94	0.39	0.66	0.44	0.65	3.06	0.39	0.73	0.54	1.17
Penman	-0.14	0.91	0.98	0.97	0.21	-0.04	0.87	0.99	0.98	0.24	-0.07	0.92	0.97	0.95	0.18	-0.11	0.90	0.98	0.96	0.17	-0.36	0.93	0.99	0.98	0.26
Hargreaves	-0.22	0.96	0.62	0.39	1.01	-1.00	1.16	0.71	0.51	1.27	0.50	0.75	0.61	0.37	0.63	0.24	0.82	0.63	0.40	0.67	-0.62	1.10	0.54	0.29	1.45
Turc	-17.30	1.73	0.61	0.38	1.00	-36.73	3.23	0.71	0.50	1.27	-3.49	0.60	0.51	0.27	0.68	-5.86	0.83	0.58	0.33	0.71	-23.10	2.27	0.64	0.41	1.32
Thornthwaite	-2.54	0.71	0.62	0.39	0.98	-9.55	1.30	0.72	0.52	1.26	0.75	0.32	0.52	0.27	0.68	-0.15	0.52	0.59	0.35	0.70	-1.21	0.70	0.66	0.44	1.29
Blaney-Criddle	3.36	0.27	0.62	0.40	0.96	3.74	0.41	0.84	0.70	0.99	2.77	0.17	0.53	0.28	0.67	2.37	0.24	0.60	0.36	0.69	4.57	0.27	0.51	0.26	1.48
Christiansen Pan	2.54	0.52	0.58	0.35	1.02	2.27	0.64	0.71	0.50	1.28	2.28	0.40	0.50	0.25	0.69	2.19	0.46	0.52	0.27	0.74	3.41	0.58	0.61	0.37	1.36
PET from Open pan	2.43	0.59	0.59	0.35	1.02	2.28	0.70	0.67	0.45	1.33	2.29	0.44	0.49	0.24	0.69	2.03	0.57	0.56	0.31	0.72	3.12	0.66	0.64	0.41	1.32

6.38 Puttur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.35	0.62	0.95	0.90	0.26	1.52	0.53	0.81	0.65	0.23	1.90	0.46	0.64	0.40	0.24	1.06	0.69	0.92	0.84	0.17	1.49	0.59	0.85	0.72	0.34
Penman	0.04	0.90	0.99	0.98	0.10	-0.11	0.96	0.99	0.99	0.05	-0.07	0.94	0.94	0.88	0.11	-0.71	1.06	0.97	0.94	0.11	-0.44	1.00	0.99	0.98	0.08
Hargreaves	-0.76	0.90	0.89	0.79	0.37	-0.96	0.94	0.76	0.58	0.25	1.67	0.38	0.30	0.09	0.30	1.33	0.49	0.46	0.21	0.38	-0.34	0.84	0.62	0.39	0.50
Turc	-30.90	2.67	0.82	0.67	0.47	-32.58	2.78	0.70	0.49	0.28	-5.24	0.67	0.30	0.09	0.30	-25.58	2.29	0.69	0.48	0.31	-30.46	2.63	0.59	0.35	0.51
Thornthwaite	-3.65	0.66	0.55	0.31	0.68	-9.80	1.17	0.69	0.48	0.28	0.23	0.28	0.30	0.09	0.30	-6.52	1.02	0.68	0.46	0.32	-0.62	0.43	0.36	0.13	0.59
Blaney-Criddle	2.70	0.19	0.84	0.71	0.44	2.60	0.32	0.98	0.97	0.07	2.89	0.09	0.72	0.52	0.22	2.14	0.21	0.81	0.66	0.25	2.96	0.24	0.94	0.89	0.21
Christiansen Pan	1.33	0.77	0.96	0.92	0.23	1.50	0.65	0.83	0.69	0.22	1.47	0.74	0.77	0.60	0.20	1.63	0.69	0.90	0.80	0.19	1.48	0.74	0.90	0.81	0.28
PET from Open pan	1.18	0.86	0.94	0.89	0.27	1.48	0.67	0.79	0.63	0.24	1.43	0.79	0.70	0.50	0.22	1.25	0.86	0.88	0.78	0.20	1.41	0.80	0.82	0.67	0.36

6.39 Raipur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.94	0.41	0.80	0.64	0.70	1.97	0.44	0.88	0.78	0.80	1.70	0.39	0.61	0.38	0.56	1.64	0.39	0.82	0.67	0.55	2.44	0.42	0.87	0.76	0.86
Penman	-0.12	0.91	0.98	0.96	0.23	-0.01	0.88	0.98	0.97	0.31	-0.21	0.96	0.97	0.94	0.17	-0.07	0.89	0.99	0.97	0.16	-0.18	0.90	0.99	0.98	0.26
Hargreaves	-0.85	1.01	0.74	0.56	0.82	-0.60	1.03	0.82	0.67	0.98	-0.16	0.83	0.61	0.37	0.57	-0.74	0.96	0.77	0.60	0.61	-1.90	1.22	0.77	0.60	1.11
Turc	-14.15	1.43	0.68	0.46	0.90	-25.86	2.31	0.71	0.51	1.19	-3.67	0.56	0.58	0.34	0.58	-5.96	0.79	0.63	0.40	0.74	-21.11	2.06	0.78	0.61	1.10
Thornthwaite	-2.32	0.58	0.71	0.50	0.86	-7.09	0.93	0.77	0.59	1.09	0.20	0.29	0.60	0.36	0.57	-0.64	0.48	0.67	0.45	0.71	-1.75	0.64	0.79	0.62	1.08
Blaney-Criddle	2.87	0.24	0.67	0.45	0.93	3.40	0.36	0.77	0.59	1.09	2.28	0.14	0.57	0.33	0.59	2.02	0.20	0.72	0.51	0.67	3.78	0.27	0.62	0.39	1.37
Christiansen Pan	1.48	0.68	0.79	0.62	0.76	1.55	0.72	0.85	0.72	0.91	1.39	0.58	0.67	0.46	0.53	1.21	0.64	0.82	0.67	0.56	1.76	0.79	0.81	0.65	1.04
PET from Open pan	1.60	0.71	0.78	0.61	0.75	1.61	0.75	0.85	0.73	0.89	1.48	0.62	0.63	0.40	0.55	1.34	0.67	0.80	0.64	0.58	1.96	0.79	0.83	0.69	0.97

