

Water requirements of major crops for different agro-climatic zones of Balochistan



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Published by:

The World Conservation Union (IUCN) Pakistan, Water Programme.



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Water requirements of major crops for different agro-climatic zones of Balochistan was prepared by the World Conservation Union (IUCN) Pakistan, Water Programme. It was supported by the Royal Netherlands Embassy (RNE).

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Citation:

Water requirements of major crops for different agro-climatic zones of Balochistan, IUCN, 2006. Water Programme, Balochistan Programme Office. vii+139 pp.

ISBN:

969-8141-85-5

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Printed:

Hamdard Packages (Pvt) Ltd. Karachi

Available from:

The World Conservation Union (IUCN), Pakistan
Water Programme, Balochistan Programme Office
Marker House, Zarghoon Road,
Quetta, Pakistan
Tel: ++92 81 2840450/51/52 Fax: ++92 81 2820706
Website: www.waterinfo.net.pk

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ACRONYMS AND ABBREVIATIONS

CWR	Crop Water Requirement(s)
Eo	Evaporation from open water surface
ET	Evapotranspiration
ETo	Reference crop evapotranspiration
FAO	Food and Agriculture Organization of United Nations
GoB	Government of Balochistan
ha	Hectare
Kc	Crop coefficient
m	Meter (s)
Mha	Million hectares
MINFAL	Ministry of Food, Agriculture, and Livestock, Government of Pakistan
mm	Millimeter
°C	Degrees Celsius
OFWM	On Farm Water Management
PARC	Pakistan Agricultural Research Council

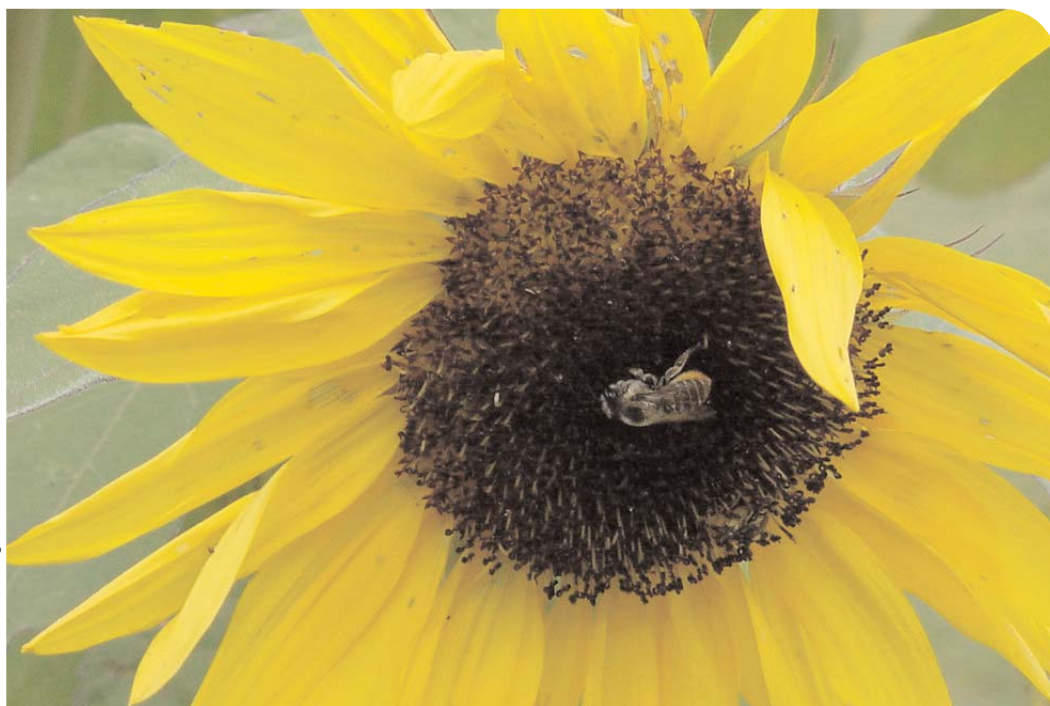
SUMMARY

Water resources of Balochistan, an arid province of Pakistan, are extremely scarce and limited. It is highly imperative that these resources be used most judiciously to ensure sustainable agriculture development and productivity. This, in turn requires knowledge of crop water requirements (CWR) in various agro-climatic zones of the province. Lack of this information often results in farmers over or under irrigating their fields with consequent loss in yields and production. Various agencies in the country have determined CWR values for the Indus Basin; however, for Balochistan the water requirements of various popular crops have not been estimated.

In this study, historical meteorological data such as maximum-minimum temperature, relative humidity, wind speed, sunshine hours and rainfall were collected from 15 stations in Balochistan for the last 44 years (1961-2004). CropWat 4 Windows Version 4.2 was used to determine reference evapotranspiration (ET_o) at different locations in the province. Isohyets, elevation, maximum, minimum temperatures, relative humidity, ET_o and rainfall contour maps were developed. Based on these maps, the province has been divided into seven zones.

Zone I includes Gwadar, Turbat, and Panjgur districts. Annual rainfall in this zone is very low and varies from 36-110 mm and increases with increase in altitude. Maximum rainfall occurs in the months from January to March (45 to 73%) and minimum during monsoon. Therefore, this zone is out of the monsoonal belt. The average ET_o is very high along the seashore (>10 mm/day) due to high wind speed and arid climate. The ET_o decreases with increase in altitude. The main crops grown are dates, wheat, onion, and fodder.

Zone II consists of Chagi and Kharan districts with annual rainfall varying from 30-160 mm. Maximum rainfall occurs in the months from January to March (30 to 50%). This zone is also outside the monsoonal belt. The average ET_o varies from 5.10 to 8.5 mm/day. The main crops grown are dates, wheat, and onion.



Zone III includes the districts of Lasbela and Awaran and southern part of Khuzdar district. The annual rainfall in this zone varies from 110-250 mm. About 20-30% rainfall occurs during the months from January to April and 40-60% during monsoon (July to August). Therefore, part of this zone is included in the monsoon belt. The average ETo varies from 5.5 to 6.25 mm/day. The main crops are wheat, cotton, onion and fodder.

Zone IV consists of Kalat and about northern tip of Khuzdar district. Average annual rainfall is between 90 to 200 mm and average ETo varies from 4.5 to 5.75 mm/day. The major crops grown are wheat, potato, onion, apple, and cherry.

Quetta, Pishin, Mastung, Qila Abdullah, Qila Saifullah (60% west) and Ziarat districts are included in Zone V. The rainfall varies from 200-280 mm/year. The maximum rainfall occurs in the months from January to April (70%) and is out of the monsoonal belt. The average ETo varies from 5.50 to 6.50 mm/day. The main crops are grapes, apple, apricot, cherry, pomegranate, wheat, potato, onion, and sunflower.

Zone VI consists of the northern part of the province. The districts included in this zone are Musakhel, Loralai, Kohlu, Barkhan, Zhob and Qila Saifullah (40% east). The average rainfall varies from 200-400 mm/year. In Zhob about 42% rainfall occurs during the months from January to April and about 36% during July and August. In Barkhan, about 56% rainfall occurs during the months from June to August and only 15% during the months from January to April. Therefore, most part of this zone is included in the monsoonal belt. The average annual ETo varies from 4.75 to 5.5 mm/day. Part of this zone i.e. Barkhan receives yearly rainfall up to 398 mm and ETo is the minimum (4.73 mm/day). The main crops of the zone are wheat, cotton, pulses, almonds, apricot, cherry, and pomegranate.

Table I

CWR of various crops grown in Balochistan

Crops	Zones	Main growing Areas	ETo (mm)	CWR (mm)
Wheat	All zones	Except Gwadar, all Balochistan	338-1,013	255-777
Cotton	III, IV, VI, VII	Nasirabad, Loralai, Khuzdar, Sibi, Lasbela	984-1,341	757-1,025
Potato	IV, V, VI, VII	Qila Saifullah, Kalat, Quetta, Pishin	784-1,270	505-825
Onion	All zones	Chagi, Kharan, Khuzdar, Qila Saifullah, Mastung, Lasbela, Nasirabad	770-1,852	434-1,037
Sunflower	IV, V, VI, VII	Mastung, Qila Abdullah, , Loralai, Nasirabad	651-964	560-842
Grapes	All zones except Zone I	Chagi, Kalat, Sibi, Mastung, Qila Abdullah, Qila Saifullah, Quetta, Zhob	1,258-2,636	566-1,209
Dates	I, II, III, VII	Turbat, Gwadar, Chagi, Kharan, Khuzdar, Lasbela	2,001-3,932	920-1,809
Apple/Cherry	IV, V, VI, VII	Pashin, Mastung, Kalat, Sibi, Khuzdar, Quetta, Qila Abdullah, Qila Saifullah, Loralai, Ziarat, Zhob	1,326-2,125	719-1,204
Apricot/Almond	IV, V, VI, VII	Mastung, Kalat, Sibi, Khuzdar, Quetta, Qila Abdullah, Qila Saifullah, Loralai, Ziarat, Zhob	1,326-2,125	708-1,075
Pomegranate	II, IV, V, VI	Chagi, Kharan, Sibi, Khuzdar, Qila Abdullah, Qila Saifullah, Loralai, Zhob	1,326-2,617	740-1,353
Pulses	III, IV, VI, VII	Nasirabad, Khuzdar, Sibi, Qila Saifullah, Loralai, Lasbela	270-405	203-321
Alfalfa	All zones except Zone III	Turbat, Chagi, Kharan, Lasbela, Khuzdar, Sibi, Nasirabad, Zhob	742-2,031	601-1,675
Maize	III, IV, VI, VII	Nasirabad, Lasbela, Khuzdar, Sibi, Zhob	756-1,080	657-925

Zone VII includes districts of Khuzdar (70% east), Jhal Magsi, Nasirabad, Jaffarabad, Bolan, Sibi and Dera Bugti. Most part of this zone is canal irrigated and is in the monsoonal belt. Annual average rainfall varies from 180 mm in the south to 400 mm in the north. The ETo varies from 4.75 to 6.08 mm/day. The major crops grown are wheat, cotton, onion, rice, sunflower, pulses, fodder and dates.

CWR of various crops grown in the province was determined from ETo using crop coefficient of each crop. CWR of wheat varies from 255-777 mm. It is grown throughout the province except in Gwadar and Turbat where CWR is very high. The CWR of cotton varies from 757 to 1,025 mm. It is mainly grown in Zones IV, V, VII and VIII. Potato and onion are relatively short duration but high delta crops. In Quetta, CWR of potato is 38% higher than in Kalat. Therefore, potato is not recommended for cultivation in Quetta. Onion is grown all over the province. Its CWR varies from 434 to 1,037 mm. In Zone I, the CWR of onion and as such may not be grown in this zone. The CWR of sunflower varies from 560 to 842 mm. Kalat and Zone VI are more appropriate for sunflower growing.

Grapes are grown mainly in Zone V and its CWR varies from 566 to 1,209 mm. Dates are the major fruit crop of the southern part of the province and are grown in Zone I and to some extent in Zone VI. The seasonal CWR of dates is very high generally more than 900 mm whereas it is more than 1,800 mm in Turbat. Apple/cherry crop is mostly grown in Pishin, Mastung, Kalat, Sibi, Khuzdar, Quetta, Qila Saifullah, Qila Abdullah, Loralai, Ziarat and Zhob. The CWR of apple/cherry varies from 853 to 1,393 mm and decreases with increase in altitude and rainfall.

Apricot/almonds are mainly grown in Kalat, Loralai, Qila Saifullah, Mastung, Quetta, Khuzdar, Qila Abdullah, Ziarat, Pishin, and Zhob. The CWR of apricot/almonds varies from 854 to 1,393 mm and that of pomegranate from 854 to 1,636 mm.

Pulses are mainly grown in Nasirabad, Khuzdar, Sibi, Qila Saifullah, Loralai and Lasbela (Zones III and VI & VII). Its CWR varies from 203 to 321 mm. The CWR of alfalfa (Lucerne) varies from 601-1,675 mm and is very high in Zone I. Therefore, it is not recommended for cultivation in Zone I. The CWR of maize varies from 657-925 mm and it is not recommended to be grown in the province except in the northern part where rainfall is sufficient during the growing period. Table I provides the summary of the CWR in various zones.

1. BACKGROUND

Surface water in Balochistan comes from precipitation in the form of surface runoff and its share of water from the Indus River. However, high spatial and temporal variations in rainfall and lack of perennial streams make groundwater extracted through dug-wells, tubewells, springs and *Karezes*, the main dependable source of water for irrigating orchards and other cash crops besides domestic and industrial uses. Due to continuous increase in population, the water demand and utilization have increased significantly. Rainfall is a limited source for productive agriculture in the province. The 44 year mean annual rainfall in Quetta valley is 247 mm whereas the average annual potential evapotranspiration is 2,400 mm. With assumed Kc value of 0.5, the crop water requirement would be 1,200 mm which is about 5 times more than the rainfall (if 100% rainfall is assumed as effective rainfall). Therefore, this shortfall is being met from the groundwater causing a continuous water table drop of more than 6 meters per year in some areas.

Sustainable groundwater management requires that there should be balance between recharge and abstraction. This can be achieved through: (i) increased/enhanced recharge to the groundwater through rainwater harvesting and artificial groundwater techniques, and (ii) reduced abstraction rate from the aquifers by reducing demands. In Balochistan case, to achieve the goals of sustainable groundwater management, an integrated approach would have to be realized. This can best be accomplished through innovative recharge techniques and adopting high efficiency irrigation systems.

Fruits are the major produce of Balochistan being cultivated on an area of 0.221 Million Hectares (Mha). The water required to raise these orchards is of the order of 1.168 Million Acre Feet (MAF) as shown in Table 1. This requirement is mostly being met from groundwater sources. Almost all farmers use basin irrigation to apply water to their crops which results in huge loss of water. For

Table 1: Water Requirement for Fruit Trees in Balochistan

Fruits	Area (ha)	Annual Water Requirement (mm)	Production (Tonnes)	Water Requirement (MAF)
<i>Almonds</i>	9,800	350	20,800	0.028
<i>Apple</i>	101,500	625	223,800	0.514
<i>Apricot</i>	26,200	450	187,700	0.095
<i>Banana</i>	1,400	1,700	23,000	0.019
<i>Citrus</i>	1,300	1,050	5,900	0.011
<i>Dates</i>	42,300	1,100	224,900	0.377
<i>Grapes</i>	12,600	350	48,400	0.036
<i>Guava</i>	600	625	2,600	0.003
<i>Mango</i>	1,400	625	6,600	0.007
<i>Peach</i>	9,400	450	18,500	0.034
<i>Pears</i>	100	400	500	0.000
<i>Plums</i>	3,700	450	26,400	0.013
<i>Pomegranate</i>	10,700	350	36,100	0.030
Total	221,000		825,200	1.168

Source: Agriculture Statistics of Pakistan (MINFAL, 2004) and Irrigation Agronomy-VI (OFWM).

example, farmers use over 2,400 mm of water for irrigating apple against the actual water requirement of less than 1,200 mm. People normally over irrigate the fields due to lack of knowledge about correct irrigation scheduling, a procedure used to determine the time and depth of water application for each irrigation event. For proper irrigation scheduling, knowledge of crop water requirement is essential.

Crop water requirement is defined as the depth of water needed to meet the water losses through evapotranspiration (ET) of a disease free crop, growing in large fields under non restricting soil conditions including soil water and fertility while achieving full production potential under the given growing environment. Evapotranspiration is important to evaluate the irrigation potentialities of various agricultural zones and helps improve the practices of water management and crop production. Some agencies have determined the crop water requirements of major crops in Pakistan particularly, in Punjab and Sindh (Clyma, 1973; PARC 1982; PARC, 1993; Ahmad, 1985a,b; Ali et al., 1973; Hussain, 1970; Kahlown et al., 2005). However, for Balochistan, crop water requirements have not been determined. The objectives of this study are to:

- (i) Identify different agro-climatic zones in Balochistan; and
- (ii) Determine crop water requirements of major crops and fruit trees in the identified agro-climatic zones.

2. METHODOLOGY

Due to difficulty in obtaining accurate field measurements, the prediction methods are applied to determine ET. The ET can be estimated using historical, meteorological and cropping conditions. The accuracy of ET estimates depends on the availability of equations being used to describe the physical processes governing the losses and the accuracy of the meteorological and cropping data. The choice of method primarily depends on the type of climatic data available and on the accuracy required in determining the water needs. There are four methods generally used to determine reference crop evapotranspiration (ET_o). These are: (i) Blaney Criddle, (ii) Radiation, (iii) Penman, and (iv) Pan Evaporation methods.

Since no field data were available in Balochistan, crop water requirements were determined by using Modified-Penman equation. The Modified-Penman method offers the best results with minimum possible errors of $\pm 10\%$ in summer and up to 20% under low evaporative conditions (FAO, 1977). For areas such as Balochistan, where measured data on temperature, humidity, wind and sunshine duration or radiation are available, an adaptation of the Penman method provides the most reasonable results. The original Penman equation predicts evaporation losses from an open water surface (E_o). Experimentally determined crop coefficients are used to determine ET of crops. The Penman equation consists of two terms; the energy (radiation) term and the aerodynamic (wind and humidity) term. The relative importance of each term varies with climatic conditions. Under calm weather conditions, the aerodynamic term is usually less important than the energy term. In such conditions, the original Penman E_o equation using a crop coefficient of 0.8 has been shown to predict ET_o closely, not only in cool, humid regions as in England but also in very hot, and semi-arid regions. It is under windy conditions and particularly in the more arid regions that the aerodynamic term becomes relatively more important and thus errors can result in predicting ET_o when using 0.8 E_o. A modified Penman equation therefore, was used to determine ET_o, involving a revised wind function term. The method uses daily temperature, humidity, sunshine hours and wind data. The ET_o for different agro-climatic zones was calculated using CropWat 4 Windows Version 4.2. CropWat uses the Penman-Monteith methods for calculating reference crop evapotranspiration (FAO, 1992).

2.1 Data Requirements

The following data of the different agro-climatic zones of Balochistan were collected from 15 meteorological stations (Figures 1 & 2) installed in Balochistan (average data of 44 years from 1961-2004) from Pakistan Meteorological Department (on daily basis) and were used as input for the calculation of ETo.

- Maximum-minimum temperature
- Relative humidity
- Wind speed
- Sunshine hours.

The rainfall data were also collected for the same period to determine agro-climatic zones and also to calculate irrigation water requirements. Isohyets, elevation, maximum, minimum temperatures, relative humidity, ETo and rainfall contour maps were developed using Surfer (Win32) version 6.04. The metrological data alongwith the calculated ETo are given as Annexes I & II.

Table 2:

Salient features of the crops studied

Crop	Botanical Name	Sowing Time	Harvesting Time	Root Depth (m)	Time of leaves shading/pruning
Wheat	<i>Triticum aestivum</i>	Mid November	April-May	0.9-1.5	-
Cotton	<i>Gossypium SPP</i>	April-June	October-November	0.9-1.5	-
Potato	<i>Solanum Tuberosum</i>	March-April	Sep-Nov	0.3-0.6	-
Onion	<i>Allium cepa</i>	October, March-April	January-February May-June	0.3-0.6	-
Sunflower	<i>Helian Thusannuus L.</i>	January-February	May-June	0.5-1	-
Grapes	<i>Vitis vinifera</i>	March	July-August	1-1.5	October-November
Dates	<i>Phoenix dactylifera</i>	February-March	August-October	1.5-2.5	-
Apple	<i>Pyrus malus</i>	February-March	September-October	2-2.5	October-November
Cherry	<i>Prunus avium</i>	February-March	June-July	2-2.5	October-November
Apricot	<i>Prunus armeniaca</i>	February-March	September-October	2-2.5	October-November
Almond	<i>Prunus amygdalus</i>	February-March	September-October	2-2.5	October-November
Berseem	<i>Trifolium alexandrinum L.</i>	September-October	50-60 days after sowing	0.5-1	-
Maize	<i>Zea mays L.</i>	March-April	September-October	0.9-1.5	-

Source: OFWM (1997).

Figure 1:**Map of Balochistan showing District Boundary**

2.2 Crop Water Requirements

The crop water requirements (CWR) of various crops were calculated using CropWat 4 Windows Version 4.2. Relevant crop coefficients (K_c) were used to calculate CWR from ETo . These coefficients present the relationship between references (ETo) and crop evapotranspiration (ET_{crop}) or $ET_{crop} = K_c * ETo$. Value of K_c varies with the crop, its stage of growth, growing season and the prevailing weather conditions. ET_{crop} or CWR can be determined in mm per day as mean over the 30 or 10-day periods. However, in this study, CWR was determined over 10-day periods. The covered area (canopy cover) was assumed as 100% for wheat, sunflower, maize, alfalfa (Lucerne), berseem, pulses; 90% for cotton; 70% for apple/cherry, apricot/almonds, onion, and potato; 50% for dates; and, 50% for grapes (FAO, 1977). The planting dates and length of growing season were taken from OFWM (1997). The CWR for deciduous trees were calculated for mature trees and the planting dates for deciduous trees were assumed to be the sprouting stage. The K_c values were taken from FAO (1998). The CWR were calculated for the districts for which climatic data were available and were applied to the nearest districts. The effective rainfall was calculated with CropWat by using USDA Soil Conservation Method. The detailed CWR and crop coefficients for various crops at different stages are given in Annex III. Table 2 shows the salient features of the main crops of the province.

3. RESULTS AND DISCUSSION

The isohyets, contour maps of elevation, climatic data and ETo were developed (Figures 3-8). Based on these maps, Balochistan has been divided into seven zones. Table 3 and Figure 9 show the zones of the province.

3.1 Agro-Climatic Zones of Balochistan

3.1.1 Zone I

Zone I starts from the Gwadar port and its altitude varies from 5-900 m. Annual rainfall is very low and varies from 36-110 mm and increases with increase in altitude. Maximum rainfall occurs in the months from January to March (45 to 73%) and minimum in the period July to September. Therefore, this zone is out of the monsoonal belt. The average minimum temperature varies from 15.5-21 °C and the maximum temperature varies from 27-36.5 °C. The average ETo is very high along the seashore (>10 mm/day) due to high wind speed and arid climate. The ETo decreases with increase in altitude. Gwadar, Turbat and Panjgur districts are included in this zone. There are maximum number of meteorological stations in this zone i.e. Jiwani, Gwadar, Pasni, Ormara, Turbat, and Panjgur. The main crops grown are dates, wheat, onion, and fodder.

3.1.2 Zone II

Zone II consists of Chagai and Kharan districts. Its altitude varies from 700-1,600 m and annual rainfall varies from 30-160 mm. Maximum rainfall occurs in the months from January to March (30 to 50%). This zone is also outside the monsoonal belt. Average minimum temperature varies from 9-17 °C and the maximum temperature from 26-32.5 °C. The average ETo varies from 5.1 to 8.5 mm/day. The main crops grown are dates, wheat, and onion.

Table 3: Different Agro-Climatic Zones of Balochistan

Zone	Districts	Elevation (m)	Ave. Rain (mm)	Ave. Max Temp (°C)	Ave. Min Temp (°C)	Ave. ETo (mm/day)	Major crops
I	Gwadar, Turbat, Panjgur	5-900	36-110	27.0-36.5	15.5-21	6.75-10.5	Dates, wheat, onion, fodder
II	Chagai, Kharan	700-1600	30-160	26.0-32.5	9.0-17	5.10-8.5	Dates, wheat, onion
III	Lasbela, Awaran	5-900	110-250	31.0-36.0	15-20	5.5-6.25	Wheat, cotton, onion, fodder
IV	Kalat, Khuzdar (30% West)	400-1900	90-200	22.5-33.50	7-17	4.5-5.75	Wheat, potato, onion, cherry, apple
V	Quetta, Pishin, Mastung, Qila Abdullah, Qila Saifullah (60% West), Ziarat	700-1600	200-280	24.0-31.5	8-15	5.5-6.5	Grapes, apple, apricot, cherry, pomegranate, potato, onion, sunflower
VI	Musakhel, Loralai, Kholu, Barkhan, Zhob, Qila Saifullah (40% East)	750-1500	200-400	26.0-31.5	11-15.5	4.75-5.50	Wheat, cotton, pulses, almond, apricot, cherr, pomegranate
VII	Khuzdar (70% east), Jhal Magsi, Nasirabad, Jaffarabad, Bolan, Sibi, Dera Bugti	300-1200	180-400	26.5-35.5	14-19	4.75-6.08	Wheat, cotton, onion, sunflower, rice, pulses, fodder, dates

Figure 2: Climatic Stations in Balochistan

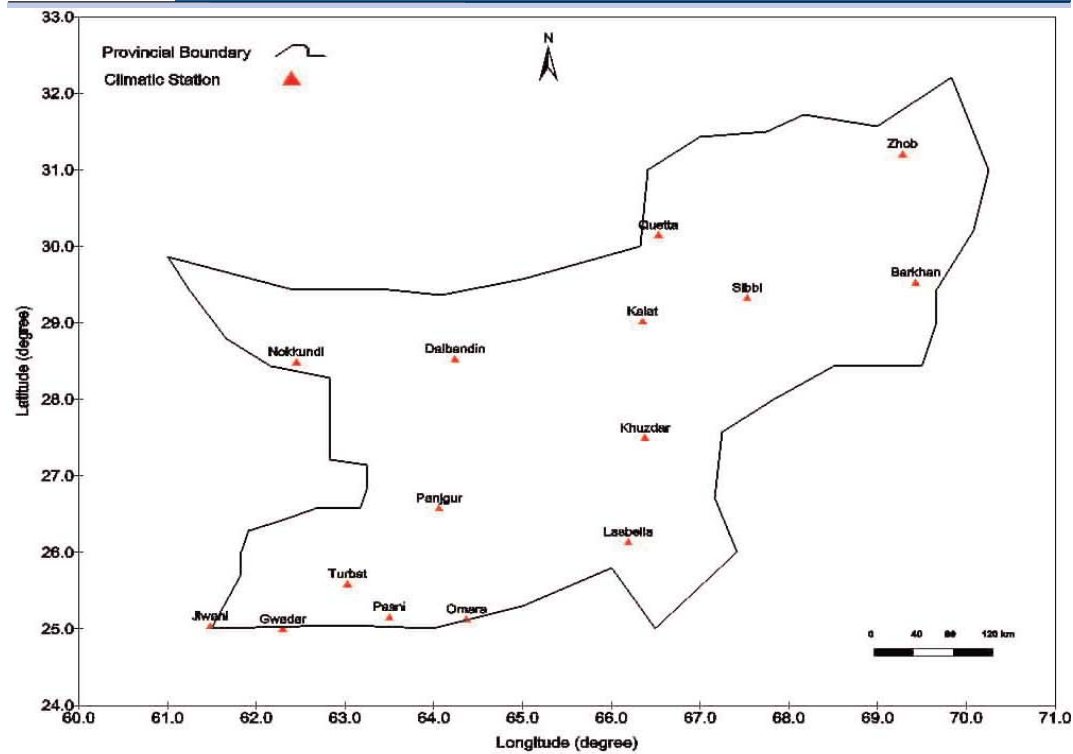


Figure 3: Isohyetal Map of Balochistan

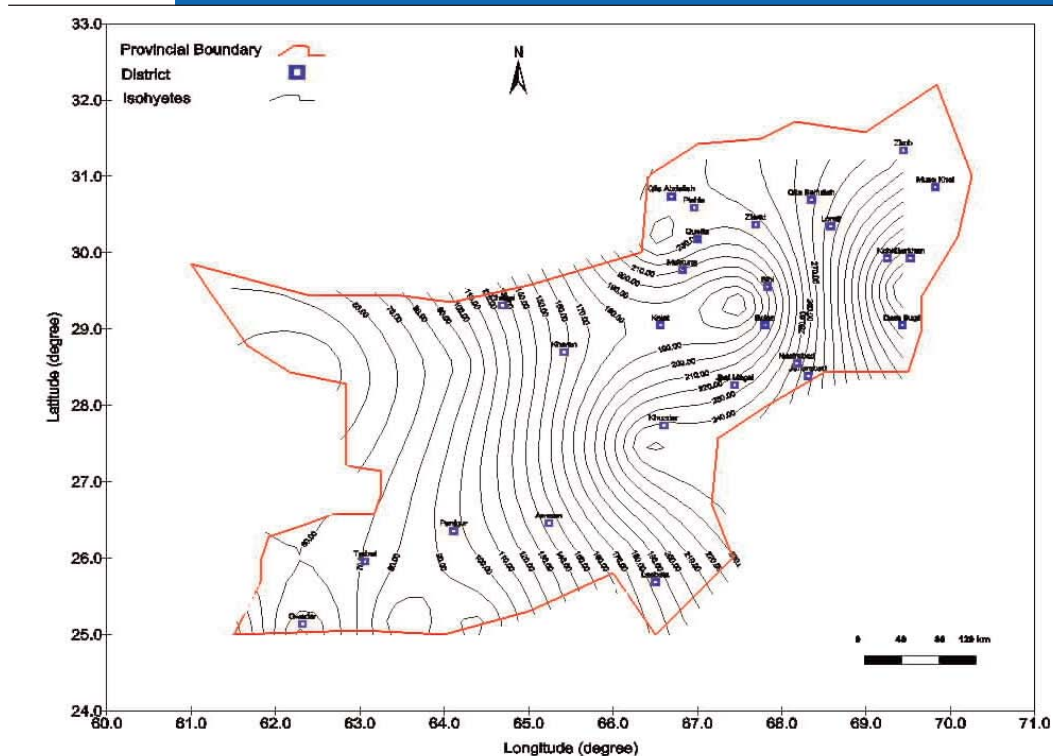


Figure 4: Elevation Map of Balochistan

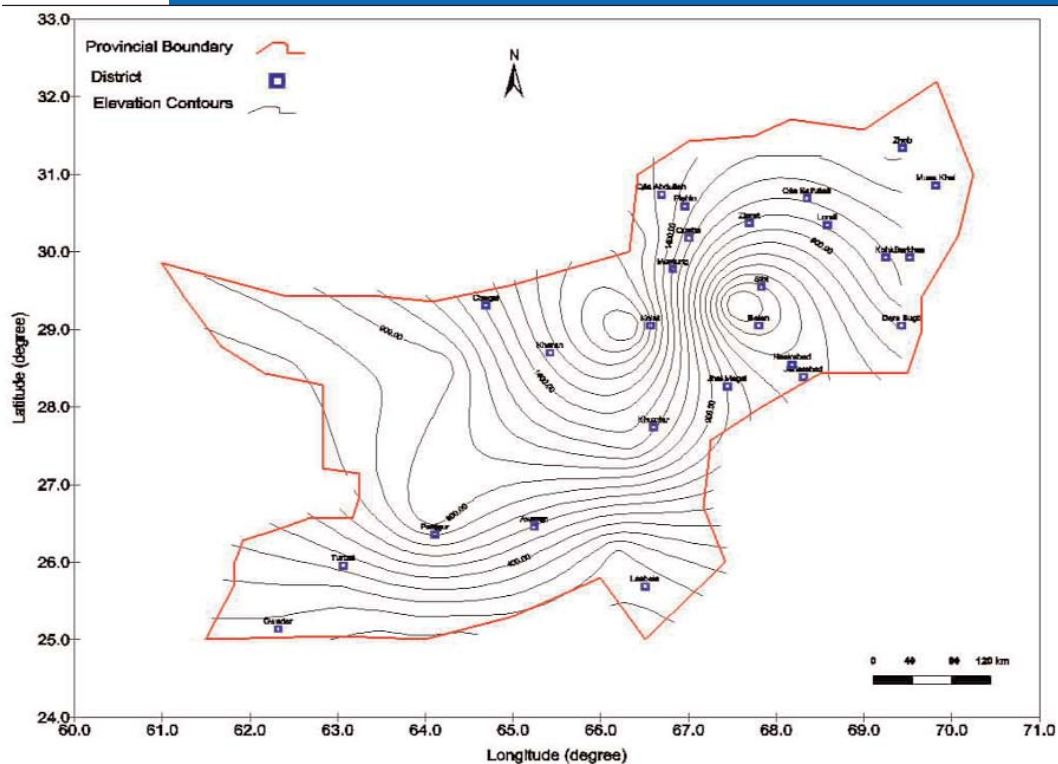


Figure 5: Mean Maximum Temperature in Balochistan

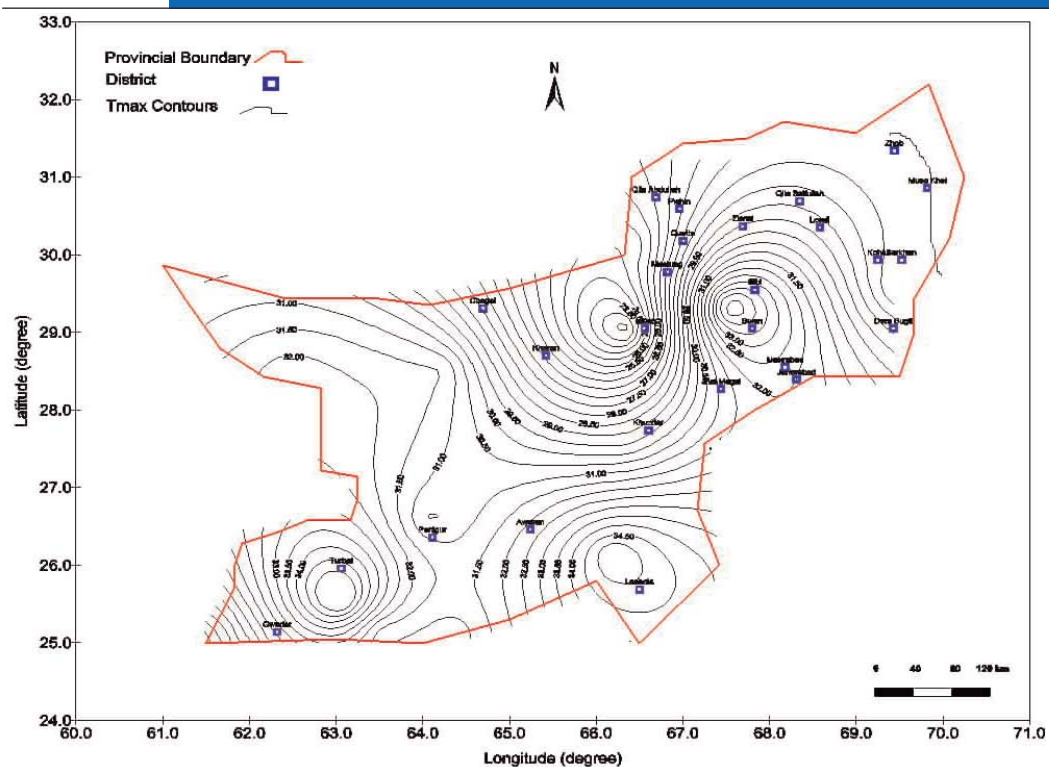


Figure 6: Mean Minimum Temperature in Balochistan

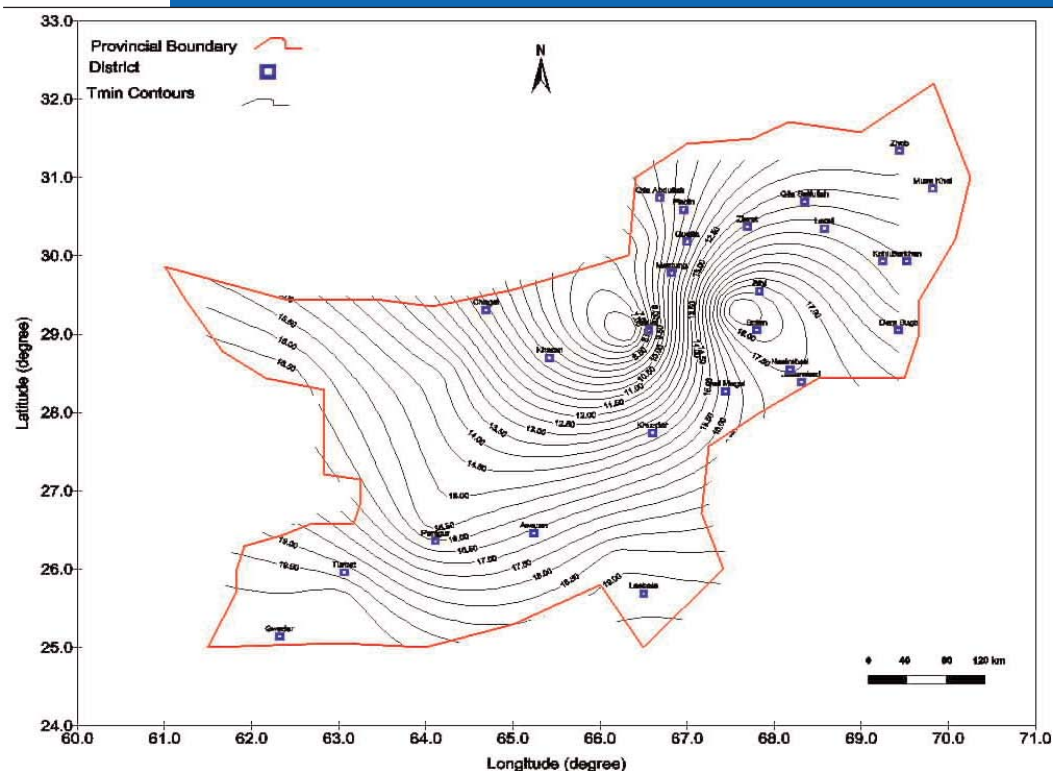
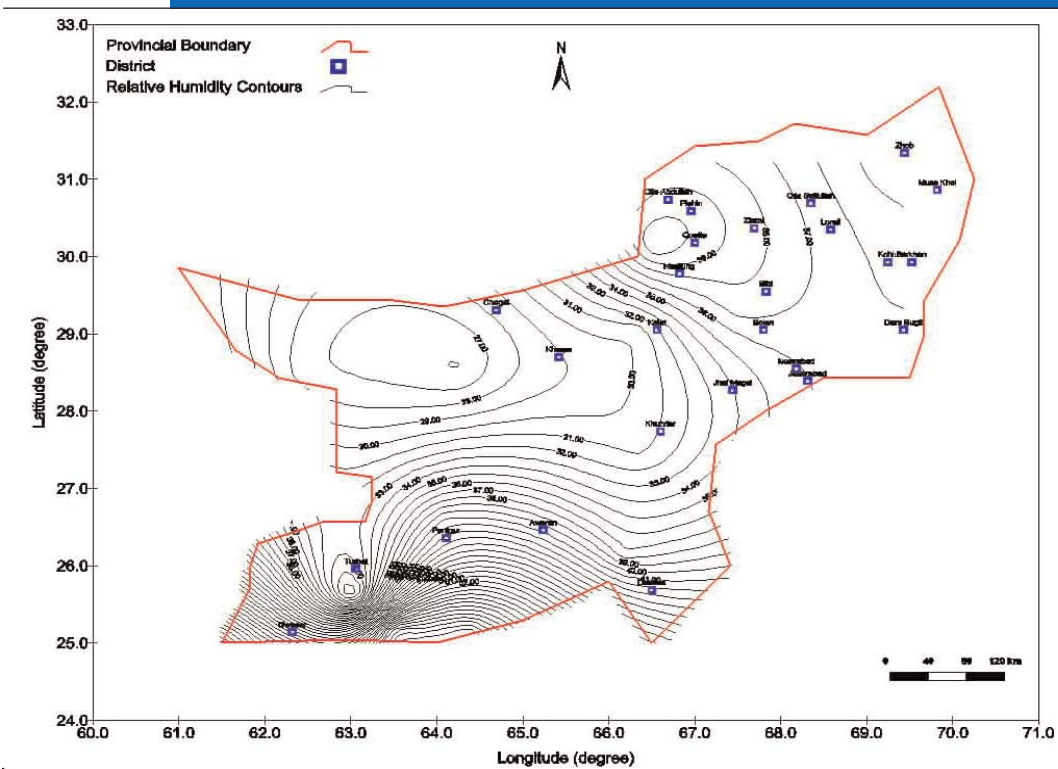


Figure 7: Humidity Map of Balochistan



3.1.3 Zone III

Zone III includes districts of Lasbela and Awaran. The average elevation varies from 5-900 m and the annual rainfall varies from 110-250 mm. About 20-30% rainfall occurs during the months from January to April and 40-60% during monsoon (July to August). Therefore, part of this zone, particularly near the boundary with Sindh, is included in the monsoonal belt. The average ETo varies from 5.5 to 6.25 mm/day. The minimum temperature varies from 15-20 °C and the maximum temperature from 31 to 36 °C. In this zone, only district Lasbela is canal irrigated. The main crops are wheat, cotton, onion, and fodder.

3.1.4 Zone IV

Zone IV consists of Kalat and about 30% of Khuzdar district. Average elevation varies from 400-1900 m. Average annual rainfall is between 90 to 200 mm and average ETo varies from 4.5 to 5.75 mm/day. Minimum temperature varies from 7-17 °C and the maximum temperature from 22.5-33.5 °C. The major crops grown are wheat, potato, onion, apple and cherry.

3.1.5 Zone V

Quetta, Pishin, Mastung, Qila Abdullah, Qila Saifullah (60%), and Ziarat are included in Zone V. The elevation varies from 700-1600 m from the mean sea level (msl) and the rainfall varies from 200-280 mm/year. The maximum rainfall occurs in the months from January to April (70%) and is out of the monsoonal belt. The average ETo varies from 5.50 to 6.50 mm/day. There is only one climatic station i.e. Quetta in this zone. The average minimum temperature varies from 8-15 °C and the maximum temperature varies from 24-31.5 °C. The main crops are grapes, apple, apricot, cherry, pomegranate, wheat, potato, onion, and sunflower.

3.1.6 Zone VI

Zone VI consists of northern part of the province. The districts included in this zone are Musakhel, Loralai, Kohlu, Barkhan and Zhob. The average elevation varies from 750-1500 m and the average rainfall varies from 200-400 mm/year. In Zhob about 42% rainfall occurs during the months from January to April and about 36% during July and August. In Barkhan, about 56% rainfall occurs during the months from June to August and only 15% during the months from January to April. Therefore, most part of this zone particularly towards the border with Punjab is included in the monsoonal belt. The average minimum temperature varies from 11-15.5 °C and the maximum temperature varies from 26-31.5 °C. The average annual ETo varies from 4.75 to 5.5 mm/day. Part of this zone i.e. Barkhan receives maximum yearly rainfall up to 398 mm and ETo is the minimum (4.73 mm/day). The main crops of the zone are wheat, cotton, pulses, almonds, apricot, cherry, and pomegranate.

3.1.7 Zone VII

Zone VII includes districts of Khuzdar (70%), Jhal Magsi, Nasirabad, Jaffarabad, Bolan, Sibi and Dera Bugti. The altitude varies from 300-1200 m. Most part of this zone is canal irrigated and is in the monsoonal belt. Annual average rainfall varies from 180 mm in the south to 400 mm in the north. The average minimum temperature varies from 14-19 °C and the maximum temperature varies from 26-35.5 °C. The ETo varies from 4.75 to 6.08 mm/day. The major crops grown are wheat, cotton, onion, rice, sunflower, pulses, fodder, and dates.

3.2 Crop Water Requirements (CWR)

As mentioned in Section 2.2, CWR were determined for the areas for which the meteorological data were available. The same values may be adopted for other areas falling in that particular zone.

3.2.1 Wheat

Except Gwadar wheat is grown all over the province with varying cropped area. The total wheat grown area is 340,794 ha with production of 65,472 tonnes. Maximum area under wheat is in Nasirabad (153,757 ha), Loralai (37,643 ha), Khuzdar (36,496 ha), Kharan (16,900 ha) and Qila Saifullah (11,430 ha). CWR of wheat for various zones is given in Table 4.



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The potential water requirement for wheat varies from 255 mm to 777 mm whereas in the Indus basin it varies from 271 to 515 mm (Kaleemullah et al., 2001). In Gwadar and Turbat, the CWR of wheat is very high mainly due to high ETo. Therefore, it is not recommended to be grown in these districts.