6.40 Rajamundry

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.40	0.37	0.70	0.50	0.78	2.82	0.30	0.73	0.53	0.62	2.84	0.16	0.42	0.18	0.45	2.99	0.15	0.49	0.24	0.42	4.21	0.21	0.51	0.26	0.72
Penman	0.06	0.90	0.99	0.98	0.13	0.11	0.87	0.99	0.98	0.12	-0.09	0.96	0.98	0.96	0.09	-0.01	0.92	0.98	0.97	0.08	-0.07	0.93	0.99	0.97	0.14
Hargreaves	-1.02	1.12	0.88	0.77	0.52	-0.44	1.02	0.74	0.54	0.61	-0.86	1.09	0.64	0.42	0.38	0.11	0.81	0.76	0.57	0.31	-2.13	1.31	0.75	0.57	0.55
Turc	-15.12	1.51	0.74	0.54	0.74	-34.99	2.97	0.76	0.58	0.59	-3.81	0.59	0.44	0.20	0.44	-8.69	1.01	0.57	0.33	0.39	-16.01	1.62	0.70	0.48	0.60
Thornthwaite	-1.11	0.43	0.69	0.47	0.79	-7.88	0.89	0.75	0.56	0.60	0.77	0.23	0.44	0.20	0.44	-1.17	0.48	0.57	0.33	0.39	-0.15	0.42	0.72	0.51	0.58
Blaney-Criddle	3.09	0.26	0.57	0.33	0.90	3.23	0.42	0.77	0.60	0.57	2.74	0.18	0.54	0.29	0.42	2.43	0.21	0.67	0.45	0.36	2.98	0.36	0.70	0.49	0.60
Christiansen Pan	2.28	0.49	0.71	0.51	0.76	2.70	0.40	0.71	0.51	0.63	2.76	0.23	0.44	0.20	0.44	2.93	0.20	0.49	0.24	0.42	4.17	0.27	0.50	0.25	0.72
PET from Open pan	2.35	0.52	0.65	0.42	0.83	2.80	0.42	0.64	0.41	0.69	2.88	0.21	0.37	0.14	0.46	3.00	0.20	0.44	0.20	0.43	4.43	0.25	0.40	0.16	0.76

6.41 Rakh Dhiansar

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.62	0.46	0.66	0.43	0.69	2.90	0.26	0.61	0.37	0.85	0.29	0.70	0.71	0.50	0.53	0.81	0.49	0.63	0.39	0.42	2.50	0.37	0.68	0.47	0.96
Penman	0.00	0.88	0.98	0.96	0.18	0.45	0.80	0.97	0.94	0.26	-0.29	0.96	0.98	0.96	0.14	-0.09	0.90	0.98	0.96	0.11	-0.08	0.85	0.99	0.97	0.22
Hargreaves	0.28	0.66	0.80	0.65	0.55	1.43	0.51	0.67	0.45	0.80	-0.47	0.77	0.91	0.83	0.31	-0.03	0.67	0.83	0.68	0.31	0.18	0.68	0.81	0.65	0.78
Turc	-9.05	0.97	0.76	0.58	0.58	-21.86	1.97	0.64	0.41	0.83	-3.62	0.50	0.89	0.79	0.34	-1.25	0.30	0.67	0.44	0.41	-9.45	1.10	0.83	0.68	0.74
Thornthwaite	-1.39	0.43	0.77	0.60	0.57	-4.51	0.66	0.64	0.41	0.83	-0.81	0.31	0.92	0.85	0.29	-0.03	0.32	0.68	0.45	0.40	-0.23	0.41	0.83	0.69	0.74
Blaney-Criddle	2.06	0.21	0.75	0.56	0.59	3.11	0.23	0.84	0.70	0.59	1.06	0.22	0.71	0.51	0.52	1.26	0.16	0.68	0.46	0.40	2.79	0.22	0.76	0.57	0.86
Christiansen Pan	1.56	0.58	0.64	0.41	0.71	2.73	0.36	0.57	0.32	0.89	0.28	0.85	0.74	0.55	0.50	0.85	0.55	0.60	0.36	0.44	2.36	0.55	0.65	0.42	1.01
PET from Open pan	1.59	0.62	0.61	0.38	0.72	2.81	0.39	0.56	0.31	0.89	0.27	0.93	0.70	0.49	0.54	0.87	0.58	0.56	0.32	0.45	2.42	0.57	0.64	0.41	1.01

6.42 Ranchi

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.51	0.38	0.65	0.43	0.69	1.80	0.33	0.67	0.45	0.81	1.30	0.34	0.50	0.25	0.61	0.60	0.52	0.76	0.57	0.50	2.35	0.33	0.66	0.44	0.83
Penman	-0.25	0.99	0.97	0.94	0.19	-0.07	0.92	0.99	0.97	0.18	-0.23	1.05	0.91	0.83	0.29	-0.33	1.01	0.99	0.98	0.12	-0.36	0.98	0.99	0.97	0.19
Hargreaves	-0.12	0.80	0.70	0.49	0.65	0.43	0.71	0.72	0.52	0.76	-0.29	0.84	0.66	0.44	0.53	-0.48	0.84	0.75	0.56	0.51	-0.16	0.80	0.68	0.46	0.81
Turc	-8.39	0.95	0.56	0.32	0.74	-23.13	2.09	0.70	0.49	0.78	-1.65	0.38	0.54	0.29	0.59	-1.73	0.40	0.47	0.22	0.67	-7.06	0.93	0.55	0.30	0.92
Thornthwaite	-0.88	0.44	0.57	0.33	0.74	-5.64	0.83	0.70	0.49	0.78	0.58	0.24	0.55	0.30	0.59	0.42	0.34	0.47	0.23	0.67	1.13	0.33	0.56	0.32	0.91
Blaney-Criddle	2.36	0.14	0.78	0.62	0.54	2.85	0.20	0.91	0.84	0.44	1.73	0.13	0.68	0.46	0.52	1.56	0.12	0.80	0.64	0.46	3.31	0.13	0.73	0.53	0.76
Christiansen Pan	1.51	0.46	0.64	0.41	0.70	1.76	0.41	0.65	0.42	0.83	1.30	0.39	0.54	0.29	0.59	0.66	0.60	0.74	0.54	0.52	2.33	0.42	0.63	0.40	0.85
PET from Open pan	1.53	0.51	0.60	0.37	0.72	1.77	0.45	0.62	0.39	0.86	1.35	0.42	0.48	0.23	0.61	0.61	0.69	0.70	0.49	0.54	2.38	0.46	0.61	0.37	0.87