Table 4:

CWR of Wheat

Zone	Area	ETo (mm)	CWR (mm)
I	Gwadar, Turbat, Panjgur	818-1013	634-777
II	Chagi, Kharan, Dalbandin	431	327
III	Lasbela, Awaran	476	369
IV	Kalat, Khuzdar (west)	338-540	255-417
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	431	314
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	347-355	265-269
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	421-540	324-417

3.2.2 Cotton

Cotton is grown on an area of 40,432 ha with a production of 66,493 tonnes. It is mainly grown in Nasirabad (20,175 ha), Loralai (1,326 ha), Khuzdar, (7,121 ha), Sibi (2,104 ha) and Lasbela (4,625 ha). In Kalat and Khuzdar, the CWR of cotton is lower as compared to Lasbela and Sibi. The CWR of cotton is given in Table 5. The potential water requirement of cotton varies from 757 mm to 1,025 mm. However, in the Indus basin, it varies from 627 mm to 1,161 mm (Kaleemullah et al., 2001). The reason for higher potential requirement of cotton in Balochistan may be due to more arid climate than the Indus basin.

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Table 5: CWR of Cotton

Zone	Area	ETo (mm)	CWR (mm)
III	Lesbela, Awaran	1,276	971
IV	Kalat, Khuzdar (west)	984-1,341	757-1,025
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	1110-1,187	853-910
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1284-1,341	974-853

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3.2.3 Potato

The grown area of potato in Balochistan is 3,345 ha and production is 48,220 tonnes. It is mainly grown in Qila Saifullah (1,723 ha), Kalat (657 ha) and Pishin. Potato is also a high delta crop. In Quetta district, the CWR of potato is 38% higher than in Kalat (Table 6). Therefore, potato is not recommended to be grown in Quetta district.

Potato is normally grown on beds. However, these beds are not properly designed. The furrows are like ditches resulting huge water loss.



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Table 6: CWR of Potato

Zone	Area	ETo (mm)	CWR (mm)
IV	Kalat, Khuzdar (west)	784	505
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	1,082-1,270	686-825
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	895-971	577-626
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,069-1,082	686-691



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3.2.4 Onion

Onion is grown on an area of 17,957 ha with a production of 332,976 tonnes. It is mainly grown in Chagi (4,200 ha), Turbat (1,731 ha), Kalat (2,675 ha), Khuzdar (1,013 ha), Kharan (800), Qila Saifullah (783 ha), Nasirabad (1,000 ha), Mastung (3,529 ha), and Lasbela (250 ha). It is grown almost in all zones. Its CWR is given in Table 7. As can be seen, the water requirement of onion is very high and varies from 434 to 1,037 mm. It is not recommended for cultivation in Turbat, Nokundi, and Quetta areas.



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Table 7: CWR of Onions

Zone	Area	ETo (mm)	CWR (mm)
I	Gwadar, Turbat, Jiwani	825-1,852	471-1,037
II	Chagi, Kharan, Dalbandin, Nokundi	994-1,600	561-911
III	Lasbela, Awaran	1047	587
IV	Kalat, Khuzdar (west)	770-1,077	434-603
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	1,059-1,227	603-698
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	879-952	496-538
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,059-1,077	595-603



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3.2.5 Sunflower

The total area grown with sunflower is 6,154 ha and its production is about 6,708 tonnes. It is mostly grown in Mastung (1,125 ha), Qila Abdullah Loralai (409 ha) and Nasirabad (2,675 ha). Table 8 shows the CWR of sunflower. It varies from 560 to 842 mm and is in general agreement with the reported values i.e. 600-1,000 mm by OFWM (1997). Therefore, district Kalat and Zone VI seem to be more appropriate for sunflower growing.



Table 8: CWR of Sunflower

Zone	Area	ETo (mm)	CWR (mm)
IV	Kalat, Khuzdar (west)	651-961	560-818
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	909-964	784-842
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	737-788	637-684
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	909-961	784-818



3.2.6 Grapes

Grapes are grown on an area of 12,524 ha with a production of 49,529 tonnes. Grapes are grown mostly in Pishin district (area 8,225 ha, production 33,388 tonnes) followed by small areas in Chagi, Panjgur, Kalat, Sibi, Khuzdar, Mastung, Qila Abdullah, Qila Saifullah, Quetta, and Zhob districts. The CWR of grapes varies from 566-1,209 mm and is given in Table 9.



Table 9: CWR of Grapes

Zone	Area	ETo (mm)	CWR (mm)
II	Chagi, Kharan, Dalbandin, Nokundi	1,626-2,636	730-1,209
III	Lasbela, Awaran	1,539	692
IV	Kalat, Khuzdar (West)	1,258-1,753	566-778
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	2,026	928
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	1,423-1,524	642-689
VII	Khuzdar (East), Nasirabad, Jaffarabad, Bolan, Sibi	1,676-1,753	750-778



3.2.7 Dates

Dates are the major fruit crop of the southern part of the province and are grown on an area of 42,885 ha with a production of 237,678 tonnes. Turbat is famous for dates and occupies 24,260 ha. Panjgur is the 2nd major dates growing area (13,878 ha). Other areas include Gwadar, Chagi, Kharan, Khuzdar, Lasbela, and Sibi. Dates are evergreen fruit trees and retain their leaves in winter and cannot tolerate any frost (OFWM, 1997). The seasonal CWR of dates is very high generally more than 900 mm whereas it is more than 1800 mm in Turbat (Table 10). CWR of dates decreases with increase in altitude similar to ETo.

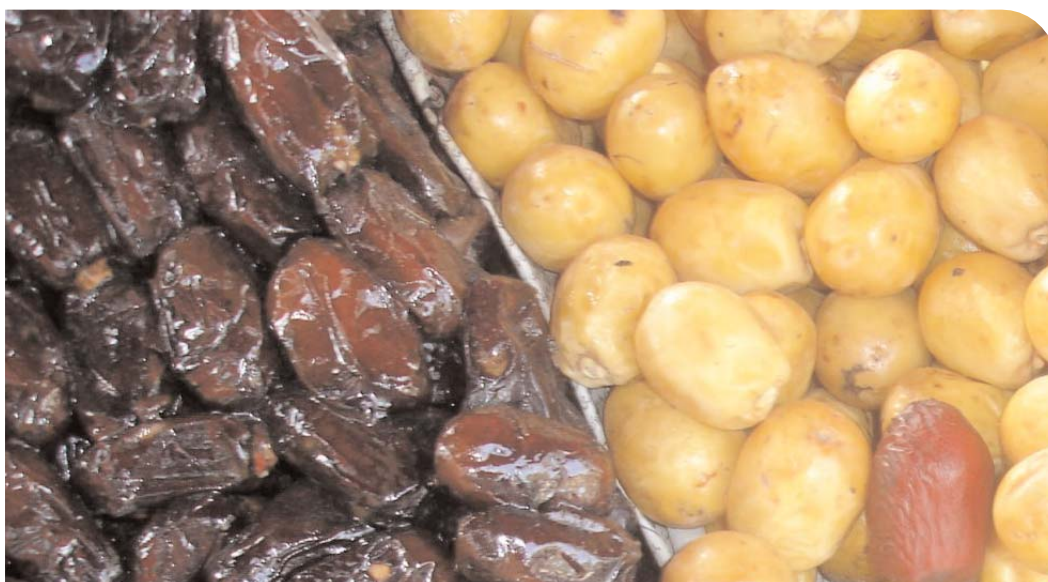


Table 10: CWR of Dates

Zone	Area	ETo (mm)	CWR (mm)
I	Gwadar, Turbat, Panjgur	2,293-3,932	1,055-1,809
II	Chagi, Kharan, Dalbandin	2,001	920
III	Lasbela, Awaran	2,092	961
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	2,041-2,229	936-1,025



3.2.8 Apple/Cherry

Apple is grown on an area of 38,042 ha, with a production of 201,577 tonnes (GoB, 2003). It is the most important fruit crop grown in the province. It is mostly grown in Pishin, Mastung, Kalat, Sibi, Khuzdar, Quetta. Qila Saifullah, Qila Abdullah, Loralai, Ziarat, and Zhob.

Cherry is grown on an area of 897 ha with a production of 1,507 tonnes. Main growing areas include Kalat, Mastung, Qila Saifullah, Loralai, Ziarat, and Quetta. Except Kalat, all these districts are included in Zone-V. These are deciduous fruit trees and require chilling (frost) to bear fruit (OFWM, 1997). FAO (1977) has given the same Kc values and length of time for both apple and cherry and for apricot and almonds. FAO (1998) also gives Kc values for apple and cherry together. Moreover, the discussions with the local departments also suggest almost the same period of sprouting and leaves falling stag for these crops. Therefore, CWR calculated for both the crops were almost the same. Literature reports almost the same values of CWR for apply and cherry (see for example OFWM, 1997). The crop water requirements of apple and cherry are given in Table 11. CWR of apple and cherry varies from 853 to 1,393 mm and decreases with increase in altitude and increase in rainfall.

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Table 11: CWR of Apple/Cherry

Zone	Area	ETo (mm)	CWR (mm)
IV	Kalat, Khuzdar (west)	1,327-1,854	853-1,176
V	Quetta, Pishin, Mastung, Qila Saifullah, Ziarat	2,125	1,393
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	1,493-1,588	961-1,026
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,751-1,854	1,119-1,176

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3.2.9 Apricot/Almonds

Almonds are grown on an area of 8,840 ha with a production of 20,073 tonnes. Almond is mainly grown in Loralai district with a total area of 4,783 ha and production of 12,577 tonnes (GoB, 2003). Other areas include: Zhob (1,638 ha), Qila Saifullah (1,034 ha), Kalat, Mastung, Khuzdar, Qila Abdullah, Ziarat, Pishin, and Zhob. The CWR of apricot and almonds varies from 854 to 1,393 mm. In Khuzdar and Quetta, the CWR is higher than at Kalat, Barkhan, and Zhob. The CWR of almonds/apricot is given in Table 12.

Apricot is grown on 11,507 ha with production of 104,930 tonnes. Apricot is mainly grown in Loralai (2,651 ha), Qila Saifullah (2,918 ha), and Zhob (1,882 ha). These are also deciduous trees but do not require much chilling (frost) but require heat to ripen the fruit (OFWM, 1997).



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Table 12: CWR of Apricot/Almonds

Zone	Area	ETo (mm)	CWR (mm)
IV	Kalat, Khuzdar (west)	1,327-1,854	854-1,176
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	2,126	1,393
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	1,493-1,588	962-1,026
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,751-1,854	1,119-1,176



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3.2.10 Pomegranate

It is grown on an area of 3,908 ha and its production is 68,910 tonnes. It is mainly grown in Khuzdar (Zone IV), Kharan, Chagi (Zone II), Qila Abdullah (Zone V), Qila Saifullah, Loralai, and Zhob (Zone VI). The CWR of pomegranate is given in Table 13.



Table 13:

CWR of Pomegranate

Zone	Area	ETo (mm)	CWR (mm)
II	Chagi, Kharan, Dalbandin, Nokundi	1,708-2,617	1,099-1,636
IV	Kalat, Khuzdar (west)	1,327-1,854	854-1,176
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	2,126	1,393
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	1,493-1,588	961-1,026
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,751-1,854	1,118-1,176



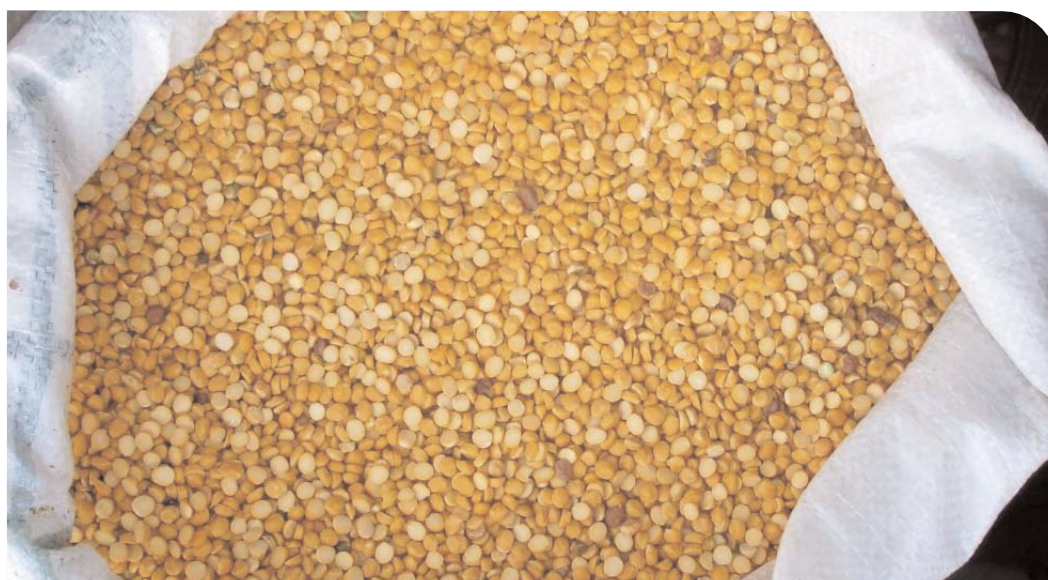
3.2.11 Pulses

The total area sown with pulses is 28,240 ha. About 79% (22,212 ha) are grown in Nasirabad. Other areas include: Khuzdar, Sibi, Qila Saifullah, Loralai, and Lasbela. The CWR of pulses varies from 203 to 321 mm and is shown in Table 14.



Table 14: CWR of Pulses

Zone	Area	ETo (mm)	CWR (mm)
III	Lesbela, Awaran	349	274
IV	Kalat, Khuzdar (west)	273-405	214-321
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	270-281	203-217
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	308-405	237-321



3.2.12 Fodder

The total area under fodder crops is 37,263 ha, out of which Nasirabad occupies 10,450 ha (28%), Khuzdar 6,872 ha (18%), Turbat 2,373 ha (6%) and Lasbela 1876 ha (5%). Jawar is mainly grown in Chagi, Turbat, Kharan and Lasbela. Alfalfa (lucerne) is grown in Turbat, Chagi, Nasirabad and maize in Nasirabad, Loralai, Khuzdar, and Lasbela. Shaftal is grown in Loralai, Qila Saifullah and Qila Abdullah whereas moth is grown only in Turbat. Guar is grown in Loralai and Panjgur and Berseem in Loralai, Nasirabad and Khuzdar (Table 15). The CWR of alfalfa was based on average cutting effects. It is very high (~1,600 mm) in Zone I whereas it is in the order of 650 mm in Zone VI (Table 16). Therefore, it is not recommended to be grown in Zone I. The Kc values for shafttal, guar, and moth were not available therefore, CWR of these crops could not be determined.

Table 15: Areas Grown with Fodder in the Province

Crops	Area (ha)	Districts
Jawar (<i>Sorghum bicolor</i>)	10,032	Chagi, Kharan, Lasbela, Turbat
Alfalfa (Lucerne) (<i>Medicago sativa</i>)	9,549	Turbat, Chagi, Nasirabad
Maize (<i>Zea mays</i> L.)	1,266	Loralai, Khuzdar Lasbela, Nasirabad
Shaftal (<i>Trifolium resupinatum</i>)	333	Loralai, Qila Saifullah, Qila Abdullah
Moth (<i>Phalaenopsis hybrids</i>)	120	Kech/Turbat
Guar (<i>Pongamia pinnata</i>)	167	Loralai, Panjgur
Barseem (<i>Trifolium alexandrinum</i> L.)	4,670	Loralai, Nasirabad, huzdar, Kharan

Source: GoB (2003).



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Table 16: CWR of Alfalfa

Zone	Area	ETo (mm)	CWR (mm)
i	Turbat	2,031	1,675
ii	Chagi, Kharan, Nokundi	1,365	1,085
IV	Kalat, Khuzdar (west)	742-1,127	601-924
V	Quetta, Pishin, Mastung, Qila Abdullah, Ziarat	1,049	833
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	806-821	650-657
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	957-1,127	774-924

3.2.13 Maize

Maize is mainly grown in zones III, IV, VI & VII. CWR of maize varies from 657 to 925 mm and is shown in Table 17. Due to high water requirements, maize is not recommended to be grown in the province except in the northern part where rainfall is sufficient during the growing period.



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Table 14: CWR of Maize

Zone	Area	ETo (mm)	CWR (mm)
III	Lesbela, Awaran	1,045	900
IV	Kalat, Khuzdar (west)	756-1,080	657-925
VI	Musakhel, Loralai, Barkhan, Zhob, Qila Saifullah	861-929	750-812
VII	Khuzdar (east), Nasirabad, Jaffarabad, Bolan, Sibi	1,048-1,080	909-925



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ANNEXURE-1

Monthly Climatological Data of Selected Stations (1961-2004)

Jiwani

Latitude: 25°.04' N
Altitude: 57 meter (s)

Longitude: 61°.48' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	24.2	13.7	54	304	8.3	4.25
Feb	25.3	15.0	57	333	9	4.86
Mar	28.5	18.2	61	409	7.8	5.85
Apr	31.9	21.5	62	450	9.2	7.18
May	34.2	24.7	66	439	9.7	7.54
Jun	34.2	26.6	72	460	8	6.77
Jul	32.4	26.5	73	440	5.7	5.80
Aug	31.1	25.5	75	423	5.2	5.17
Sep	31.4	24.1	73	342	6.6	5.13
Oct	32.6	21.6	64	330	8.5	5.72
Nov	29.7	17.9	57	297	9.5	5.03
Dec	26.0	14.9	56	257	7.7	3.93
Avg	30.1	20.8	64.2	373.4	7.9	5.60

Gwadar

Latitude: 25°.00' N
Altitude: 44 meter (s)

Longitude: 62°.30' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	25.6	12.9	48	302	8.3	4.70
Feb	27.3	12.8	46	370	9	6.00
Mar	31.5	16.2	41	431	7.8	7.95
Apr	35	21	42	561	9.2	10.33
May	35.9	24.8	64	490	9.7	8.35
Jun	35.5	27.5	74	536	8	7.07
Jul	33.5	27.3	67	543	5.7	6.95
Aug	32.2	26.1	66	493	5.2	6.41
Sep	32	24.3	64	463	6.6	6.43
Oct	33.9	20.2	56	456	8.5	7.37
Nov	31.3	17.1	49	342	9.5	5.19
Dec	26.1	13.3	43	367	7.7	5.34
Avg.	31.2	20.3	55.0	446.2	7.9	6.84

Pasni

Latitude: 25°.16' N
Altitude: 6.1 meter (s)

Longitude: 64°.29' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	25.1	12.0	55.0	418.0	8.3	5.0
Feb	26.6	13.8	55.0	453.0	9.0	5.8
Mar	30.0	16.7	58.0	463.0	7.8	6.7
Apr	33.0	20.7	61.0	631.0	9.2	8.4
May	35.4	24.5	64.0	580.0	9.7	8.7
Jun	35.1	26.9	71.0	592.0	8.0	7.5
Jul	33.3	27.1	73.0	479.0	8.0	6.5
Aug	32.2	25.9	73.0	508.0	5.7	5.9
Sep	32.5	23.7	70.0	587.0	5.2	6.2
Oct	33.9	19.3	59.0	457.0	8.5	7.2
Nov	31.0	16.5	55.0	356.0	9.5	5.8
Dec	26.9	14.0	56.0	326.0	7.7	4.5
Avg	31.3	20.1	62.5	487.5	8.0	6.52

Nokundi

Latitude: 28°.49' N
Altitude: 683 meter (s)

Longitude: 62°.45' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	19.2	4.5	40.0	289.0	8.4	3.77
Feb	22.2	7.0	36.0	313.0	7.9	4.83
Mar	27.5	12.3	33.0	345.0	8.2	6.61
Apr	34.2	18.9	27.0	364.0	9.3	9.03
May	39.2	24.2	21.0	399.0	9.6	11.28
Jun	42.8	27.6	25.0	547.0	9.0	13.95
Jul	43.1	28.8	20.0	531.0	7.4	14.00
Aug	38.6	22.3	19.0	525.0	9.8	12.67
Sep	38.6	22.3	19.0	500.0	9.7	11.91
Oct	33.3	15.7	24.0	273.0	9.8	6.86
Nov	27.3	10.5	29.0	208.0	9.1	4.44
Dec	21.6	5.8	36.0	203.0	8.1	3.35
Avg	32.3	16.7	27.4	374.8	8.9	8.56

TurbatLatitude: 25°.59' N
Altitude: 152 meter (s)

Longitude: 63°.03' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	26.0	11.9	29	416	8.3	6.50
Feb	28.8	12.9	29	437	9	7.67
Mar	33.4	17.0	27	502	7.8	9.93
Apr	39.7	21.8	24	488	9.2	12.31
May	43.6	26.2	20	657	9.7	16.46
Jun	44.1	27.8	24	724	8	16.91
Jul	41.2	26.8	38	759	5.7	14.01
Aug	39.9	25.5	39	510	5.2	10.87
Sep	39	23.9	32	409	6.6	9.97
Oct	38.8	21.0	25	391	8.5	9.79
Nov	33.2	16.6	28	359	9.5	7.54
Dec	29.4	13.0	26	425	7.7	7.29
Avg.	36.4	20.4	28.4	506.4	7.9	10.77

PanjgurLatitude: 26°.58' N
Altitude: 981 meter (s)

Longitude: 64°.06' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	17.8	4.1	51	292	7.7	3.33
Feb	25.4	6.2	48	325	8.1	5.11
Mar	25.6	11.2	44	305	7.8	5.51
Apr	31.7	16.5	38	301	9.4	7.37
May	36.7	21.3	36	293	9.8	8.58
Jun	39.6	24.3	35	326	9.5	9.57
Jul	39.0	25.0	43	269	7.3	7.94
Aug	38.3	23.5	41	226	8.6	7.46
Sep	35.5	19.5	37	226	8.8	6.77
Oct	30.7	14.2	35	243	8.9	5.77
Nov	25.0	9.2	40	260	8.6	4.47
Dec	20.0	7.1	46	240	8.2	3.31
Avg.	30.4	15.2	41.2	275.5	8.6	6.27

Ormara

Latitude: 25°.13' N
Altitude: 5 meter (s)

Longitude: 64°.37' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	25.6	10.6	53.0	332	10.0	4.82
Feb	26.5	11.4	55.0	364	10.0	5.47
Mar	29.2	17	63.0	486	10.0	6.49
Apr	32.6	21	63.0	612	10.0	8.09
May	33.7	24.7	69.0	459	10.0	7.32
Jun	33.8	26.1	73.0	509	10.0	7.15
Jul	33.3	25.8	72.0	521	10.0	7.14
Aug	31.8	24.8	74.0	505	10.0	6.48
Sep	31.7	23.3	73.0	437	10.0	6.09
Oct	32.1	20.2	70.0	371	10.0	5.72
Nov	30.3	15.5	60.0	335	10.0	5.34
Dec	27.4	11.8	55.0	384	10.0	5.22
Avg.	30.7	19.4	65.0	442.9	10.0	6.28

Dalbandin

Latitude: 28°.53' N
Altitude: 850 meter (s)

Longitude: 64°.24' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	17.9	3.0	43.0	147.0	8.5	2.6
Feb	20.9	4.9	38.0	157.0	8.5	3.4
Mar	26.4	9.9	33.0	205.0	8.1	5.1
Apr	32.0	15.8	25.0	195.0	8.8	6.5
May	38.2	20.6	19.0	204.0	8.3	7.8
Jun	42.4	24.3	15.0	181.0	9.4	8.2
Jul	42.8	26.0	19.0	181.0	9.3	8.2
Aug	41.5	23.4	17.0	174.0	9.7	7.6
Sep	37.0	17.6	16.0	129.0	10.3	5.8
Oct	32.5	12.0	19.0	124.0	9.5	4.4
Nov	26.0	6.6	27.0	149.0	8.8	3.6
Dec	20.3	2.9	40.0	143.0	8.2	2.6
Avg	31.5	13.9	25.9	165.8	8.9	5.47

Kalat

Latitude: 29°.02' N

Longitude: 66°.35' E

Altitude: 2,017 meter (s)

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	10.2	-3.8	46.0	195.0	8.3	2.13
Feb	12.3	-1.0	44.0	181.0	9.0	2.65
Mar	15.5	3.5	38.0	202.0	7.8	3.57
Apr	22.4	6.7	30.0	219.0	9.2	5.22
May	27.7	10.0	23.0	208.0	9.7	6.29
Jun	31.2	13.4	20.0	185.0	7.8	6.34
Jul	31.9	16.8	25.0	210.0	5.7	6.33
Aug	31.3	14.6	22.0	155.0	5.2	5.30
Sep	28.2	9.2	23.0	163.0	6.6	4.84
Oct	22.5	3.4	24.0	156.0	8.5	3.77
Nov	18.8	-1.6	28.0	123.0	9.5	2.58
Dec	12.9	-3.3	40.0	140.0	7.7	1.97
Avg.	22.1	5.7	30.3	178.1	7.9	4.25

Sibi

Latitude: 29°.33' N

Longitude: 67°.53' E

Altitude: 134 meter (s)

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	22.1	6.3	43.0	102.0	6.9	2.38
Feb	25.3	9.6	39.0	134.0	7.7	3.51
Mar	31.0	15.7	35.0	168.0	8.1	5.24
Apr	38.0	22.4	30.0	177.0	8.8	7.04
May	43.6	23.0	27.8	225.0	9.8	9.19
Jun	45.8	31.0	29.0	200.0	9.9	9.28
Jul	42.6	30.4	45.0	163.0	8.1	7.4
Aug	41.0	29.3	47.0	157.0	9.0	7.03
Sep	39.6	23.8	43.0	144.0	9.4	6.19
Oct	36.8	20.5	34.0	124.0	9.4	4.87
Nov	30.7	12.4	36.0	81.0	8.4	2.83
Dec	25.4	7.3	41.0	54.0	7.0	1.79
Avg.	35.2	19.3	37.5	144.1	8.5	5.56

Lasbela

Latitude: 26°.14' N
Altitude: 89 meter (s)

Longitude: 66°.19' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	27.0	8.9	35.0	89.0	9.1	2.87
Feb	29.6	10.5	31.0	114.0	9.2	3.98
Mar	33.4	15.3	31.0	124.0	9.2	5.16
Apr	38.8	20.1	31.0	209.0	9.8	7.85
May	41.5	24.6	37.0	259.0	9.0	9.03
Jun	41.8	26.9	42.0	259.0	8.0	8.73
Jul	38.9	26.3	52.0	221.0	6.8	7.06
Aug	37.6	25.2	52.0	226.0	7.5	6.91
Sep	37.8	23.2	46.0	211.0	8.7	6.83
Oct	38.1	19.5	29.0	99.0	9.6	4.73
Nov	33.6	14.0	30.0	56.0	9.6	2.82
Dec	29.5	10.5	34.0	64.0	8.9	2.42
Avg.	35.6	18.8	37.5	160.9	8.8	5.7

Khuzdar

Latitude: 27°.50' N
Altitude: 1,232 meter (s)

Longitude: 66°.38' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ETo (mm/d)
Jan	17.4	3.5	37.0	210.0	8.4	3.11
Feb	19.3	5.7	35.0	288.0	9.1	4.32
Mar	34.0	10.7	31.0	265.0	8.4	6.89
Apr	30.2	16.3	25.0	259.0	9.9	7.15
May	35.0	20.8	21.0	299.0	10.4	8.95
Jun	38.2	24.5	26.0	273.0	8.8	8.82
Jul	36.8	24.0	39.0	269.0	8.6	7.98
Aug	36.0	23.1	40.0	237.0	9.3	7.38
Sep	34.4	20.2	29.0	210.0	10.0	6.72
Oct	30.0	14.1	23.0	169.0	10.0	4.99
Nov	25.1	8.6	29.0	169.0	9.6	3.75
Dec	20.1	5.0	35.0	164.0	8.0	2.88
Avg	29.7	14.7	30.8	234.3	9.2	6.08

QuettaLatitude: 30°.15' N
Altitude: 1,601 meter (s)

Longitude: 66°.53' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	11.3	-2.3	58	339	6.3	2.39
Feb	13.6	-0.6	55	413	7.3	3.23
Mar	18.8	3.9	51	493	7.6	4.77
Apr	25.4	11.2	43	524	8.4	7.04
May	30.9	12.3	33	573	10.7	9.79
Jun	35.4	17.0	28	511	9.9	10.82
Jul	36.2	20.4	34	499	9.5	10.46
Aug	35.3	18.6	35	418	9.4	9.19
Sep	31.7	14.6	32	419	9.5	8.14
Oct	25.7	5.0	32	383	9.7	6.11
Nov	19.7	0.4	41	352	7.6	4.11
Dec	14.3	-2.0	50	302	7.5	2.74
Avg.	24.9	8.2	41.0	435.5	8.6	6.57

ZhobLatitude: 31°.21' N
Altitude: 1,407 meter (s)

Longitude: 69°.28' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	13.6	-0.7	44.0	120.0	7.0	1.86
Feb	20.4	2.0	42.0	164.0	7.7	3.15
Mar	27.1	7.5	38.0	205.0	7.7	4.86
Apr	27.2	13.2	32.0	219.0	8.8	5.84
May	32.8	18.2	24.0	214.0	9.6	7.21
Jun	37.0	22.7	26.0	243.0	8.1	8.04
Jul	36.3	23.3	39.0	247.0	7.0	7.31
Aug	35.7	22.6	39.0	320.0	7.8	7.91
Sep	33.4	19.0	31.0	166.0	8.9	5.64
Oct	28.1	12.4	26.0	124.0	9.3	3.87
Nov	22.4	5.7	32.0	96.0	8.7	2.37
Dec	16.7	0.8	38.0	87.0	7.9	1.66
Avg.	27.6	12.2	34.3	183.8	8.2	4.98

Barkhan

Latitude: 29°.'53 N
Altitude: 1,098 meter (s)

Longitude: 69°.'43' E

Month	Mean Max. Temp. (°C)	Mean Min. Temp. (°C)	Relative Humidity (%)	Wind speed (km/day)	Daily Sunshine (hrs)	ET _o (mm/d)
Jan	14.9	1.7	41.0	110.0	7.0	1.98
Feb	16.8	4.0	40.0	146.0	7.7	2.82
Mar	22.2	9.5	36.0	182.0	7.7	4.23
Apr	28.2	21.9	32.0	181.0	8.8	5.89
May	33.9	20.1	26.0	183.0	9.6	6.98
Jun	37.4	23.5	28.0	211.0	8.1	7.66
Jul	36.0	23.6	45.0	208.0	7.0	6.68
Aug	35.2	22.8	46.0	193.0	7.8	6.31
Sep	33.3	19.8	37.0	153.0	8.9	5.49
Oct	28.9	13.8	30.0	133.0	9.3	4.17
Nov	23.0	8.1	32.0	99.0	8.7	2.59
Dec	19.7	3.6	37.0	86.0	7.9	1.92
Avg.	27.5	14.4	35.8	157.1	8.2	4.73

ANNEXURE-II

Average Monthly Rainfall Data of Selected Stations

Month	Jiwani	Gwadar	Pasni	Nokundi	Turbat	Panigur	Ormara	Dalbandin	Kalat	Sibi	Lasbela	Khuzdar	Quetta	Zhob	Barkhan
Jan	24	19	27	9	15	15	14	18	35	11	9	22	52	17	14
Feb	20	0	16	7	5	13	8	15	31	12	13	27	44	25	19
Mar	13	0	15	6	24	15	11	19	26	18	11	23	48	42	27
Apr	5	0	3	2	2	8	2	7	8	12	5	17	25	35	33
May	0	0	1	0	3	3	0	2	4	5	19	12	7	15	20
Jun	1	0	0	0	1	3	0	0	6	8	9	12	1	16	43
Jul	7	4	8	2	10	17	18	6	18	39	70	59	15	56	97
Aug	3	6	7	1	0	7	6	0	8	31	28	48	8	46	80
Sep	0	0	1	0	0	2	2	0	1	11	6	8	3	12	42
Oct	2	0	2	0	0	3	2	2	5	4	7	7	5	6	10
Nov	4	0	1	1	0	2	0	3	5	1	0	5	5	4	5
Dec	22	7	19	2	12	9	12	10	33	5	1	14	34	11	7
Total	101	36	100	30	72	97	75	82	180	157	178	254	247	285	397



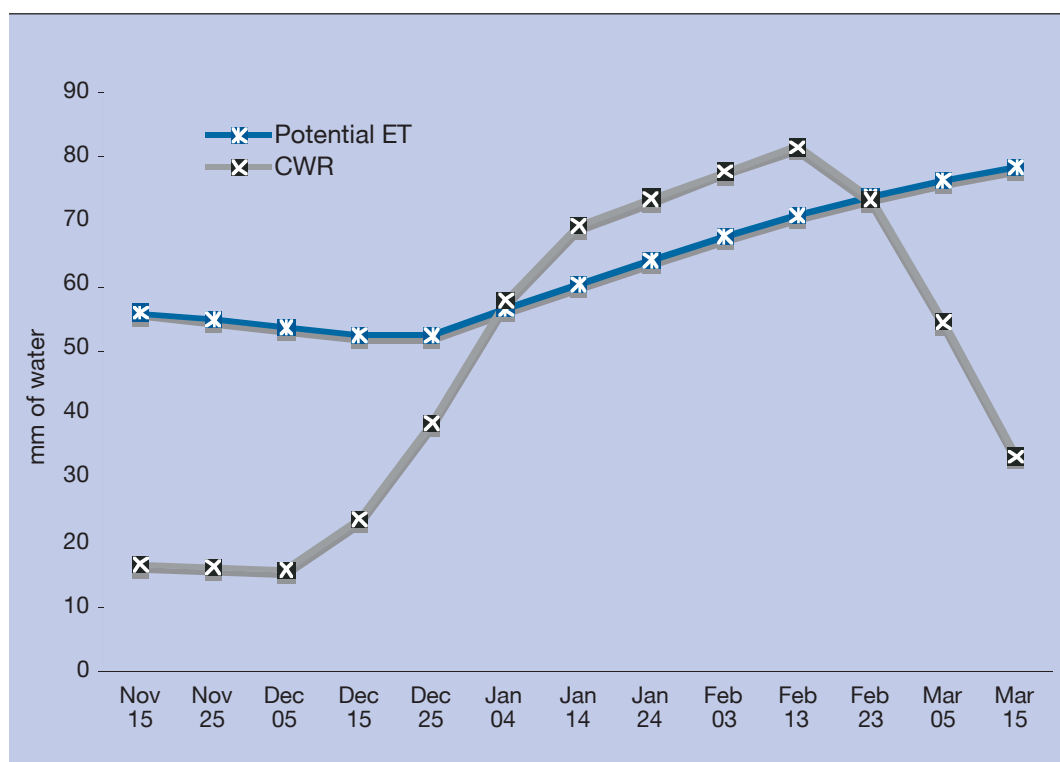
ANNEXURE-III

Crop Water Requirements

Wheat

Gwadar

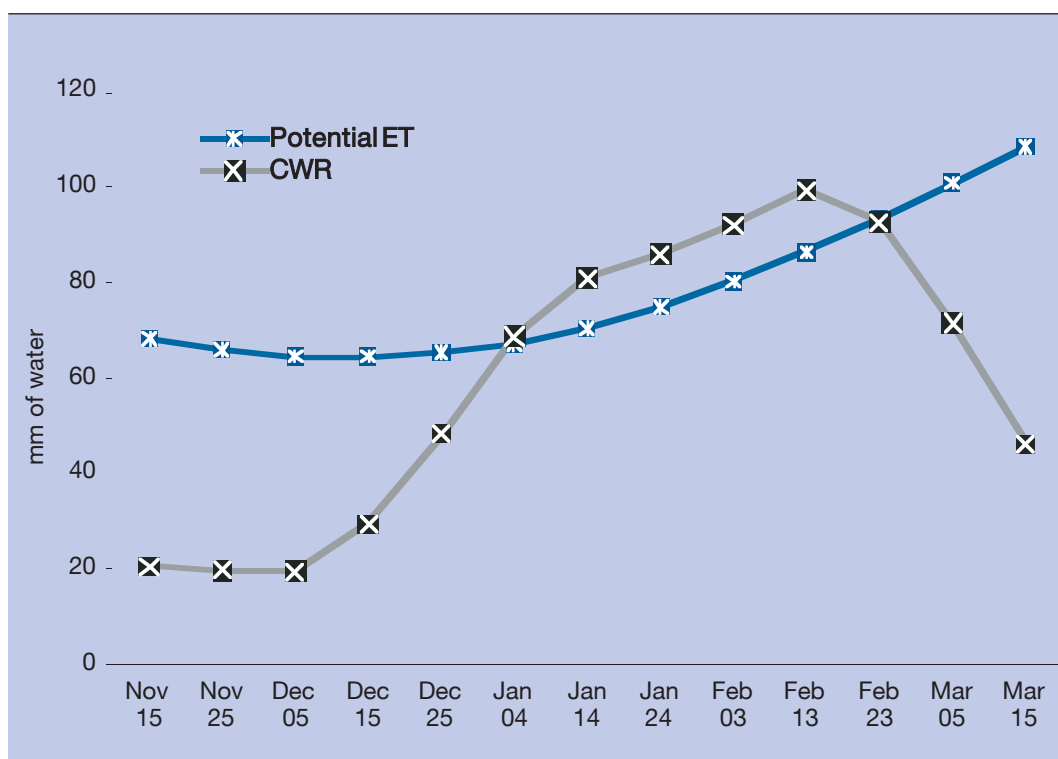
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	55.89	0.30	16.77			16.77
25/11	54.73	0.30	16.42			16.42
5/12	53.59	0.30	16.08			16.08
15/12	52.46	0.46	23.89			23.89
25/12	52.30	0.74	38.73	2.78	2.78	35.95
4/1	56.56	1.02	57.92	5.49	5.48	52.43
14/1	60.35	1.15	69.41	5.20	4.88	64.52
24/1	64.11	1.15	73.73	0.92	0.82	72.92
3/2	67.70	1.15	77.86			77.86
13/2	71.01	1.15	81.66			81.66
23/2	73.96	0.99	73.46			73.46
5/3	76.49	0.71	54.32			54.32
15/3	78.58	0.43	33.55			33.55
Total	817.72	-	633.8	14.38	13.96	619.82



Wheat

Turbat

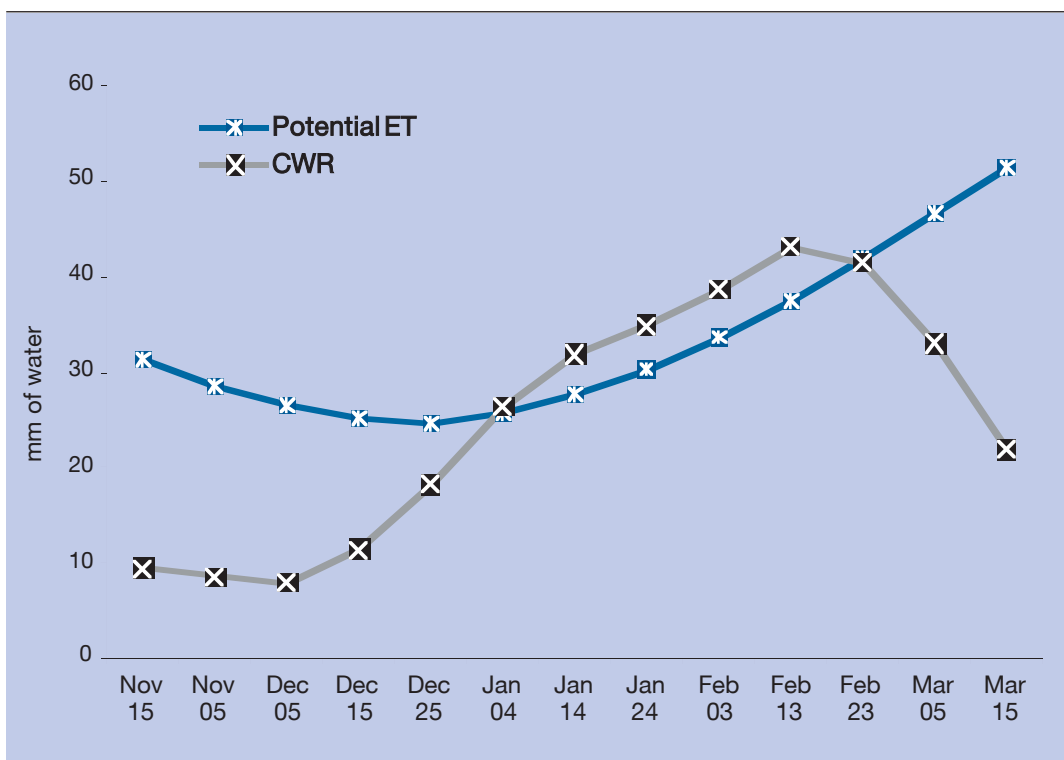
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	68.49	0.3	20.55			20.55
25/11	65.97	0.3	19.79			19.79
5/12	64.7	0.3	19.41			19.41
15/12	64.65	0.46	29.48			29.48
25/12	65.57	0.74	48.49			48.49
4/1	67.33	1.02	68.90			68.90
14/1	70.53	1.15	81.11			81.11
24/1	74.91	1.15	86.14			86.14
3/2	80.34	1.15	92.39			92.39
13/2	86.64	1.15	99.64			99.64
23/2	93.62	0.99	92.91	4.57	4.57	88.34
5/3	101.06	0.71	71.66	7.72	7.68	63.97
15/3	108.7	0.43	46.29	6.70	6.04	40.25
Total:	1012.51	-	776.76	18.99	18.29	758.47



Wheat

Dalbandin

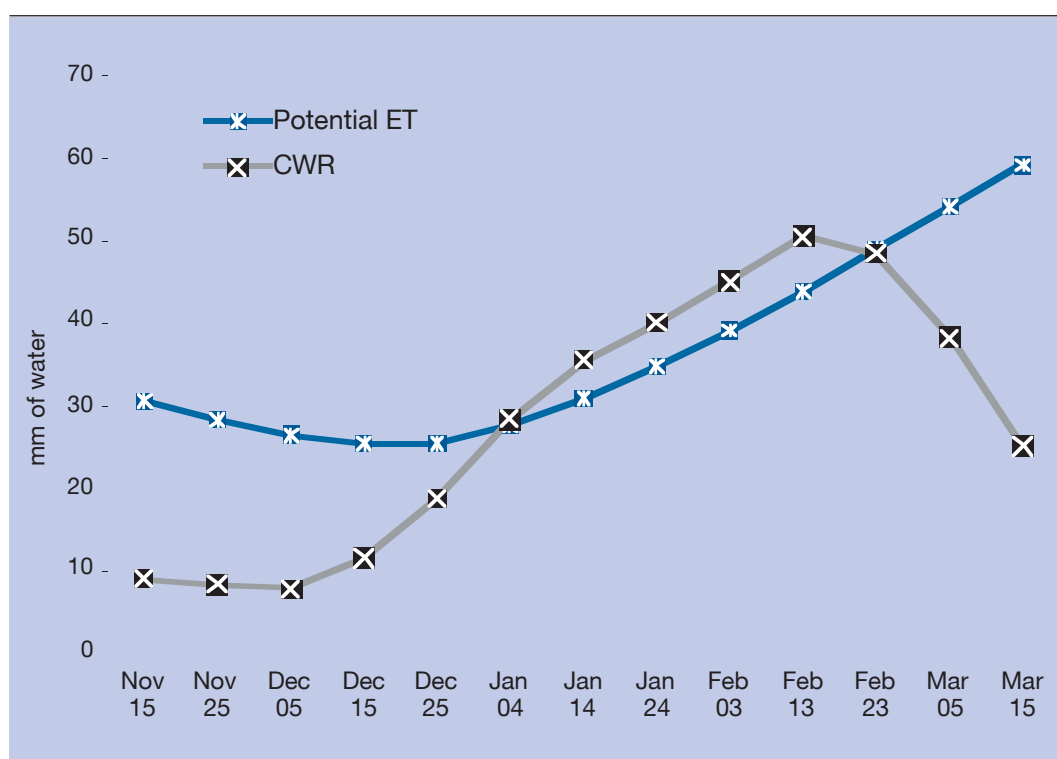
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	31.41	0.3	9.42			9.42
5/11	28.62	0.3	8.59			8.59
5/12	26.54	0.3	7.96			7.96
15/12	25.2	0.46	11.46			11.46
25/12	24.69	0.74	18.25	3.71	3.62	14.64
4/1	25.76	1.02	26.38	5.44	5.29	21.09
14/1	27.7	1.15	31.86	5.83	5.67	26.19
24/1	30.35	1.15	34.91	5.68	5.53	29.38
3/2	33.67	1.15	38.71	5.43	5.29	33.42
13/2	37.55	1.15	43.18	5.39	5.24	37.94
23/2	41.9	0.99	41.55	5.64	5.48	36.07
5/3	46.59	0.71	33.01	6.02	5.83	27.18
15/3	51.49	0.43	21.9	5.97	5.79	16.11
Total	431.47	-	327.18	49.10	47.72	279.45