6.43 Ranichauri

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.17	0.70	0.64	0.42	0.63	2.10	0.41	0.45	0.21	0.95	0.34	0.96	0.75	0.56	0.39	0.64	0.73	0.60	0.36	0.46	1.60	0.69	0.74	0.55	0.72
Penman	0.05	0.87	0.99	0.97	0.12	0.24	0.86	0.99	0.99	0.11	-0.03	0.91	0.97	0.95	0.13	-0.06	0.81	0.99	0.98	0.09	0.04	0.89	0.99	0.98	0.14
Hargreaves	-0.11	1.00	0.86	0.75	0.42	-0.53	1.04	0.83	0.69	0.59	-0.02	0.95	0.92	0.84	0.24	-0.16	1.08	0.86	0.74	0.30	0.27	0.94	0.85	0.72	0.57
Turc	-4.80	0.73	0.79	0.62	0.51	-15.63	1.67	0.68	0.47	0.78	-1.06	0.35	0.85	0.73	0.31	0.17	0.24	0.75	0.56	0.38	-2.68	0.65	0.86	0.74	0.55
Thornthwaite	-1.01	0.55	0.80	0.65	0.48	-5.26	0.98	0.70	0.49	0.76	-0.07	0.36	0.88	0.77	0.28	0.59	0.40	0.76	0.57	0.37	0.71	0.46	0.88	0.77	0.51
Blaney-Criddle	1.82	0.33	0.90	0.81	0.34	2.58	0.34	0.94	0.89	0.35	1.14	0.35	0.84	0.70	0.33	1.20	0.31	0.90	0.81	0.25	2.36	0.32	0.91	0.82	0.45
Christiansen Pan	1.38	0.83	0.55	0.33	0.68	2.30	0.42	0.35	0.12	1.00	0.46	1.20	0.74	0.54	0.40	0.83	0.86	0.49	0.24	0.50	1.94	0.86	0.64	0.41	0.82
PET from Open pan	1.38	0.86	0.52	0.30	0.69	2.39	0.41	0.31	0.10	1.01	0.39	1.29	0.71	0.50	0.42	0.89	0.79	0.44	0.19	0.52	1.83	0.94	0.64	0.41	0.82

6.44 Samastipur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.95	0.52	0.72	0.53	0.70	2.59	0.45	0.67	0.45	0.96	1.14	0.59	0.77	0.59	0.51	1.43	0.55	0.72	0.52	0.55	2.65	0.47	0.74	0.54	0.77
Penman	0.01	0.91	0.95	0.91	0.26	0.03	0.89	0.99	0.98	0.19	-0.31	0.99	0.99	0.98	0.12	0.07	0.91	0.90	0.81	0.35	0.24	0.87	0.94	0.89	0.38
Hargreaves	0.09	0.88	0.75	0.56	0.68	0.52	0.87	0.67	0.44	0.97	-0.90	1.01	0.81	0.65	0.48	-0.24	0.89	0.85	0.72	0.42	0.98	0.74	0.66	0.44	0.86
Turc	-17.61	1.65	0.74	0.54	0.68	-51.17	4.16	0.73	0.53	0.89	-5.29	0.65	0.82	0.67	0.46	-3.79	0.59	0.69	0.47	0.58	-10.17	1.19	0.71	0.50	0.80
Thornthwaite	-3.83	0.65	0.75	0.56	0.67	-14.17	1.38	0.72	0.52	0.90	-0.96	0.34	0.84	0.71	0.44	-0.67	0.48	0.70	0.49	0.57	0.48	0.39	0.74	0.55	0.77
Blaney-Criddle	2.46	0.26	0.80	0.65	0.56	3.29	0.31	0.94	0.88	0.45	1.69	0.22	0.72	0.52	0.56	1.66	0.24	0.80	0.63	0.48	3.20	0.28	0.75	0.56	0.76
Christiansen Pan	1.91	0.65	0.71	0.51	0.71	2.63	0.54	0.64	0.41	1.00	1.14	0.70	0.78	0.61	0.50	1.39	0.69	0.72	0.52	0.55	2.48	0.67	0.70	0.49	0.81
PET from Open pan	1.92	0.72	0.70	0.49	0.73	2.66	0.60	0.61	0.38	1.02	1.13	0.79	0.76	0.58	0.52	1.39	0.76	0.71	0.50	0.56	2.52	0.73	0.70	0.49	0.81

6.45 Sirsa

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.20	0.42	0.65	0.42	0.79	3.14	0.08	0.30	0.09	0.44	0.63	0.38	0.56	0.32	0.46	0.45	0.47	0.60	0.36	0.32	2.61	0.15	0.49	0.24	0.43
Penman	-0.08	0.68	0.91	0.83	0.43	1.49	0.42	0.67	0.45	0.34	-0.24	0.64	0.80	0.64	0.33	-0.14	0.71	0.90	0.81	0.17	1.20	0.40	0.85	0.72	0.26
Hargreaves	0.22	0.50	0.85	0.72	0.55	2.83	0.12	0.25	0.06	0.44	-0.28	0.53	0.85	0.73	0.29	-0.38	0.72	0.92	0.85	0.15	1.41	0.28	0.77	0.59	0.31
Turc	-3.95	0.54	0.88	0.77	0.50	-2.98	0.48	0.27	0.07	0.44	-2.92	0.40	0.86	0.75	0.28	-2.51	0.42	0.87	0.76	0.19	-1.62	0.38	0.73	0.53	0.34
Thornthwaite	-0.03	0.25	0.86	0.75	0.52	1.57	0.14	0.25	0.06	0.45	-0.53	0.24	0.88	0.77	0.27	-0.48	0.38	0.85	0.73	0.21	1.60	0.14	0.75	0.56	0.33
Blaney-Criddle	1.91	0.17	0.38	0.14	0.96	2.89	0.17	0.79	0.62	0.28	1.09	0.12	0.50	0.25	0.48	0.86	0.17	0.77	0.59	0.25	2.55	0.11	0.55	0.30	0.41
Christiansen Pan	1.11	0.65	0.68	0.46	0.76	3.09	0.13	0.32	0.10	0.44	0.63	0.57	0.61	0.37	0.44	0.50	0.64	0.65	0.42	0.30	2.59	0.24	0.45	0.20	0.44
PET from Open pan	1.08	0.65	0.66	0.44	0.78	3.12	0.12	0.30	0.09	0.44	0.61	0.56	0.59	0.35	0.45	0.48	0.62	0.58	0.34	0.32	2.58	0.23	0.45	0.21	0.44