Wheat

Lasbela

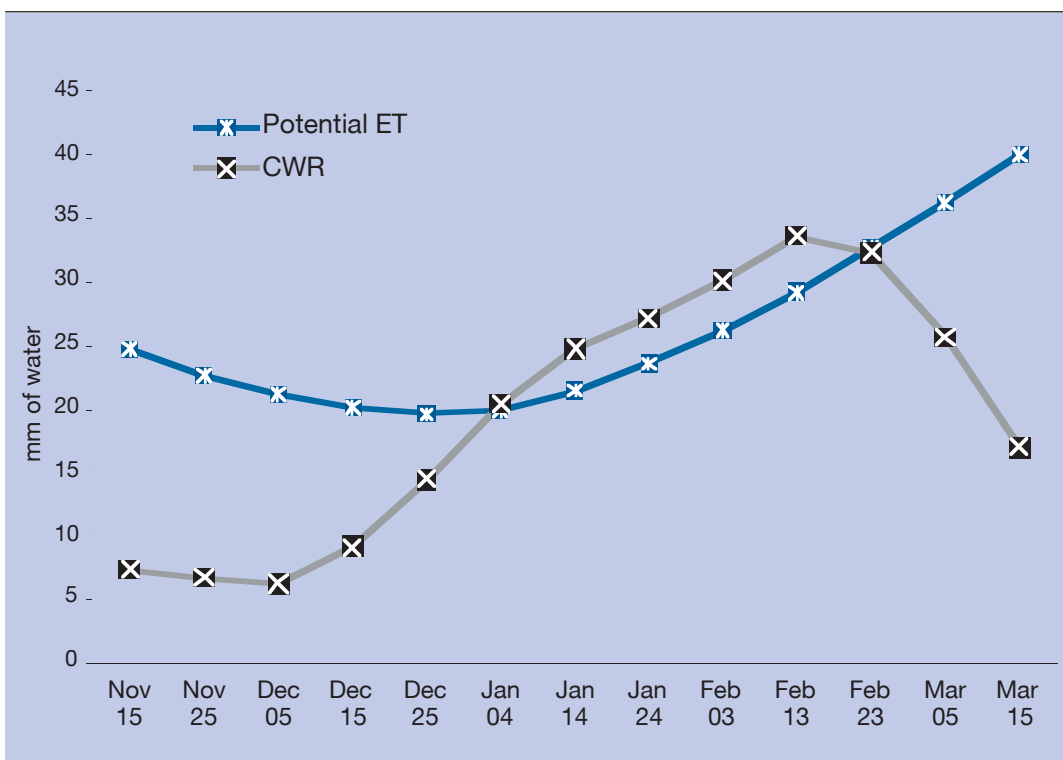
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	30.73	0.30	9.22			9.22
25/11	28.31	0.30	8.49			8.49
5/12	26.61	0.30	7.98			7.98
15/12	25.65	0.46	11.68			11.68
25/12	25.56	0.74	18.92			18.92
4/1	27.79	1.02	28.48			28.48
14/1	31.05	1.15	35.71			35.71
24/1	34.91	1.15	40.15	3.47	3.45	36.70
3/2	39.27	1.15	45.16	4.90	4.90	40.26
13/2	44.02	1.15	50.63	6.73	6.60	44.03
23/2	49.04	0.99	48.63	8.64	8.19	40.44
5/3	54.18	0.71	38.39	9.92	9.27	29.12
15/3	59.31	0.43	25.24	10.34	9.64	15.60
Total	476.42	-	368.67	44.00	42.05	326.63



Wheat

Kalat

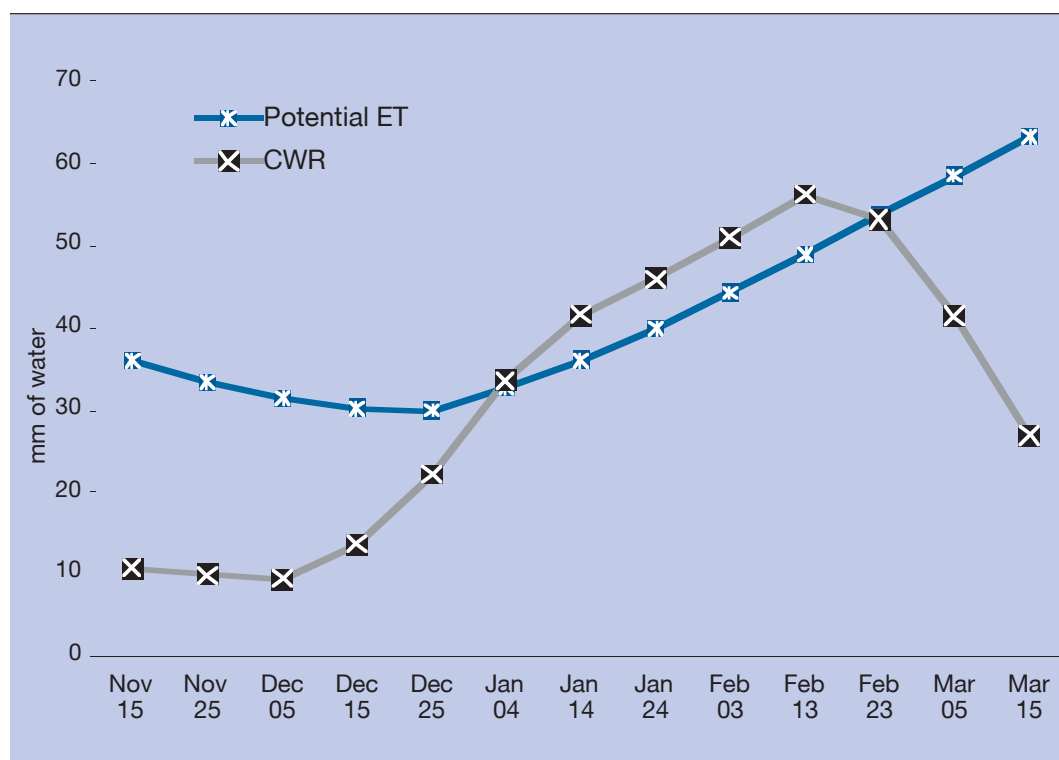
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	24.80	0.3	7.44	0	0	7.44
25/11	22.71	0.3	6.81	4.61	4.43	2.38
5/12	21.17	0.3	6.35	9.16	8.71	0.00
15/12	20.20	0.46	9.19	11.28	10.68	0.00
25/12	19.63	0.74	14.49	11.59	10.96	3.54
4/1	19.96	1.02	20.44	11.16	10.53	9.91
14/1	21.52	1.15	24.74	11.34	10.69	14.05
24/1	23.61	1.15	27.16	11.4	10.78	16.38
3/2	26.21	1.15	30.14	11.29	10.71	19.43
13/2	29.24	1.15	33.63	10.95	10.43	23.20
23/2	32.62	0.99	32.35	10.29	9.83	22.52
5/3	36.26	0.71	25.69	9.2	8.81	16.88
15/3	40.05	0.43	17.03	7.5	7.19	9.84
Total	338	-	255.46	119.77	113.75	145.57



Wheat

Khuzdar

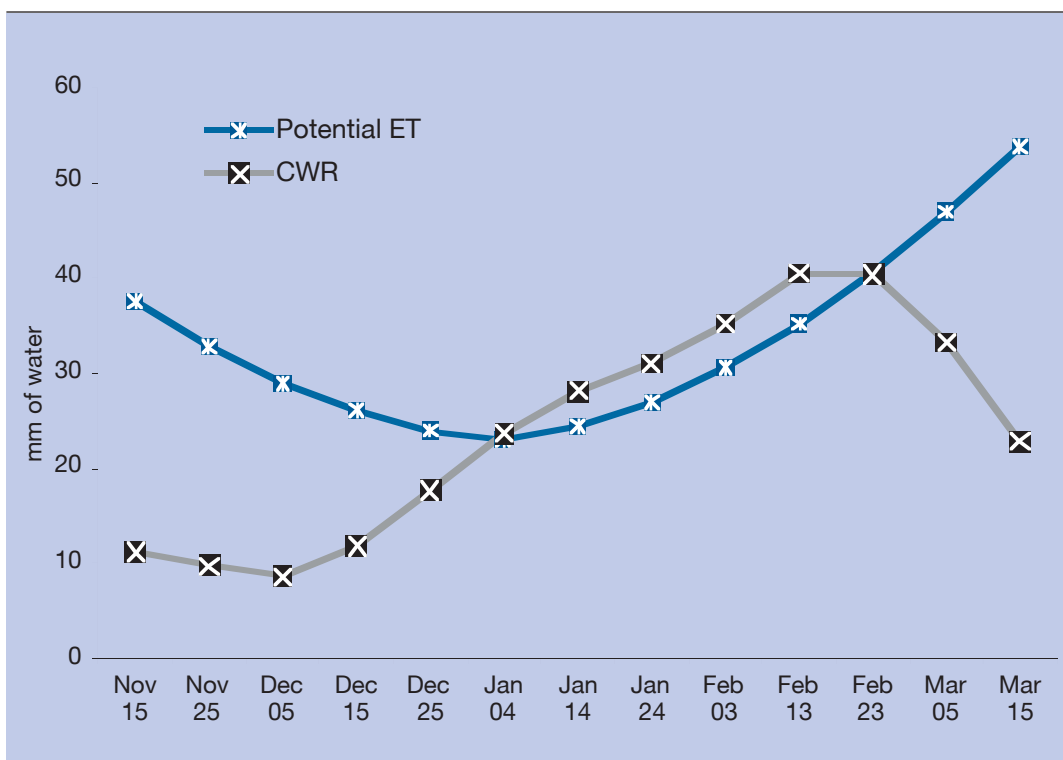
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	36.11	0.3	10.83			10.83
25/11	33.55	0.3	10.07			10.07
5/12	31.61	0.3	9.48			9.48
15/12	30.30	0.46	13.79			13.79
25/12	30.06	0.74	22.25	4.17	4.09	18.17
4/1	32.85	1.02	33.66	5.88	5.71	27.95
14/1	36.20	1.15	41.63	7.71	7.41	34.22
24/1	40.06	1.15	46.07	9.11	8.71	37.36
3/2	44.34	1.15	51.00	9.69	9.26	41.74
13/2	48.94	1.15	56.28	9.51	9.09	47.18
23/2	53.72	0.99	53.3	8.81	8.45	44.85
5/3	58.58	0.71	41.53	7.91	7.62	33.91
15/3	63.39	0.43	26.99	7.07	6.83	20.15
Total	539.72	-	416.87	69.87	67.17	349.70



Wheat

Quetta

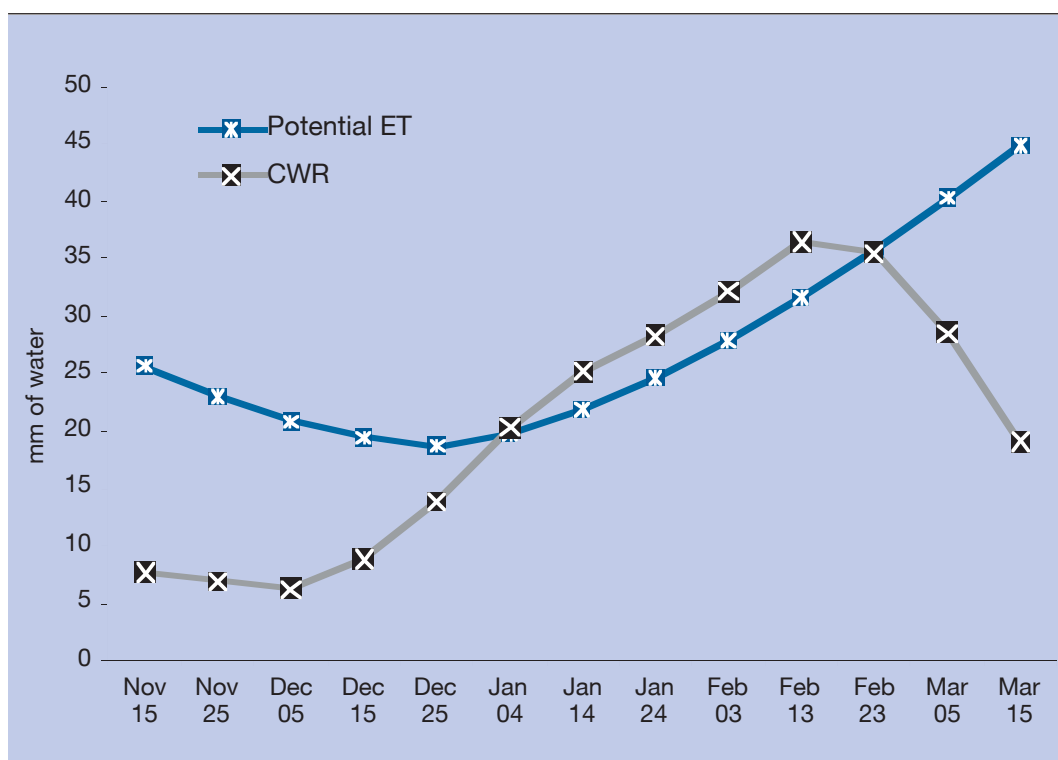
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	37.43	0.30	11.23			11.23
25/11	32.70	0.30	9.81	4.17	4.06	5.75
5/12	28.90	0.30	8.67	8.87	8.47	0.20
15/12	26.10	0.46	11.84	12.34	11.61	0.24
25/12	23.97	0.74	17.65	14.27	13.28	4.37
4/1	23.06	1.02	23.60	14.70	13.63	9.98
14/1	24.45	1.15	28.12	15.87	14.66	13.46
24/1	26.97	1.15	31.02	16.71	15.41	15.61
3/2	30.58	1.15	35.17	17.11	15.76	19.41
13/2	35.20	1.15	40.48	16.99	15.66	24.82
23/2	40.70	0.99	40.32	16.38	15.12	25.21
5/3	46.91	0.71	33.20	15.31	14.18	19.01
15/3	53.66	0.43	22.78	13.88	12.93	9.85
Total	430.64	-	313.89	166.58	154.76	159.14



Wheat

Barkhan

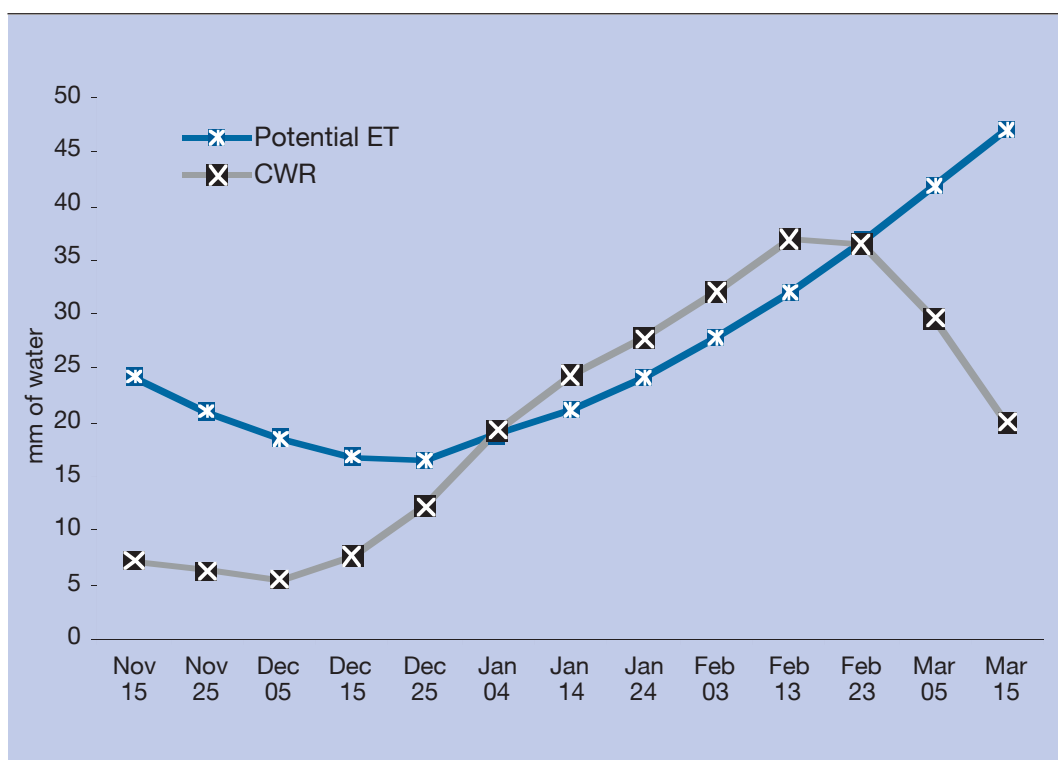
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	25.65	0.30	7.70			7.70
25/11	22.94	0.30	6.88			6.88
5/12	20.85	0.30	6.26			6.26
15/12	19.43	0.46	8.83			8.83
25/12	18.73	0.74	13.84			13.84
4/1	19.80	1.02	20.29			20.29
14/1	21.90	1.15	25.18			25.18
24/1	24.62	1.15	28.31	3.47	3.45	24.87
3/2	27.91	1.15	32.10	4.90	4.90	27.20
13/2	31.69	1.15	36.45	6.73	6.60	29.85
23/2	35.86	0.99	35.55	8.64	8.19	27.35
5/3	40.29	0.71	28.54	9.92	9.27	19.27
15/3	44.88	0.43	19.08	10.34	9.64	9.44
Total	354.55	-	269.00	44.00	42.04	226.96



Wheat

Zhob

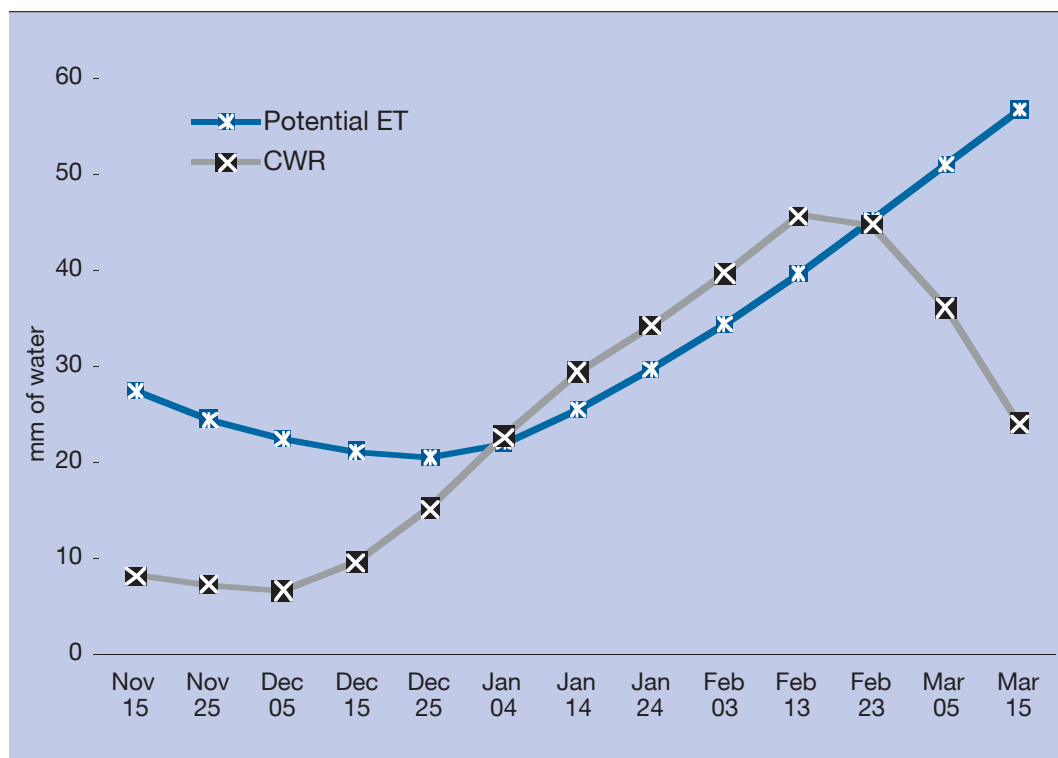
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	24.26	0.30	7.28	0.00	0.00	7.28
25/11	21.04	0.30	6.31	0.00	0.00	6.31
5/12	18.55	0.30	5.56	0.00	0.00	5.56
15/12	16.84	0.46	7.65	0.00	0.00	7.65
25/12	16.51	0.74	12.25	3.87	3.73	8.52
4/1	18.84	1.02	19.31	5.21	5.00	14.30
14/1	21.15	1.15	24.33	5.64	5.51	18.82
24/1	24.18	1.15	27.80	6.37	6.24	21.56
3/2	27.85	1.15	32.03	7.66	7.44	24.59
13/2	32.09	1.15	36.90	9.40	8.99	27.91
23/2	36.78	0.99	36.45	11.27	10.64	25.81
5/3	41.79	0.71	29.59	12.88	12.05	17.53
15/3	47.00	0.43	19.97	13.85	12.92	7.05
Total	346.87	-	265.42	76.17	72.52	192.90



Wheat

Sibi

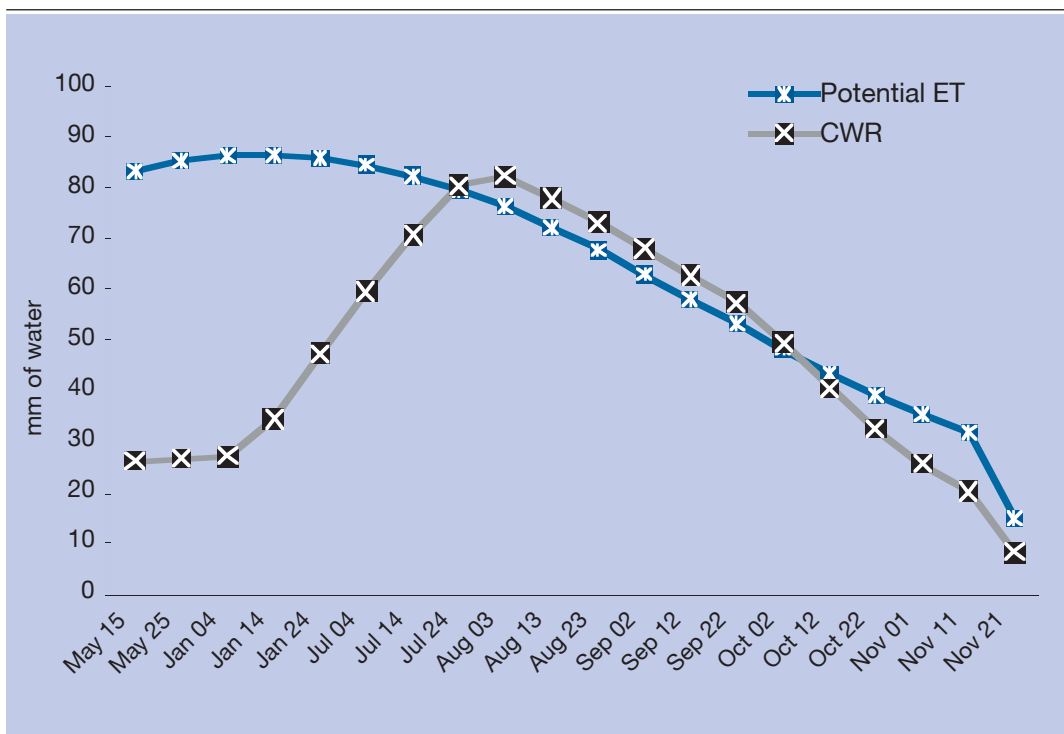
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/11	27.41	0.30	8.22			8.22
25/11	24.56	0.30	7.37			7.37
5/12	22.50	0.30	6.75			6.75
15/12	21.24	0.46	9.66			9.66
25/12	20.59	0.74	15.20			15.20
4/1	22.09	1.02	22.66			22.66
14/1	25.60	1.15	29.44			29.44
24/1	29.78	1.15	34.25			34.25
3/2	34.54	1.15	39.72			39.72
13/2	39.75	1.15	45.71			45.71
23/2	45.28	0.99	44.89	4.82	4.63	40.26
5/3	50.99	0.71	36.11	5.63	5.39	30.72
15/3	56.72	0.43	24.11	5.71	5.65	18.47
Total	421.03	-	324.09	16.16	15.66	308.42



Cotton

Lasbela

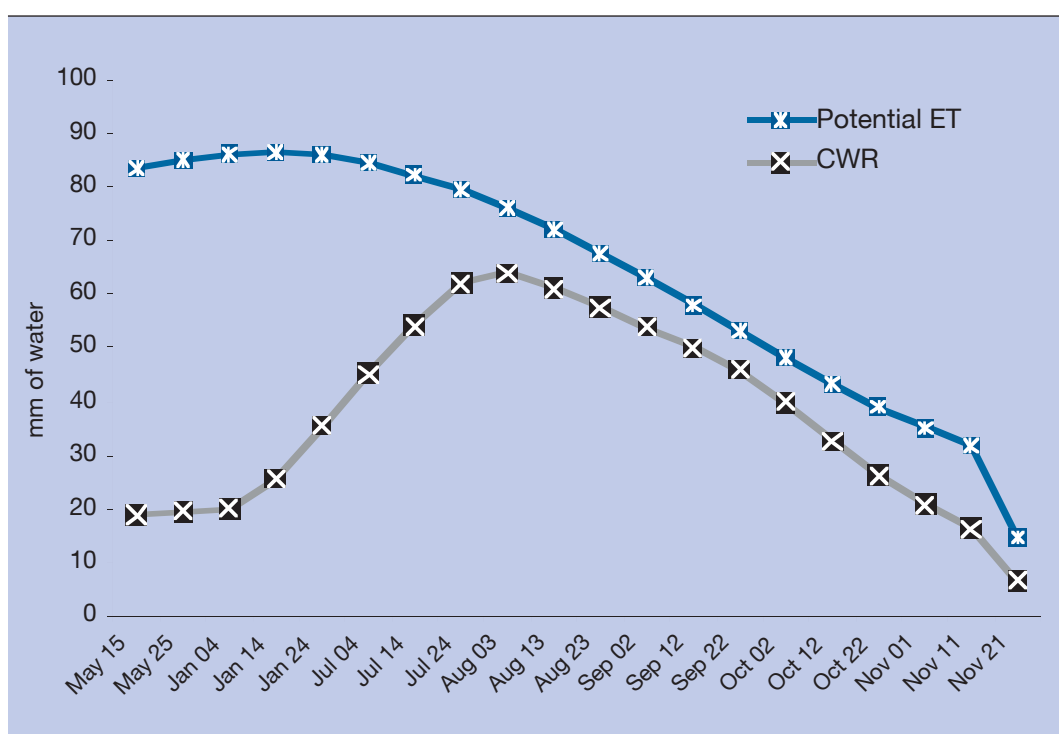
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	83.35	0.32	26.25	7.74	7.53	18.72
25/5	85.15	0.32	26.82	9.58	9.00	17.82
4/6	86.17	0.32	27.14	12.28	11.16	15.99
14/6	86.39	0.40	34.48	15.62	13.83	20.65
24/6	85.81	0.55	47.37	19.26	16.75	30.62
4/7	84.44	0.71	59.52	22.74	19.57	39.95
14/7	82.32	0.86	70.61	25.56	21.88	48.74
24/7	79.51	1.01	80.36	27.20	23.27	57.08
3/8	76.07	1.08	82.16	27.23	23.39	58.77
13/8	72.10	1.08	77.87	25.36	22.00	55.87
23/8	67.70	1.08	73.12	21.59	19.05	54.07
2/9	62.98	1.08	68.02	16.29	14.80	53.22
12/9	58.07	1.08	62.71	10.35	9.87	52.84
22/9	53.10	1.08	57.34	5.32	5.32	52.02
2/10	48.20	1.08	49.49	1.36	1.35	48.14
12/10	43.50	0.93	40.40			40.40
22/10	39.14	0.83	32.51			32.51
1/11	35.24	0.73	25.80			25.80
11/11	31.89	0.63	20.22			20.22
21/11	14.89	0.56	8.34			8.34
Total	1276.01	-	970.53	247.50	218.77	751.76



Cotton

Kalat

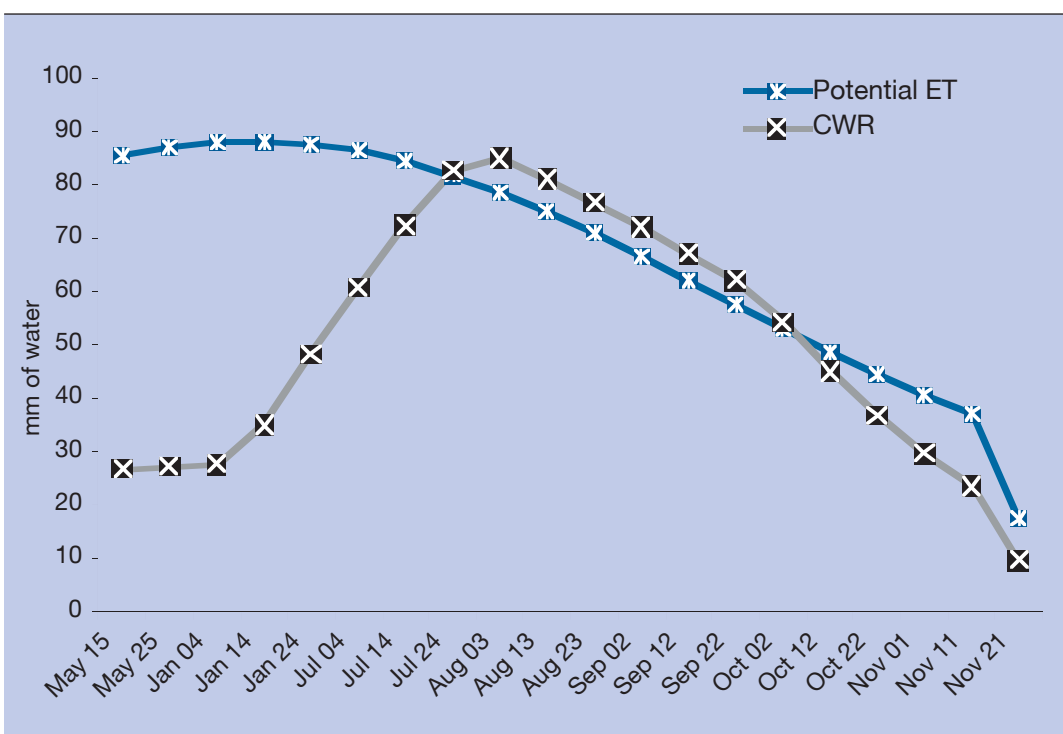
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	60.30	0.32	18.99			18.99
25/5	62.26	0.32	19.61			19.61
4/6	63.66	0.32	20.05			20.05
14/6	64.45	0.40	25.73			25.73
24/6	64.62	0.55	35.68	2.53	2.47	33.21
4/7	64.16	0.71	45.23	4.59	4.46	40.77
14/7	63.08	0.86	54.11	5.22	5.08	49.03
24/7	61.42	1.10	62.08	4.25	4.15	57.93
3/8	59.22	1.08	63.95	0.80	0.78	63.17
13/8	56.53	1.08	61.06			61.06
23/8	53.45	1.08	57.72			57.72
2/9	50.04	1.08	54.04			54.04
12/9	46.40	1.08	50.11			50.11
22/9	42.65	1.08	46.06			46.06
2/10	38.88	1.08	39.92			39.92
12/10	35.20	0.93	32.69			32.69
22/10	31.73	0.83	26.35			26.35
1/11	28.56	0.73	20.91			20.91
11/11	25.78	0.63	16.35			16.35
21/11	12.00	0.56	6.72	0.15	0.15	6.57
Total	984.35	-	757.36	17.53	17.08	740.27



Cotton

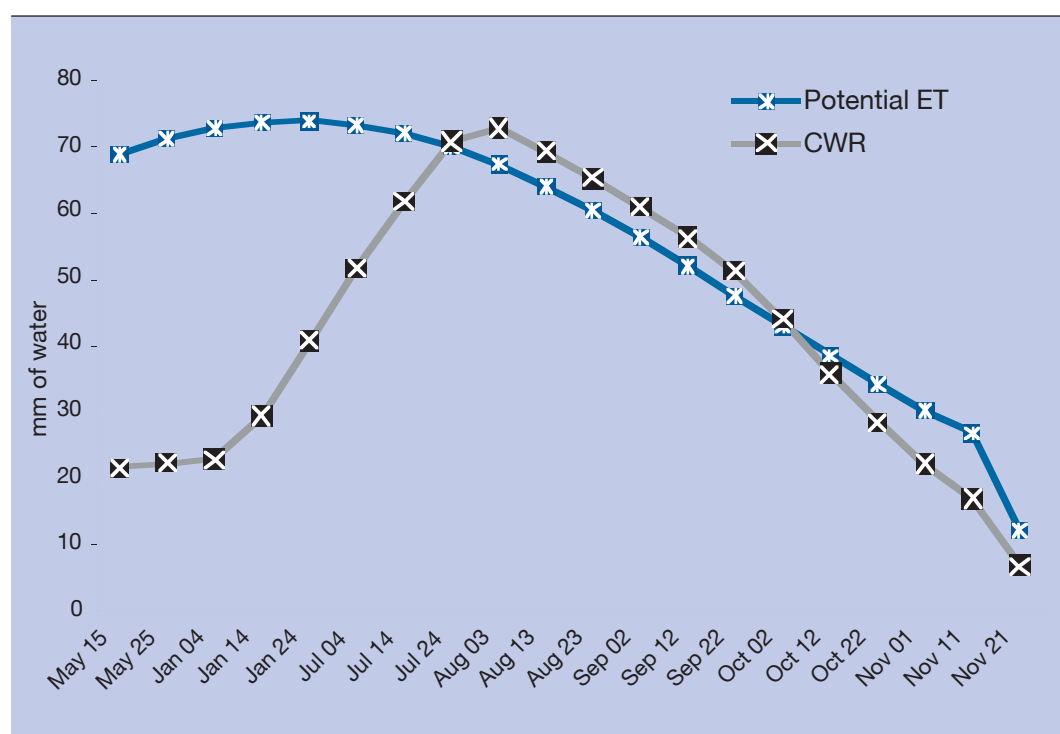
Khuzdar

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	85.42	0.32	26.91			26.91
25/5	87.03	0.32	27.41			27.41
4/6	87.93	0.32	27.70			27.70
14/6	88.10	0.40	35.16			35.16
24/6	87.55	0.55	48.33	6.53	6.08	42.25
4/7	86.29	0.71	60.83	14.05	12.76	48.07
14/7	84.35	0.86	72.36	18.01	16.30	56.05
24/7	81.78	1.01	82.66	18.82	17.09	65.56
3/8	78.65	1.08	84.94	16.84	15.40	69.53
13/8	75.02	1.08	81.02	12.66	11.73	69.29
23/8	71.00	1.08	76.68	7.20	6.81	69.86
2/9	66.67	1.08	72.00	1.29	1.26	70.75
12/9	62.15	1.08	67.12			67.12
22/9	57.55	1.08	62.15			62.15
2/10	52.98	1.08	54.40			54.40
12/10	48.57	0.93	45.10			45.10
22/10	44.41	0.83	36.89			36.88
1/11	40.62	0.73	29.74			29.74
11/11	37.30	0.63	23.64			23.64
21/11	17.57	0.56	9.83			9.83
Total	1340.92	-	1024.85	95.44	87.44	937.41



Barkhan

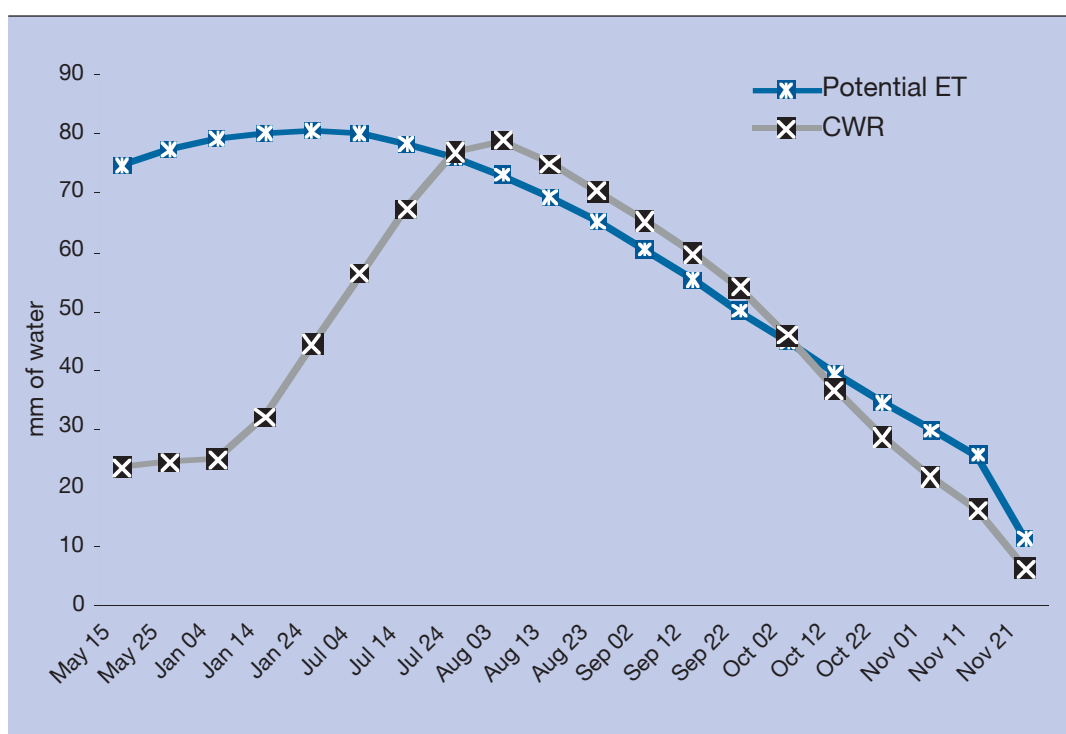
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	68.96	0.32	21.72	7.74	7.53	14.19
25/5	71.26	0.32	22.45	9.58	9.00	13.44
4/6	72.88	0.32	22.96	12.28	11.16	11.80
14/6	73.79	0.40	29.46	15.62	13.83	15.63
24/6	73.96	0.55	40.83	19.26	16.75	24.08
4/7	73.38	0.71	51.73	22.74	19.57	32.16
14/7	72.08	0.86	61.83	25.56	21.88	39.95
24/7	70.08	1.01	70.83	27.20	23.27	47.56
3/8	67.45	1.08	72.84	27.23	33.39	49.45
13/8	64.24	1.08	69.38	25.36	22.00	47.38
23/8	60.54	1.08	65.39	21.59	19.05	46.34
2/9	56.46	1.08	60.98	16.29	14.80	46.18
12/9	52.10	1.08	56.27	10.35	9.87	46.40
22/9	47.58	1.08	51.39	5.32	5.32	46.07
2/10	43.02	1.08	44.18	1.36	1.35	42.83
12/10	38.56	0.93	35.81			35.81
22/10	34.30	0.83	28.49			28.49
1/11	30.38	0.73	22.25			22.25
11/11	26.90	0.63	17.06			17.06
21/11	12.31	0.56	6.89			6.89
Total	1110.22	-	852.74	247.50	218.77	633.96



Cotton

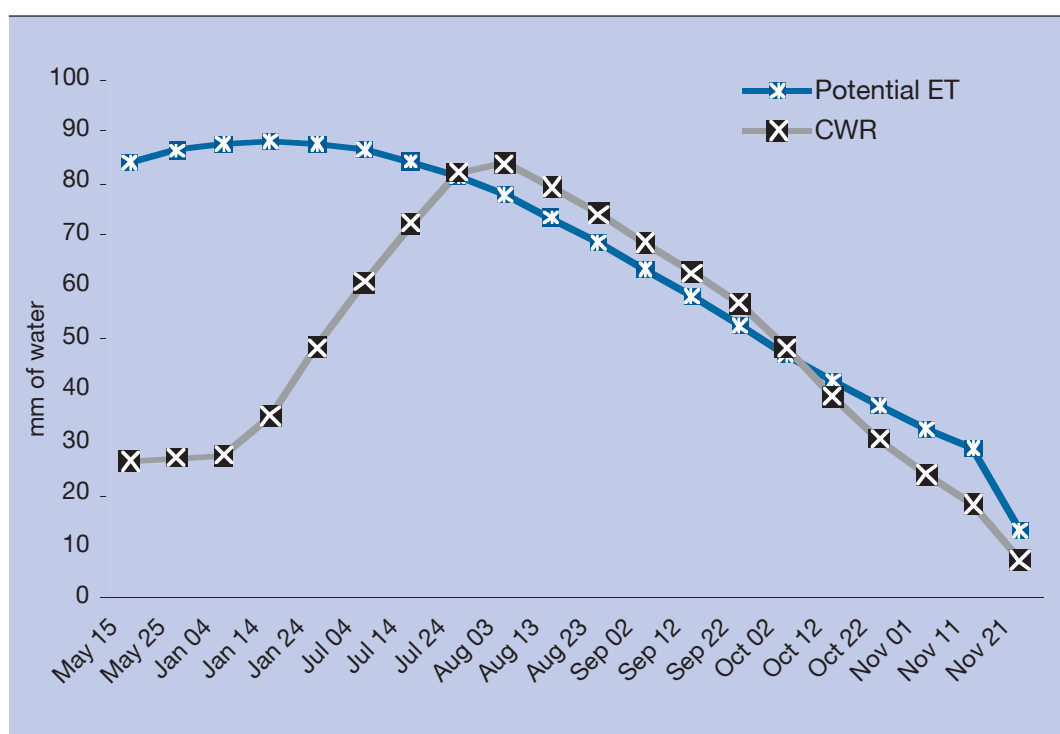
Zhob

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	74.67	0.32	23.52			23.52
25/5	77.36	0.32	24.37	3.00	2.98	21.39
4/6	79.27	0.32	24.97	3.30	3.30	21.67
14/6	80.36	0.40	32.08	6.07	5.80	26.28
24/6	80.59	0.55	44.50	10.10	9.36	35.14
4/7	79.97	0.71	56.38	13.98	12.80	43.57
14/7	78.50	0.86	67.34	16.63	15.17	52.17
24/7	76.22	1.01	77.03	17.32	15.82	61.21
3/8	73.19	1.08	79.04	15.79	14.50	64.54
13/8	69.48	1.08	75.04	12.26	11.39	63.65
23/8	65.20	1.08	70.42	7.54	7.17	63.25
2/9	60.46	1.08	65.29	1.70	1.66	63.64
12/9	55.37	1.08	59.80			59.80
22/9	50.09	1.08	54.10			54.10
2/10	44.75	1.08	45.96			45.96
12/10	39.50	0.93	36.70			36.70
22/10	34.50	0.83	28.66			28.66
1/11	29.86	0.73	21.88			21.88
11/11	25.74	0.63	16.33			16.33
21/11	11.52	0.56	6.45			6.45
Total	1186.60	-	909.86	107.67	99.94	809.92