6.46 Solapur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	2.93	0.28	0.49	0.26	1.09	2.72	0.32	0.59	0.35	1.25	3.15	0.14	0.29	0.09	0.83	2.36	0.31	0.57	0.33	0.86	3.51	0.33	0.51	0.26	1.40
Penman	-0.09	0.89	0.99	0.97	0.21	0.12	0.85	0.99	0.97	0.25	-0.09	0.91	0.98	0.96	0.17	-0.03	0.87	0.99	0.97	0.17	-0.36	0.93	0.99	0.97	0.26
Hargreaves	-0.07	0.95	0.53	0.29	1.07	-1.42	1.21	0.68	0.46	1.14	0.75	0.72	0.48	0.23	0.76	0.64	0.80	0.49	0.24	0.91	-0.23	1.08	0.46	0.21	1.45
Turc	-17.42	1.73	0.45	0.23	1.09	-37.64	3.28	0.66	0.43	1.17	-0.61	0.37	0.21	0.05	0.85	-8.71	1.07	0.45	0.20	0.94	-22.71	2.22	0.50	0.25	1.41
Thornthwaite	-2.27	0.62	0.46	0.24	1.09	-9.93	1.19	0.66	0.43	1.17	2.07	0.17	0.22	0.05	0.85	-0.75	0.54	0.46	0.21	0.94	-0.47	0.56	0.51	0.26	1.40
Blaney-Criddle	3.44	0.28	0.68	0.46	0.93	3.91	0.35	0.78	0.61	0.98	2.83	0.20	0.64	0.40	0.67	2.49	0.27	0.69	0.47	0.77	4.53	0.28	0.61	0.37	1.29
Christiansen Pan	3.61	0.27	0.33	0.13	1.18	2.91	0.40	0.51	0.26	1.33	3.51	0.10	0.16	0.02	0.86	3.04	0.30	0.36	0.13	0.98	5.00	0.30	0.31	0.10	1.55
PET from Open pan	3.59	0.30	0.33	0.12	1.19	3.10	0.40	0.45	0.20	1.39	3.50	0.11	0.16	0.03	0.85	2.85	0.37	0.40	0.16	0.96	4.93	0.33	0.30	0.09	1.55

6.47 Targhadia

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	-0.25	0.72	0.87	0.76	1.01	1.50	0.48	0.79	0.62	0.83	1.44	0.33	0.60	0.36	0.58	1.70	0.35	0.55	0.31	0.65	1.21	0.64	0.76	0.58	1.02
Penman	-1.14	1.08	0.99	0.99	0.22	-0.28	0.94	1.00	0.99	0.11	-0.85	0.98	0.96	0.92	0.21	-1.29	1.08	0.99	0.98	0.11	-1.19	1.09	1.00	0.99	0.15
Hargreaves	-3.05	1.55	0.94	0.89	0.70	-2.00	1.35	0.92	0.84	0.54	-0.38	0.86	0.82	0.67	0.41	-1.38	1.22	0.83	0.69	0.43	-5.99	2.00	0.82	0.67	0.90
Turc	-20.15	1.96	0.69	0.48	1.49	-53.96	4.45	0.91	0.82	0.57	-9.04	1.00	0.79	0.63	0.44	-9.81	1.17	0.65	0.42	0.59	-38.69	3.49	0.88	0.77	0.76
Thornthwaite	-2.90	0.68	0.66	0.44	1.55	-15.20	1.57	0.91	0.83	0.56	-1.58	0.46	0.82	0.67	0.42	-2.10	0.73	0.66	0.43	0.58	-3.75	0.90	0.88	0.77	0.75
Blaney-Criddle	2.73	0.38	0.63	0.40	1.61	3.58	0.43	0.71	0.50	0.95	2.06	0.23	0.61	0.38	0.57	1.94	0.29	0.48	0.23	0.68	1.21	0.67	0.67	0.45	1.16
Christiansen Pan	-0.13	0.94	0.88	0.78	0.97	1.41	0.62	0.77	0.59	0.86	1.68	0.42	0.57	0.32	0.60	2.16	0.41	0.40	0.16	0.71	0.94	0.89	0.84	0.70	0.86
PET from Open pan	-0.73	1.20	0.82	0.67	1.19	1.49	0.70	0.68	0.46	0.99	1.66	0.44	0.53	0.28	0.62	2.19	0.42	0.39	0.15	0.71	0.78	1.10	0.68	0.46	1.15

6.48 Thrissur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.99	0.46	0.74	0.54	0.64	1.42	0.60	0.68	0.46	0.68	1.72	0.43	0.78	0.61	0.59	2.07	0.42	0.77	0.59	0.64	2.74	0.40	0.72	0.52	0.64
Penman	0.21	0.79	0.98	0.95	0.20	0.15	0.88	0.99	0.97	0.16	0.25	0.71	0.98	0.96	0.19	-0.09	0.77	0.98	0.96	0.19	0.55	0.78	0.96	0.92	0.26
Hargreaves	0.89	0.74	0.47	0.27	0.81	-1.27	1.17	0.71	0.50	0.65	1.33	0.56	0.29	0.09	0.91	3.38	0.31	0.19	0.04	0.98	0.12	0.91	0.68	0.46	0.68
Turc	-28.70	2.53	0.47	0.31	0.79	-40.72	3.45	0.74	0.55	0.62	-24.54	2.18	0.41	0.17	0.87	-13.97	1.44	0.08	0.07	0.96	-35.57	3.04	0.65	0.42	0.70
Thornthwaite	-6.32	0.88	0.47	0.25	0.82	-12.77	1.40	0.73	0.54	0.63	-6.37	0.84	0.40	0.16	0.87	-1.65	0.56	0.27	0.07	0.96	-4.50	0.74	0.49	0.24	0.80
Blaney-Criddle	2.87	0.24	0.84	0.72	0.49	2.81	0.31	0.95	0.91	0.28	2.47	0.21	0.85	0.72	0.51	2.77	0.22	0.69	0.47	0.72	3.43	0.22	0.88	0.77	0.44
Christiansen Pan	1.86	0.60	0.69	0.47	0.69	1.40	0.69	0.69	0.48	0.67	1.44	0.62	0.74	0.54	0.64	1.97	0.59	0.64	0.40	0.77	2.63	0.50	0.68	0.47	0.67
PET from Open pan	1.86	0.68	0.67	0.45	0.70	1.44	0.76	0.64	0.41	0.71	1.47	0.69	0.73	0.53	0.65	1.92	0.68	0.65	0.43	0.75	2.60	0.59	0.67	0.45	0.68