Sibi

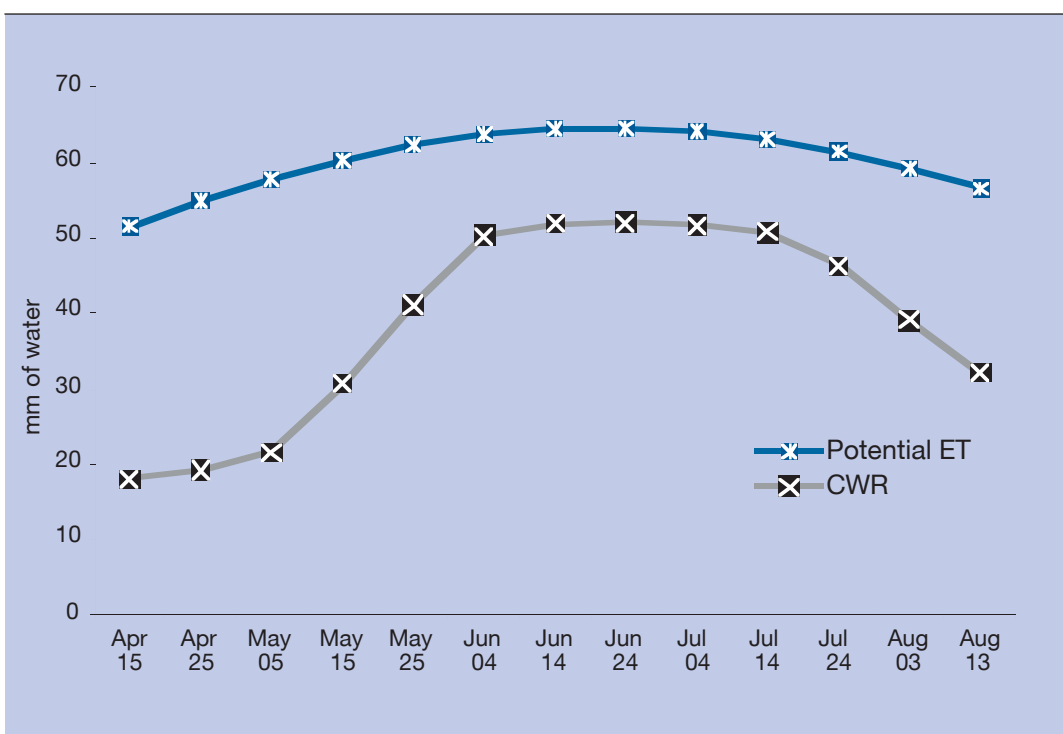
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/5	84.17	0.32	26.51			26.51
25/5	86.37	0.32	27.21			27.21
4/6	87.71	0.32	27.63			27.63
14/6	88.17	0.40	35.19			35.19
24/6	87.74	0.55	48.43	4.37	4.18	44.26
4/7	86.43	0.71	60.92	9.35	8.80	52.12
14/7	84.27	0.86	72.29	11.85	11.12	61.17
24/7	81.34	1.10	82.20	12.22	11.49	70.71
3/8	77.69	1.08	83.90	10.83	10.24	73.66
13/8	73.43	1.08	79.30	8.26	7.88	71.42
23/8	68.66	1.08	74.15	5.33	5.17	68.98
2/9	63.51	1.08	68.59	1.44	1.41	67.18
12/9	58.12	1.08	62.77			62.77
22/9	52.63	1.08	56.84			56.84
2/10	47.18	1.08	48.46			48.46
12/10	41.94	0.93	38.95			38.95
22/10	37.03	0.83	30.76			30.76
1/11	32.60	0.73	23.88			23.88
11/11	28.76	0.63	18.24			18.24
21/11	13.15	0.56	7.36			7.36
Total	1280.87	-	973.58	63.66	60.28	913.30



Potato

Kalat

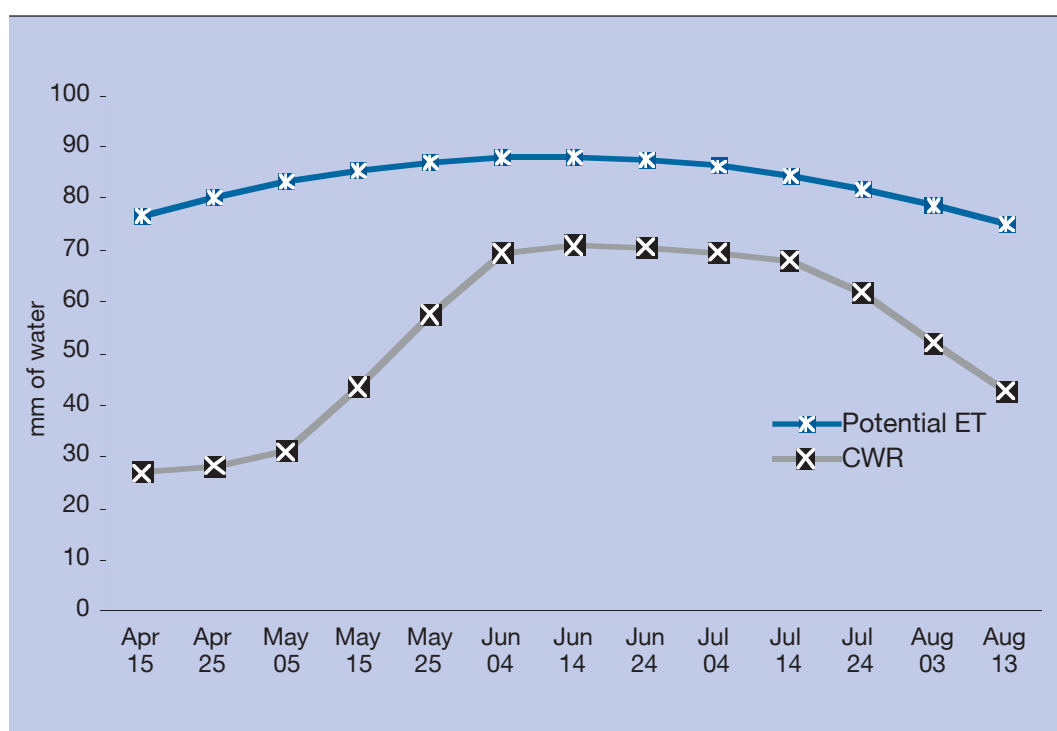
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	51.59	0.35	18.06	0.00	0.00	18.06
25/4	54.89	0.35	19.21	0.00	0.00	19.21
5/5	57.82	0.37	21.57	0.00	0.00	21.57
15/5	60.30	0.51	30.73	0.00	0.00	30.73
25/5	62.26	0.66	41.17	0.00	0.00	41.17
4/6	63.66	0.79	50.28	0.00	0.00	50.28
14/6	64.45	0.80	51.88	0.00	0.00	51.88
24/6	64.62	0.80	52.02	1.96	1.92	50.10
4/7	64.16	0.80	51.64	3.57	3.47	48.18
14/7	63.08	0.80	50.78	4.06	3.95	46.83
24/7	61.42	0.75	46.30	3.30	3.23	43.08
3/8	59.22	0.66	39.12	0.62	0.61	38.51
13/8	56.53	0.57	32.08	0.00	0.00	32.08
Total	783.98	-	504.84	13.51	13.17	491.68



Potato

Khuzdar

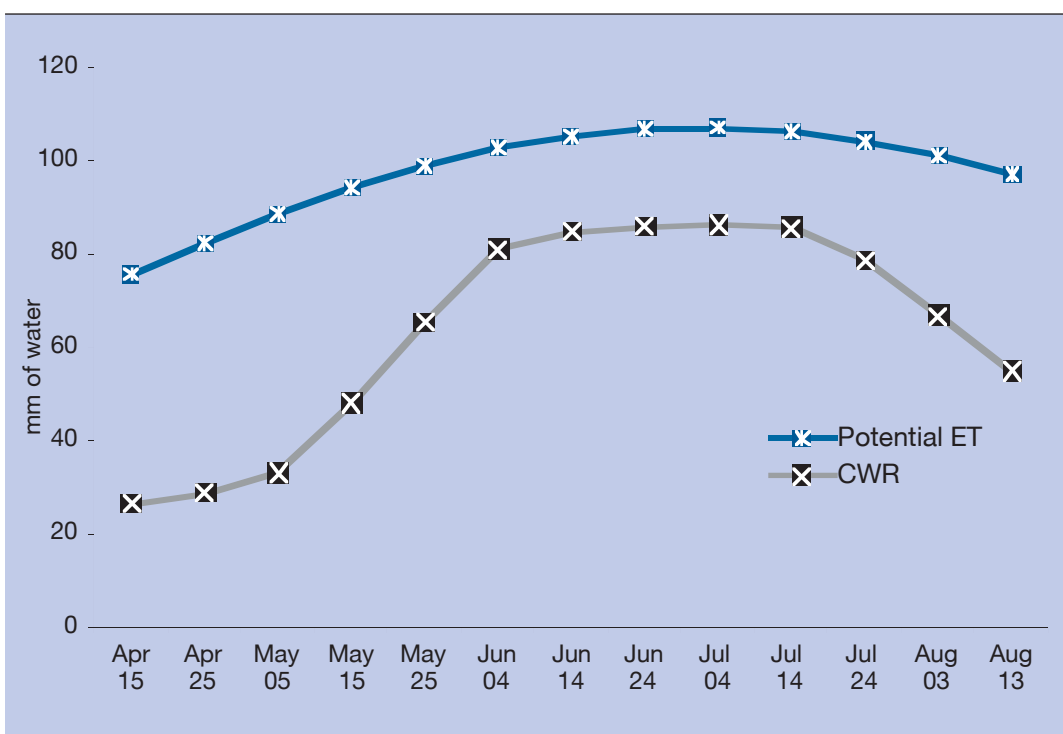
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	76.76	0.35	26.87	3.79	3.68	23.19
25/4	80.23	0.35	28.08	3.20	3.12	24.96
5/5	83.14	0.37	31.01	0.27	0.27	30.74
15/5	85.42	0.51	43.52	0.00	0.00	43.52
25/5	87.03	0.66	57.53	0.00	0.00	57.53
4/6	87.93	0.79	69.45	0.00	0.00	69.45
14/6	88.10	0.80	70.92	0.00	0.00	70.92
24/6	87.55	0.80	70.48	5.08	4.73	65.75
4/7	86.29	0.80	69.46	10.93	9.92	59.54
14/7	84.35	0.80	67.90	14.01	12.68	55.22
24/7	81.78	0.75	61.66	14.64	13.29	48.36
3/8	78.65	0.66	51.96	13.10	11.98	39.98
13/8	75.02	0.57	42.57	9.85	9.12	33.44
Total	1082.25	-	691.41	74.86	68.80	622.61



Potato

Quetta

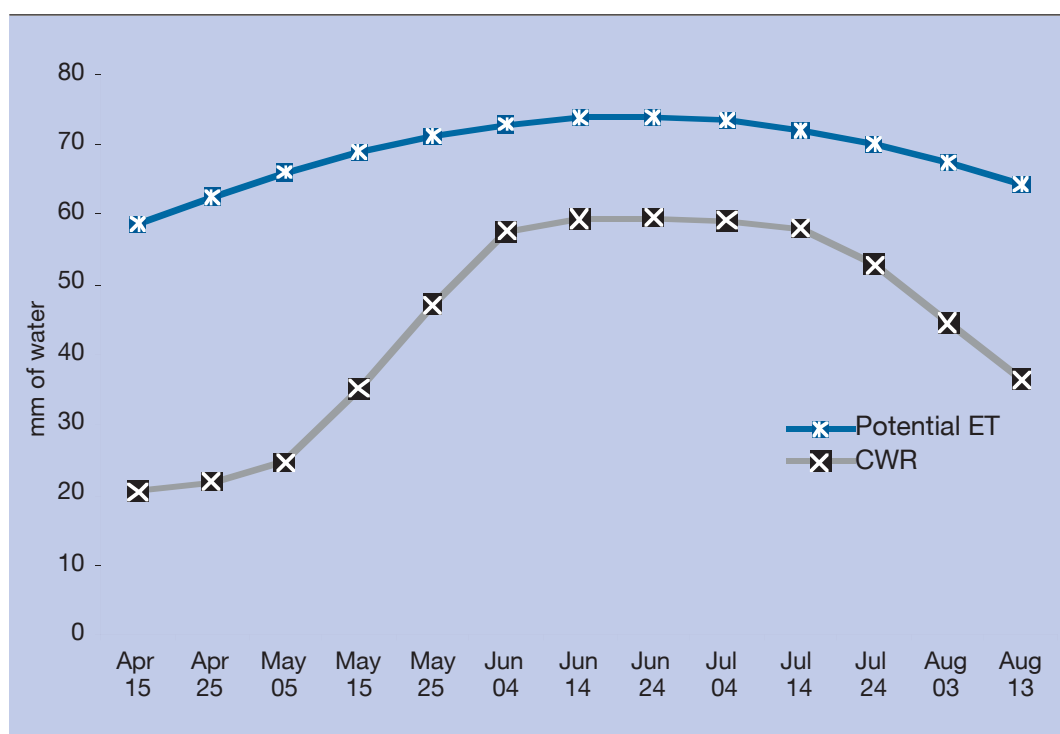
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	75.69	0.35	26.49	5.25	5.04	21.45
25/4	82.43	0.35	28.85	3.04	2.96	25.89
5/5	88.66	0.37	33.09	0.15	0.15	32.94
15/5	94.19	0.51	48.03	0.00	0.00	48.03
25/5	98.88	0.66	65.41	0.00	0.00	65.41
4/6	102.60	0.79	81.05	0.00	0.00	81.05
14/6	105.24	0.80	84.72	0.00	0.00	84.72
24/6	106.73	0.80	85.92	0.00	0.00	85.92
4/7	107.04	0.80	86.17	0.00	0.00	86.17
14/7	106.17	0.80	85.46	0.00	0.00	85.46
24/7	104.12	0.75	78.49	0.00	0.00	78.49
3/8	100.97	0.66	66.70	0.00	0.00	66.70
13/8	96.81	0.57	54.93	0.00	0.00	54.93
Total	1269.55	-	825.32	8.44	8.15	817.18



Potato

Barkhan

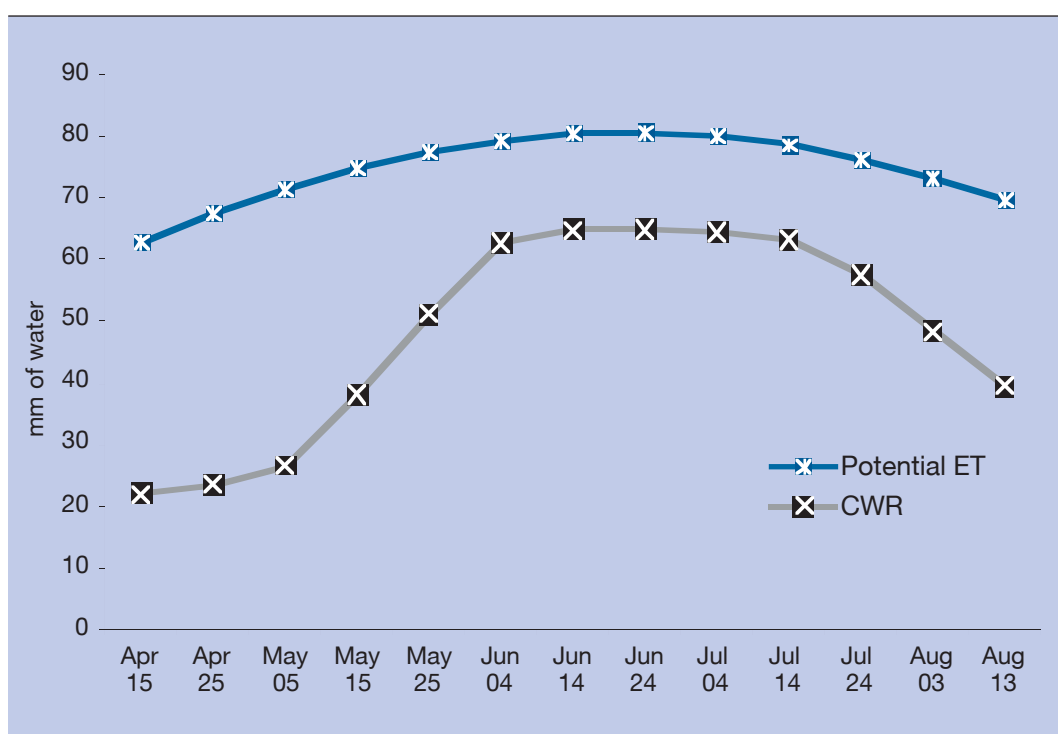
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	58.69	0.35	20.54	5.65	5.54	15.00
25/4	62.59	0.35	21.91	5.23	5.22	16.69
5/5	66.05	0.37	24.64	5.30	5.28	19.36
15/5	68.96	0.51	35.15	6.02	5.86	29.29
25/5	71.26	0.66	47.12	7.45	7.00	40.12
4/6	72.88	0.79	57.57	9.55	8.68	48.89
14/6	73.79	0.80	59.40	12.15	10.76	48.64
24/6	73.96	0.80	59.53	14.98	13.03	46.51
4/7	73.38	0.80	59.07	17.69	15.22	43.85
14/7	72.08	0.80	58.02	19.88	17.02	41.01
24/7	70.08	0.75	52.84	21.16	18.10	34.73
3/8	67.45	0.66	44.56	21.18	18.20	26.36
13/8	64.24	0.57	36.45	19.73	17.11	19.34
Total	895.39	-	576.80	165.97	147.01	429.79



Potato

Zhob

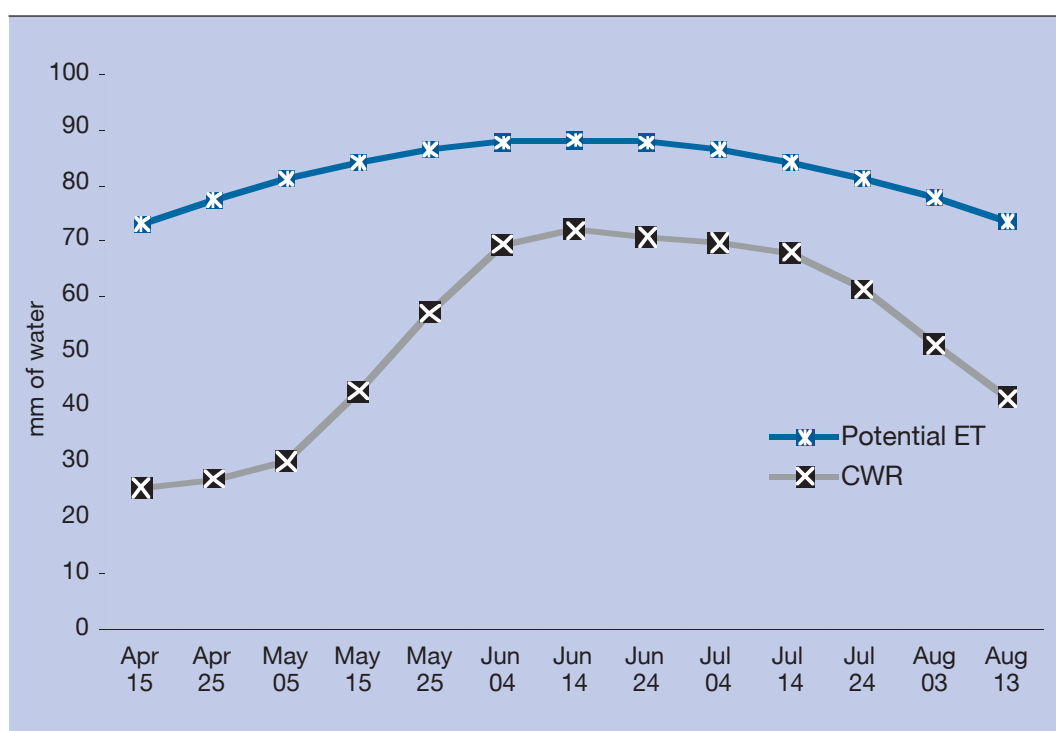
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	62.79	0.35	21.98	7.33	6.94	15.04
25/4	67.29	0.35	23.55	4.98	4.77	18.78
5/5	71.29	0.37	26.60	0.34	0.33	26.27
15/5	74.67	0.51	38.07	0.00	0.00	37.07
25/5	77.36	0.66	51.16	2.34	2.32	48.84
4/6	79.27	0.79	62.62	2.57	2.56	60.05
14/6	80.36	0.80	64.69	4.72	4.51	60.18
24/6	80.59	0.80	64.88	7.85	7.28	57.60
4/7	79.97	0.80	64.37	10.87	9.96	54.42
14/7	78.50	0.80	63.19	12.93	11.80	51.39
24/7	76.22	0.75	57.46	13.47	12.30	45.16
3/8	73.19	0.66	48.35	12.28	11.28	37.07
13/8	69.48	0.57	39.43	9.53	8.86	30.57
Total	970.97	-	626.34	89.20	82.91	542.42



Potato

Sibi

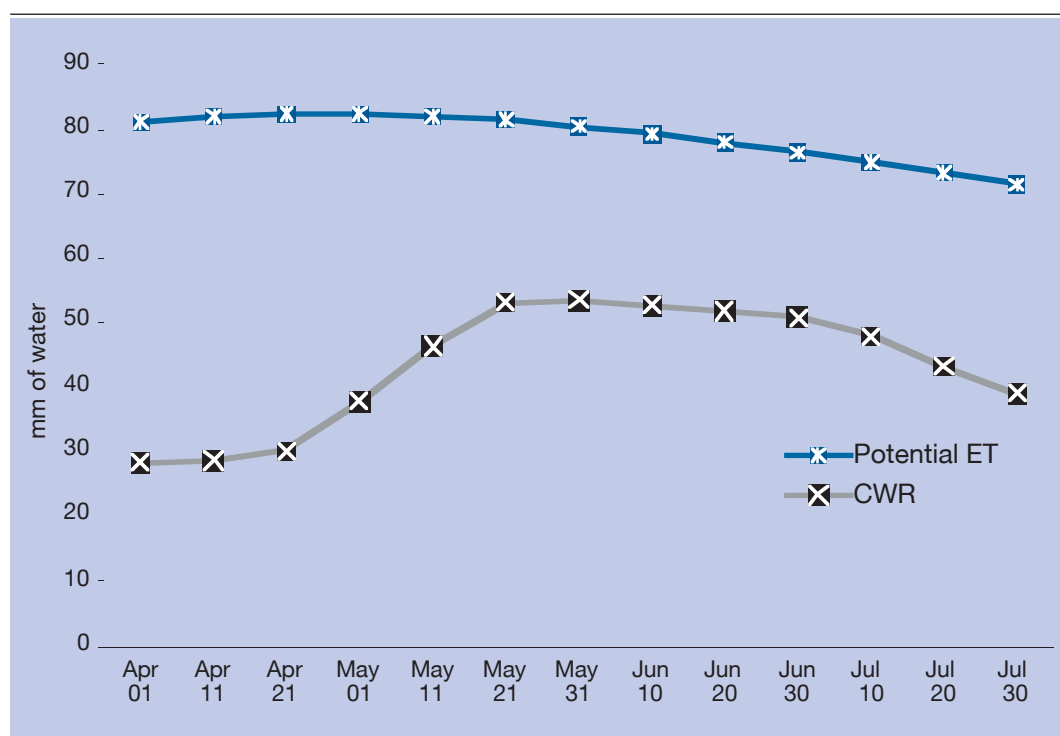
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	73.08	0.35	25.58	0.00	0.00	25.58
25/4	77.45	0.35	27.11	0.00	0.00	27.11
5/5	81.17	0.37	30.28	0.00	0.00	30.28
15/5	84.17	0.51	42.90	0.00	0.00	42.90
25/5	86.37	0.66	57.10	0.00	0.00	57.10
4/6	87.71	0.79	69.28	0.00	0.00	69.28
14/6	88.17	0.80	70.97	0.00	0.00	70.97
24/6	87.74	0.80	70.63	3.40	3.25	67.38
4/7	86.43	0.80	69.57	7.27	6.84	62.73
14/7	84.27	0.80	67.84	9.22	8.65	59.19
24/7	81.34	0.75	61.33	9.51	8.94	52.39
3/8	77.69	0.66	51.33	8.43	7.96	43.37
13/8	73.43	0.57	41.67	6.43	6.13	35.54
Total	1069.00	-	685.58	44.25	41.77	643.81