6.49 Udaipur

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.60	0.46	0.83	0.69	0.60	2.09	0.46	0.89	0.79	0.77	1.12	0.47	0.76	0.58	0.50	1.17	0.46	0.79	0.63	0.41	2.01	0.43	0.88	0.77	0.73
Penman	-0.38	0.88	0.98	0.96	0.18	0.20	0.84	0.99	0.99	0.19	-0.18	0.92	0.97	0.94	0.18	-0.01	0.86	0.97	0.94	0.16	-1.55	0.88	0.99	0.98	0.21
Hargreaves	0.02	0.85	0.69	0.48	0.84	-0.44	1.08	0.73	0.54	1.13	-0.20	0.76	0.80	0.64	0.46	0.37	0.65	0.66	0.43	0.50	0.34	0.90	0.56	0.31	1.26
Turc	-12.89	1.34	0.70	0.50	0.77	-34.64	3.02	0.77	0.59	1.07	-3.67	0.57	0.74	0.54	0.52	-0.98	0.36	0.50	0.25	0.57	-12.29	1.42	0.79	0.62	0.93
Thornthwaite	-2.09	0.58	0.72	0.53	0.75	-8.93	1.13	0.77	0.60	1.06	-0.23	0.35	0.76	0.58	0.50	0.82	0.31	0.52	0.27	0.57	-0.02	0.52	0.82	0.67	0.87
Blaney-Criddle	1.55	0.32	0.72	0.53	0.73	3.27	0.39	0.89	0.80	0.75	1.43	0.27	0.64	0.41	0.59	1.51	0.25	0.66	0.43	0.50	-0.02	0.37	0.69	0.48	1.09
Christiansen Pan	15.20	0.68	0.74	0.63	0.67	1.74	0.70	0.86	0.73	0.86	0.97	0.67	0.77	0.60	0.49	1.09	0.64	0.53	0.53	0.45	5.70	0.73	0.81	0.66	0.89
PET from Open pan	1.38	0.75	0.80	0.64	0.66	1.76	0.76	0.85	0.73	0.87	0.98	0.73	0.75	0.57	0.50	1.08	0.71	0.74	0.55	0.45	1.69	0.78	0.85	0.71	0.81

6.50 Umiam

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	0.82	0.77	0.73	0.54	0.49	2.17	0.39	0.51	0.26	0.24	0.23	0.87	0.61	0.37	0.32	-0.20	0.95	0.95	0.90	0.16	2.49	0.37	0.66	0.43	0.32
Penman	0.11	0.88	0.99	0.98	0.09	0.41	0.81	0.97	0.95	0.07	-0.12	0.99	0.99	0.98	0.05	0.08	0.86	0.99	0.98	0.06	0.39	0.81	0.97	0.94	0.11
Hargreaves	0.49	0.68	0.84	0.71	0.38	2.19	0.23	0.54	0.29	0.24	0.51	0.63	0.76	0.57	0.26	-0.91	1.17	0.93	0.86	0.18	1.11	0.62	0.64	0.40	0.32
Turc	-2.07	0.45	0.69	0.47	0.52	-6.50	0.78	0.63	0.40	0.22	-1.85	0.39	0.86	0.73	0.21	-5.13	0.77	0.96	0.92	0.14	-2.75	0.57	0.57	0.32	0.35
Thornthwaite	1.18	0.23	0.62	0.38	0.56	-0.41	0.36	0.57	0.32	0.23	0.46	0.25	0.83	0.68	0.23	-1.43	0.75	0.97	0.94	0.12	2.20	0.19	0.47	0.22	0.37
Blaney-Criddle	2.86	0.05	0.14	0.02	0.71	2.90	0.23	0.67	0.44	0.21	2.82	-0.14	0.28	0.08	0.39	0.72	0.38	0.76	0.58	0.31	3.16	0.16	0.72	0.51	0.29
ChristiansenPan	0.49	1.17	0.79	0.62	0.44	2.21	0.47	0.51	0.26	0.24	0.18	1.17	0.72	0.51	0.28	-0.44	1.40	0.94	0.89	0.16	2.31	0.56	0.66	0.44	0.31
PET from Open pan	0.37	1.25	0.75	0.57	0.47	2.32	0.43	0.43	0.18	0.26	0.74	0.88	0.52	0.27	0.34	-0.69	1.54	0.92	0.85	0.19	2.35	0.57	0.62	0.38	0.33

6.51 Varanasi

PET estimating Method	Annual					Southwest Monsoon					Northeast Monsoon					Winter					Summer				
	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE	a	b	r	R^2	SEE
Open pan	1.38	0.62	0.92	0.85	0.59	2.29	0.45	0.86	0.73	0.48	0.70	0.83	0.85	0.72	0.35	1.35	0.51	0.64	0.41	0.48	2.64	0.45	0.80	0.65	0.67
Penman	0.02	0.89	0.99	0.98	0.20	0.41	0.83	0.99	0.98	0.12	-0.42	1.03	0.98	0.97	0.12	0.14	0.84	0.82	0.67	0.36	-0.35	0.94	0.99	0.98	0.14
Hargreaves	-0.60	0.99	0.94	0.89	0.50	0.37	0.84	0.87	0.76	0.46	-1.04	1.06	0.89	0.79	0.31	-0.40	0.94	0.78	0.60	0.39	-1.09	1.06	0.83	0.68	0.64
Turc	-8.84	1.03	0.81	0.66	0.89	-40.84	3.40	0.91	0.83	0.39	-5.77	0.72	0.94	0.88	0.23	-4.75	0.69	0.70	0.49	0.45	-14.01	1.50	0.87	0.76	0.55
Thornthwaite	-0.73	0.43	0.81	0.65	0.90	-9.84	1.07	0.91	0.82	0.39	-0.93	0.37	0.95	0.90	0.21	-1.10	0.56	0.70	0.49	0.45	-0.06	0.46	0.88	0.77	0.55
Blaney-Criddle	1.97	0.43	0.71	0.50	1.08	3.13	0.41	0.90	0.81	0.41	1.24	0.34	0.65	0.43	0.51	1.42	0.31	0.72	0.51	0.44	1.39	0.53	0.78	0.61	0.70
Christiansen Pan	1.10	0.93	0.92	0.85	0.60	1.76	0.72	0.84	0.70	0.51	0.81	1.04	0.89	0.80	0.30	1.38	0.67	0.63	0.40	0.48	2.46	0.72	0.80	0.64	0.68
PET from Open pan	1.03	1.00	0.91	0.83	0.63	1.91	0.73	0.80	0.63	0.57	0.69	1.12	0.87	0.75	0.34	1.39	0.68	0.59	0.35	0.50	2.47	0.75	0.77	0.59	0.73

Table 7 (a) : Mean Bias Error (MBE) in estimating PET before employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	3.76	0.90	0.96	8.39	7.41	1.59	1.00	0.79
Anand	1.50	0.61	0.81	8.22	6.95	1.64	0.02	-0.41
Anantapur	1.10	0.94	-0.71	6.82	5.74	0.67	-0.78	-1.59
Arjia	-0.77	-2.14	-2.27	5.04	3.32	-1.48	-2.46	-3.09
Bangalore	0.38	0.31	0.40	7.87	4.75	0.78	-0.69	-0.99
Bhubaneswar	0.95	0.47	0.79	8.78	8.48	0.93	-0.12	-0.49
Bijapur	1.31	0.71	0.35	7.59	5.36	1.27	-0.44	-0.98
Dapoli	0.01	0.23	0.97	8.82	6.27	0.22	-0.59	-0.83
Faizabad	-0.35	0.54	0.93	8.21	6.42	0.82	-1.26	-1.35
Hisar	0.37	0.44	0.75	7.65	5.62	0.48	-0.70	-0.99
Hyderabad	0.47	-0.79	-0.32	7.34	5.58	-0.23	-0.96	-1.18
Jabalpur	0.86	0.55	0.89	7.89	5.96	1.44	-0.72	-0.90
Jodhpur	-0.50	-1.86	-2.45	5.33	3.92	-1.06	-2.62	-3.00
Jorhat	-0.63	0.32	0.96	9.08	6.72	0.64	-1.11	-1.16
Kanpur	2.00	0.52	0.80	8.34	6.89	0.95	0.57	0.34
Kovilpatti	2.25	0.47	0.94	7.85	6.37	-0.10	0.71	0.04
Ludhiana	0.49	0.43	0.49	7.94	5.84	0.84	-0.53	-0.76
Mohanpur	-1.60	-0.45	0.12	8.30	7.07	0.15	-2.13	-2.10
Palampur	-0.17	1.24	0.34	7.37	4.18	-0.42	-1.32	-1.29
Parbhani	-0.84	-0.84	0.07	7.30	4.94	0.46	-2.02	-0.61
Raipur	1.18	0.64	0.64	8.32	6.61	1.68	-0.31	-0.60
Rakh Dhiansar	0.22	0.42	0.91	7.94	5.87	0.68	-0.80	-0.90
Ranchi	4.83	0.30	1.28	8.32	5.63	-0.70	3.10	2.89
Ranichauri	-0.09	0.26	0.36	6.38	3.21	0.07	-0.80	-0.73
Samastipur	-0.17	0.58	0.43	7.74	6.39	1.45	-1.10	-1.48
Solapur	1.48	0.78	0.55	7.89	6.79	1.43	-0.37	-0.78
Thrissur	0.31	0.52	0.33	8.85	7.67	1.91	-0.66	-0.94
Udaipur	1.23	1.61	1.05	8.29	6.18	0.99	-1.18	-1.37
Varanasi	3.18	0.14	-0.47	8.44	6.11	6.75	1.89	0.97
Average	0.66	0.19	0.34	7.71	5.82	0.51	-0.64	-0.86

7 (b) : Root Mean Square Error (RMSE) in estimating PET before employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	4.21	0.95	1.70	8.51	7.49	4.04	1.42	1.29
Anand	2.04	0.69	1.25	8.29	7.03	3.57	0.94	0.93
Anantapur	1.73	1.16	1.19	6.88	5.83	3.19	1.30	1.92
Arjia	1.88	2.70	3.52	5.98	4.45	4.03	3.27	3.96
Bangalore	1.00	0.38	0.62	7.89	4.82	2.81	0.97	1.20
Bhubaneswar	1.87	0.51	1.20	8.81	8.54	3.59	1.28	1.48
Bijapur	1.89	0.73	0.86	7.64	5.42	3.67	1.13	1.34
Dapoli	0.76	0.28	1.18	8.83	6.31	2.31	0.89	1.07
Faizabad	1.06	0.68	1.25	8.27	6.57	3.76	1.60	1.71
Hisar	1.63	0.50	1.06	7.73	5.75	2.52	1.47	1.49
Hyderabad	2.11	0.98	0.84	7.45	5.85	3.18	1.83	1.94
Jabalpur	1.68	0.60	1.13	7.95	6.05	3.46	1.25	1.31
Jodhpur	1.1	2.5	3.6	6.2	4.6	3.2	3.0	3.5
Jorhat	1.11	0.34	1.25	9.10	6.80	3.29	1.38	1.43
Kanpur	2.80	0.57	1.21	8.39	7.02	3.16	1.74	1.55
Kovilpatti	2.68	0.50	1.37	7.89	6.43	2.15	1.34	0.93
Ludhiana	1.23	0.50	0.94	8.01	5.98	3.21	0.91	1.06
Mohanpur	1.89	0.54	0.62	8.35	7.17	2.34	2.32	2.30
Palampur	0.88	1.30	0.62	7.42	4.32	2.31	1.46	1.44
Parbhani	2.23	1.54	0.51	7.34	5.03	2.89	2.62	2.57
Raipur	1.71	0.68	0.99	8.38	6.68	3.70	0.91	0.97
Rakh Dhiansar	1.18	0.46	1.12	7.99	5.99	3.05	1.12	1.20
Ranchi	5.35	0.33	1.45	8.35	5.71	1.36	3.64	3.49
Ranichauri	0.60	0.30	0.54	6.48	3.36	2.25	0.99	0.98
Samastipur	1.00	0.59	0.96	7.77	6.42	2.89	1.35	1.62
Solapur	1.99	0.80	1.13	7.94	6.85	3.67	1.24	1.26
Thrissur	0.98	0.55	1.03	8.89	7.72	4.33	0.88	1.11
Udaipur	1.84	1.69	1.36	8.34	6.25	2.75	1.39	1.48
Varanasi	20.22	2.29	1.77	8.64	6.55	4.67	18.85	13.22
Average	1.82	0.81	1.24	7.83	5.99	3.04	1.61	1.71

7 (c) : Mean Percentage Error (MPE) in estimating PET before employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	87.46	24.29	48.09	261.45	211.09	92.72	29.47	31.64
Anand	34.36	13.97	28.18	222.11	178.47	88.69	15.75	16.00
Anantapur	23.84	14.92	14.38	123.28	100.35	50.59	17.02	25.92
Arjia	177.92	120.04	114.39	413.92	343.57	187.50	111.90	87.21
Bangalore	19.13	8.37	12.80	190.99	115.34	61.67	19.48	24.62
Bhubaneswar	40.92	12.22	31.89	252.40	234.51	82.98	26.29	30.18
Bijapur	30.54	14.60	16.44	168.19	116.16	72.46	19.69	23.53
Dapoli	18.35	6.74	31.86	266.10	191.19	67.36	21.34	25.43
Faizabad	22.46	15.11	37.43	284.68	192.60	86.77	31.21	33.95
Hisar	28.53	11.60	29.76	263.61	156.33	69.70	32.91	34.18
Hyderabad	31.35	14.22	13.74	154.88	116.78	53.90	29.68	32.04
Jabalpur	27.49	12.73	28.73	225.91	156.85	85.49	27.42	28.95
Jodhpur	13.91	21.57	28.83	112.56	74.05	37.54	36.22	39.68
Jorhat	30.24	11.81	43.74	355.70	244.18	105.65	40.33	40.96
Kanpur	61.55	14.33	33.43	280.98	202.89	84.35	42.55	38.99
Kovilpatti	46.26	10.08	27.64	182.43	142.35	40.91	22.40	17.92
Ludhiana	25.23	12.42	28.71	313.54	186.68	90.57	22.63	24.57
Mohanpur	38.28	10.86	13.21	212.29	178.67	54.09	48.51	47.54
Palampur	20.95	48.11	18.39	279.98	142.99	81.10	43.01	40.70
Parbhani	39.98	25.92	10.42	158.83	105.71	57.02	42.81	43.61
Raipur	30.62	15.59	24.94	234.96	176.25	91.85	18.09	19.75
Rakh Dhiansar	26.18	12.90	33.59	327.44	193.20	93.96	31.23	31.98
Ranchi	191.83	9.02	48.61	276.69	167.35	44.49	128.67	129.22
Ranichauri	21.33	11.15	19.33	264.99	119.62	84.72	32.41	31.54
Samastipur	17.69	14.57	30.87	240.70	163.81	64.91	29.81	34.08
Solapur	33.84	16.54	23.29	182.40	152.35	75.64	21.85	22.05
Thrissur	18.63	11.86	25.30	249.05	216.26	87.26	18.92	23.66
Udaipur	40.07	46.04	44.94	278.96	187.02	87.68	35.08	26.07
Varanasi	109.02	61.15	62.08	35.31	26.67	150.32	102.81	99.69
Average	44.26	19.49	30.78	242.74	168.44	77.24	36.83	37.37

Table 8 (a) : Mean Bias Error (MBE) in estimating PET after employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	-1.80	0.31	-0.35	0.01	0.15	0.15	0.65	1.07
Anand	-0.06	0.02	0.36	0.45	0.34	0.89	0.09	0.09
Anantapur	0.28	-0.06	0.36	0.01	0.03	0.20	0.05	0.35
Arjia	-0.59	-0.41	-0.90	-0.80	-0.95	-1.21	-1.32	-1.39
Bangalore	-0.06	-0.41	0.15	1.15	0.17	0.34	0.03	0.05
Bhubaneswar	0.20	-0.05	0.46	0.38	0.41	0.49	0.30	0.27
Bijapur	-0.48	-0.02	-0.07	-0.30	-0.31	0.02	-0.57	-0.50
Dapoli	-0.17	-0.24	0.15	0.09	0.09	-0.01	-0.16	-0.10
Faizabad	-0.68	0.09	0.19	0.07	0.09	0.09	0.05	0.06
Hisar	-0.65	-0.07	0.37	0.52	0.56	0.41	-0.44	-0.56
Hyderabad	1.32	0.44	-5.39	2.49	2.52	1.86	1.43	1.81
Jabalpur	-0.31	-0.15	-0.04	-0.24	-0.99	-0.10	-0.43	-0.31
Jodhpur	0.55	0.36	1.56	1.75	1.78	1.37	0.85	0.86
Jorhat	-0.09	0.15	0.08	-0.04	-0.03	0.21	-0.18	-0.11
Kanpur	0.23	0.05	-0.27	-0.17	0.28	-0.19	0.22	0.25
Kovilpatti	0.51	-0.22	-0.17	0.06	0.15	0.13	0.62	0.64
Ludhiana	-0.21	-0.01	0.19	0.27	0.25	0.07	0.07	0.15
Mohanpur	-0.57	-0.82	-0.59	-0.42	-0.41	-0.66	-0.67	-0.49
Palampur	0.10	1.12	-0.09	1.28	1.14	0.14	-0.09	-0.01
Parbhani	-0.60	-0.24	-0.06	0.14	0.27	-0.18	-1.66	-0.06
Raipur	0.03	0.10	0.20	0.14	0.14	0.28	-0.13	0.04
Rakh Dhiansar	0.14	-0.02	-0.03	0.01	0.02	0.06	0.08	-0.32
Ranchi	-0.23	-0.02	-0.49	0.20	-0.80	-0.71	-0.25	-0.20
Ranichauri	0.07	-0.14	-0.03	0.61	0.60	-0.01	-0.01	0.06
Samastipur	0.04	0.10	-0.40	0.21	0.25	-0.24	0.14	0.11
Solapur	0.19	0.02	0.75	0.25	0.77	0.76	0.58	0.54
Thrissur	-0.03	0.01	0.09	0.16	0.16	0.21	-0.14	0.01
Udaipur	-0.27	-0.76	0.28	0.44	0.42	-0.74	-0.29	-0.63
Varanasi	-0.57	-0.39	-0.75	0.37	-0.06	-0.51	-0.49	-0.51
Average	-0.13	-0.04	-0.15	0.31	0.24	0.11	-0.06	0.04

8 (b) : Root Mean Square Error (RMSE) in estimating PET after employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	2.04	0.39	1.95	1.59	1.50	1.76	1.15	1.60
Anand	0.82	0.30	0.95	1.02	0.98	1.14	0.78	0.97
Anantapur	0.78	0.19	0.67	0.76	0.76	0.72	0.84	0.87
Arjia	1.46	1.16	2.42	3.14	3.06	3.55	2.52	2.84
Bangalore	0.36	0.42	0.35	1.22	0.44	0.53	0.33	0.36
Bhubaneswar	0.73	0.26	0.86	0.81	0.84	0.96	0.78	0.82
Bijapur	0.75	0.15	0.52	0.62	0.62	0.61	0.82	0.80
Dapoli	0.38	0.27	0.33	0.39	0.39	0.30	0.38	0.37
Faizabad	1.36	0.21	0.99	0.99	0.98	1.13	1.14	1.15
Hisar	1.00	0.24	0.98	1.04	0.98	1.29	0.99	1.06
Hyderabad	2.14	0.78	2.97	3.18	3.20	2.32	2.21	2.74
Jabalpur	0.42	0.17	0.23	0.37	1.03	0.54	0.51	0.42
Jodhpur	1.10	0.87	2.70	3.26	2.98	3.18	1.49	1.43
Jorhat	0.41	0.17	0.28	0.37	0.37	0.37	0.45	0.44
Kanpur	0.75	0.23	0.99	0.76	0.80	1.00	0.79	0.83
Kovilpatti	0.71	0.25	0.60	0.62	0.66	0.29	0.78	0.83
Ludhiana	0.39	0.10	0.35	0.43	0.43	0.37	0.32	0.37
Mohanpur	1.02	0.87	0.90	0.77	0.81	0.77	1.07	0.99
Palampur	0.80	1.15	0.55	1.47	1.34	0.37	0.85	0.86
Parbhani	0.89	0.24	0.09	0.19	0.31	0.22	1.75	0.71
Raipur	0.37	0.16	0.42	0.48	0.45	0.58	0.35	0.36
Rakh Dhiansar	0.30	0.08	0.19	0.24	0.22	0.32	0.29	0.39
Ranchi	0.92	0.20	0.72	0.69	1.02	0.80	0.92	0.95
Ranichauri	0.53	0.18	0.49	0.95	0.92	0.26	0.54	0.59
Samastipur	0.70	0.17	0.88	0.73	0.76	0.52	0.76	0.76
Solapur	0.56	0.20	1.18	0.84	1.11	1.15	0.84	0.86
Thrissur	0.60	0.09	0.46	0.53	0.54	0.27	0.59	0.61
Udaipur	0.61	0.86	1.00	0.78	0.80	1.17	0.62	0.87
Varanasi	1.16	0.72	1.32	1.21	1.13	1.40	1.09	1.19
Average	0.83	0.38	0.91	1.02	1.02	0.96	0.90	0.93

8 (c) : Mean Percentage Error (MPE) in estimating PET after employing calibration coefficients

Station	Open Pan	Penman	Hargr-eaves	Turc	Thornth-waite	Blaney-Criddle	Christiansen Pan	PET from Open pan
Akola	28.69	6.28	26.79	23.23	22.23	27.79	19.74	28.16
Anand	10.66	3.21	17.90	21.79	18.93	33.54	11.79	13.13
Anantapur	14.78	2.97	12.22	14.40	14.63	12.54	16.42	16.43
Arjia	43.3	93.2	72.8	175.9	170.0	57.8	53.4	50.3
Bangalore	6.41	9.86	7.25	28.36	8.82	11.70	6.30	6.93
Bhubaneswar	10.53	3.54	13.01	11.61	12.20	13.73	11.25	11.76
Bijapur	14.35	3.17	9.65	12.50	12.49	12.64	15.91	15.41
Dapoli	8.42	7.04	8.89	9.60	9.52	7.49	8.27	8.26
Faizabad	19.20	3.47	14.06	12.89	12.24	18.52	17.46	17.61
Hisar	14.15	3.71	15.81	17.22	16.57	21.64	14.18	14.71
Hyderabad	32.67	11.72	49.89	60.60	59.66	39.67	34.90	42.67
Jabalpur	11.51	5.24	6.46	9.98	11.66	15.30	15.11	11.55
Jodhpur	15.53	11.40	39.63	51.24	44.74	49.86	23.24	20.41
Jorhat	16.19	7.42	12.35	14.90	15.12	17.18	16.02	16.84
Kanpur	11.59	3.71	13.87	10.96	13.00	14.63	12.15	12.98
Kovilpatti	11.26	4.20	8.94	9.92	10.50	4.40	13.04	13.79
Ludhiana	11.61	4.30	10.67	15.07	15.05	12.62	11.12	13.15
Mohanpur	7.69	15.68	9.06	6.03	5.53	11.74	9.76	6.08
Palampur	9.92	22.66	11.36	34.40	37.96	8.74	20.18	21.22
Parbhani	8.18	3.39	1.23	1.98	3.99	2.59	23.35	8.91
Raipur	10.26	4.45	11.58	14.22	12.89	17.99	9.07	10.06
Rakh Dhiansar	26.94	5.17	12.74	19.84	15.11	26.37	25.44	25.32
Ranchi	16.75	3.18	13.55	13.01	19.75	15.50	16.45	17.53
Ranichauri	9.89	4.53	12.28	26.07	25.34	5.77	12.67	14.09
Samastipur	10.73	2.98	13.03	12.35	12.74	8.02	11.12	11.42
Solapur	7.73	2.64	17.34	11.42	15.87	16.55	12.62	12.90
Thrissur	14.98	2.27	12.76	14.75	15.00	7.65	13.99	15.77
Udaipur	8.48	15.71	17.13	12.76	12.77	16.49	9.00	11.76
Varanasi	68.85	66.94	70.87	58.66	63.38	68.18	68.00	68.24
Average	12.84	6.03	12.40	15.17	14.80	14.45	14.10	14.23


Weather
Station
2900ET