Onion

Gwadar

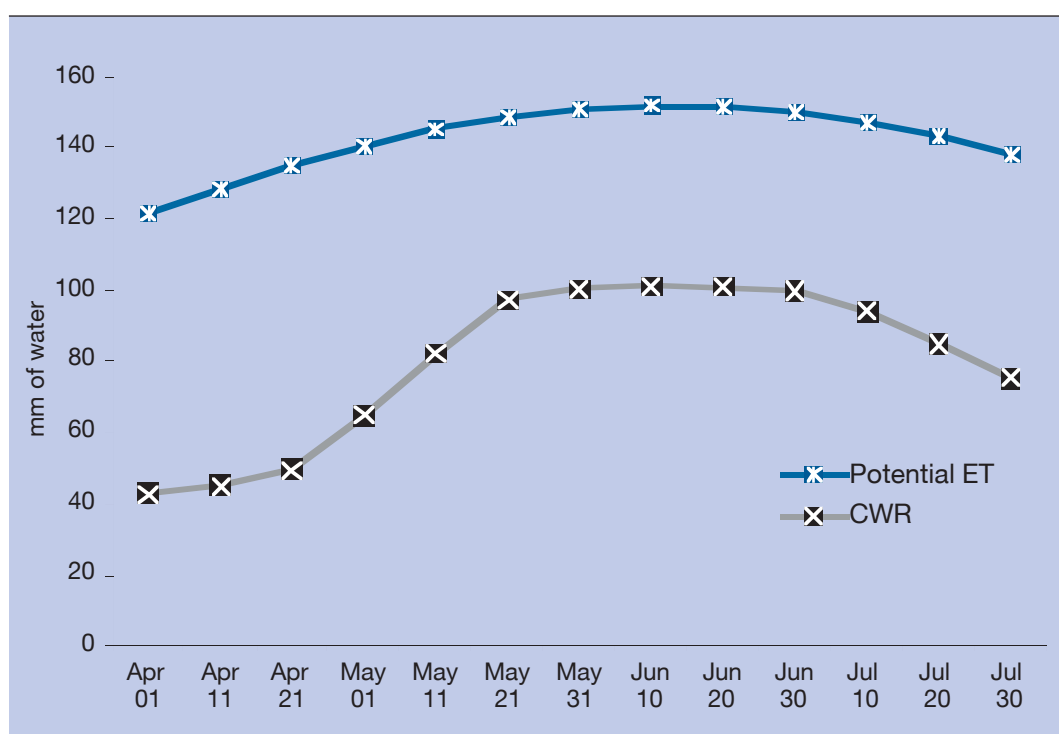
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	81.07	0.35	28.38	0.00	0.00	28.38
11/4	81.92	0.35	28.67	0.00	0.00	28.67
21/4	82.35	0.37	30.12	0.00	0.00	30.12
1/5	82.37	0.46	37.91	0.00	0.00	37.91
11/5	82.03	0.57	46.36	0.00	0.00	46.36
21/5	81.37	0.65	53.25	0.00	0.00	53.25
31/5	80.43	0.66	53.48	0.00	0.00	53.48
10/6	79.25	0.66	52.70	0.00	0.00	52.70
20/6	77.90	0.66	51.80	0.00	0.00	51.80
30/6	76.40	0.66	50.80	0.00	0.00	50.80
10/7	74.80	0.64	47.83	0.00	0.00	47.83
20/7	73.14	0.59	43.35	0.00	0.00	43.35
30/7	71.44	0.55	39.02	0.00	0.00	39.02
Total	1024.47	-	563.67	0.00	0.00	563.67



Onion

Turbat

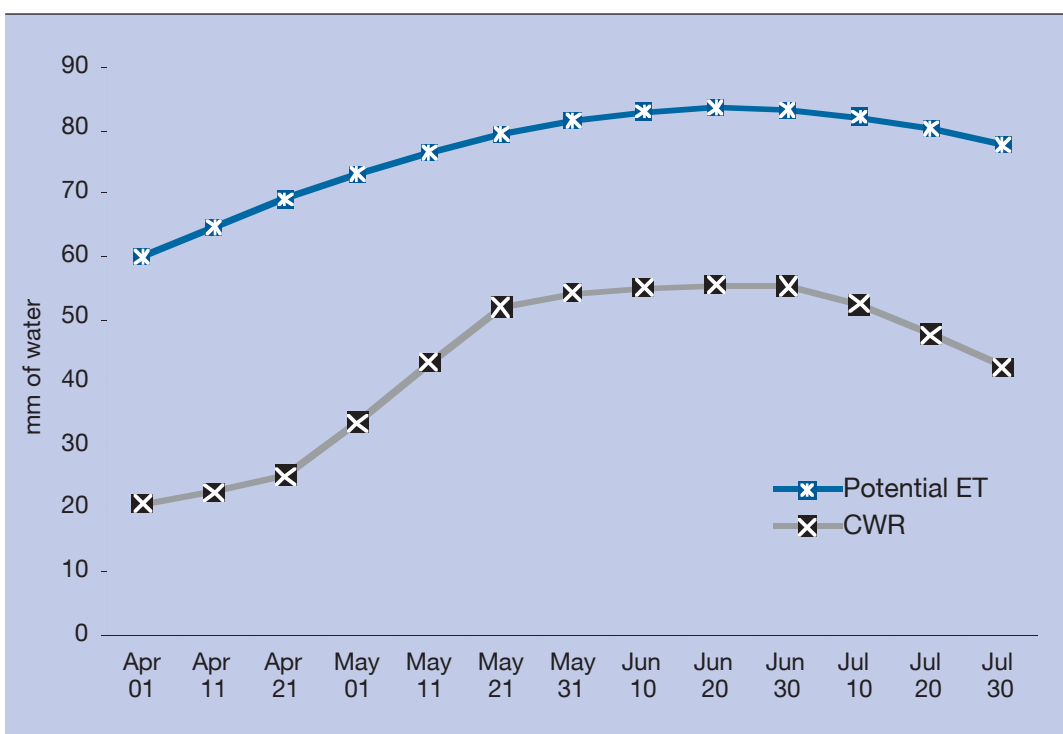
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	121.51	0.35	42.53	0.48	0.34	42.19
11/4	128.55	0.35	44.99	-	-	44.99
21/4	134.97	0.37	49.39	-	-	49.39
1/5	140.56	0.46	64.74	-	-	64.74
11/5	145.17	0.57	82.09	-	-	82.09
21/5	148.67	0.65	97.31	-	-	97.31
31/5	150.95	0.66	100.38	-	-	100.38
10/6	151.94	0.66	101.04	-	-	101.04
20/6	151.63	0.66	100.83	-	-	100.83
30/6	150.01	0.66	99.79	-	-	99.76
10/7	147.14	0.64	94.08	-	-	94.08
20/7	143.09	0.59	84.83	-	-	84.83
30/7	138.00	0.55	75.37	-	-	75.37
Total	1852.18	-	1037.35	0.48	0.34	1037.01



Onion

Dalbandin

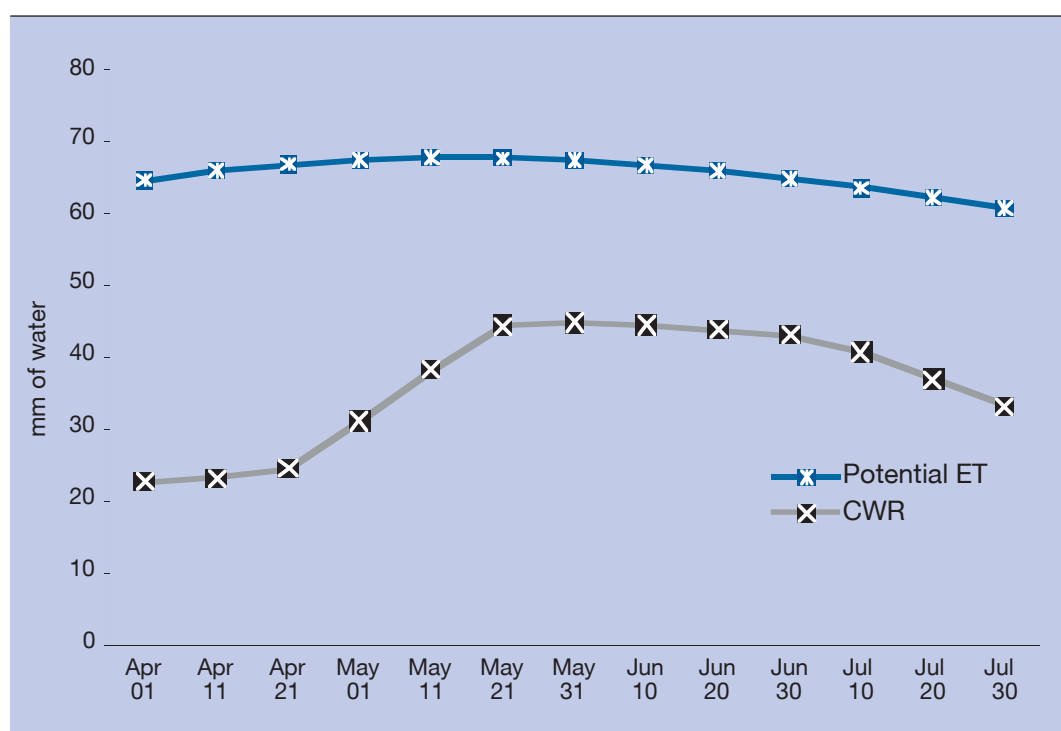
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	59.89	0.35	20.96	1.11	1.09	19.88
11/4	64.64	0.35	22.62	0.00	0.00	22.62
21/4	69.09	0.37	25.29	0.00	0.00	25.29
1/5	73.10	0.46	33.68	0.00	0.00	33.68
11/5	76.58	0.57	43.31	0.00	0.00	43.31
21/5	79.42	0.65	51.99	0.00	0.00	51.99
31/5	81.55	0.66	54.23	0.00	0.00	54.23
10/6	82.92	0.66	55.14	0.00	0.00	55.14
20/6	83.48	0.66	55.51	0.00	0.00	55.51
30/6	83.22	0.66	55.34	0.00	0.00	55.34
10/7	82.14	0.64	52.52	0.00	0.00	52.52
20/7	80.29	0.59	47.59	0.00	0.00	47.59
30/7	77.70	0.55	42.44	0.00	0.00	42.44
Total	994.02	-	560.64	1.11	1.09	559.54



Onion

Jiwani

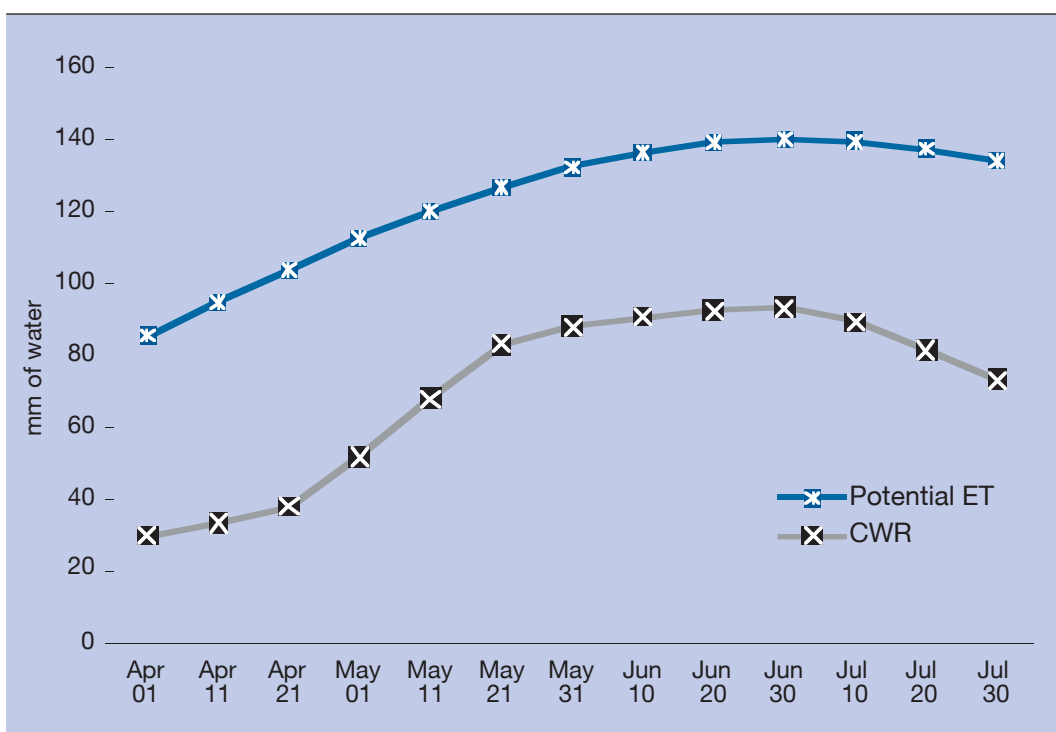
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	64.71	0.35	22.65	0.81	0.81	21.84
11/4	65.98	0.35	23.09	0.00	0.00	23.09
21/4	66.9	0.37	24.47	0.00	0.00	24.47
1/5	67.5	0.46	31.07	0.00	0.00	31.07
11/5	67.77	0.57	38.31	0.00	0.00	38.31
21/5	67.73	0.65	44.33	0.00	0.00	44.33
31/5	67.39	0.66	44.82	0.00	0.00	44.82
10/6	66.78	0.66	44.41	0.00	0.00	44.41
20/6	65.93	0.66	43.84	0.00	0.00	43.84
30/6	64.86	0.66	43.13	0.00	0.00	43.13
10/7	63.6	0.64	40.67	0.00	0.00	40.67
20/7	62.19	0.59	36.86	0.00	0.00	36.86
30/7	60.67	0.55	33.13	0.00	0.00	33.13
Total	852.01	-	470.79	0.81	0.81	469.98



Onion

Nokundi

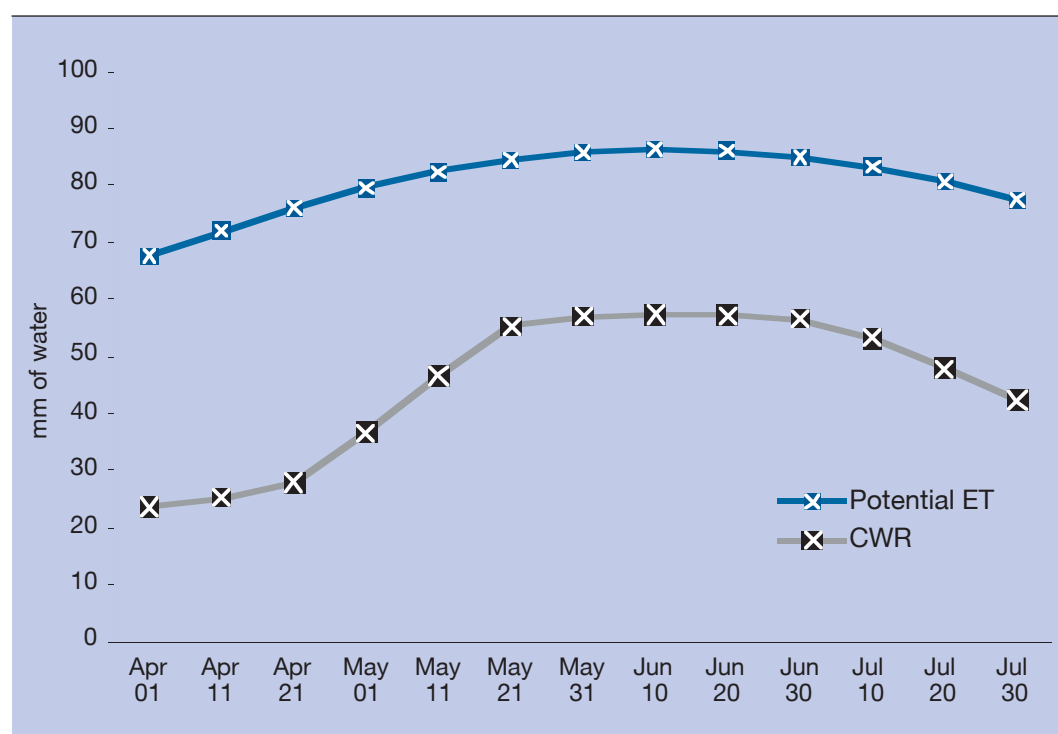
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	85.40	0.35	29.89	0.00	0.00	29.89
11/4	94.69	0.35	33.14	0.00	0.00	33.14
21/4	103.72	0.37	37.98	0.00	0.00	37.98
1/5	112.20	0.46	51.71	0.00	0.00	51.71
11/5	119.90	0.57	67.84	0.00	0.00	67.84
21/5	126.59	0.65	82.87	0.00	0.00	82.87
31/5	132.07	0.66	87.82	0.00	0.00	87.82
10/6	136.18	0.66	90.56	0.00	0.00	90.56
20/6	138.82	0.66	92.31	0.00	0.00	92.31
30/6	139.89	0.66	93.03	0.00	0.00	93.03
10/7	139.38	0.64	89.12	0.00	0.00	89.12
20/7	137.30	0.59	81.38	0.00	0.00	81.38
30/7	133.69	0.55	73.01	0.00	0.00	73.01
Total	1599.82	-	910.66	0.00	0.00	910.67



Onion

Lasbela

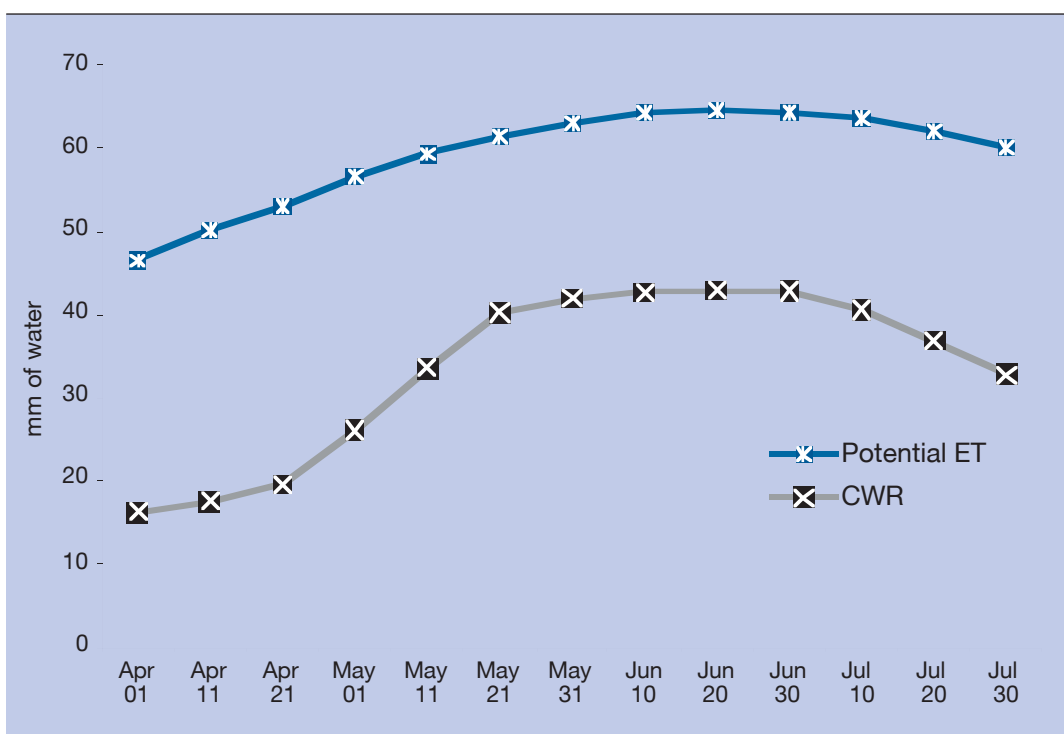
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	67.66	0.35	23.68	5.68	6.26	17.42
11/4	72.14	0.35	25.25	5.90	5.74	19.51
21/4	76.16	0.37	27.87	5.35	5.31	22.56
1/5	79.61	0.46	36.67	5.20	5.20	31.47
11/5	82.42	0.57	46.61	5.65	5.56	41.05
21/5	84.52	0.65	55.32	6.80	6.48	48.85
31/5	85.85	0.66	57.09	8.64	7.95	49.14
10/6	86.40	0.66	57.45	11.07	9.89	47.57
20/6	86.14	0.66	57.28	13.84	12.11	45.17
30/6	85.08	0.66	56.58	16.64	14.37	42.21
10/7	83.26	0.64	53.24	19.09	16.37	36.87
20/7	80.71	0.59	47.85	20.78	17.77	30.08
30/7	77.52	0.55	42.34	21.34	18.29	24.05
Total	1047.47	-	587.23	146.88	131.30	455.94



Onion

Kalat

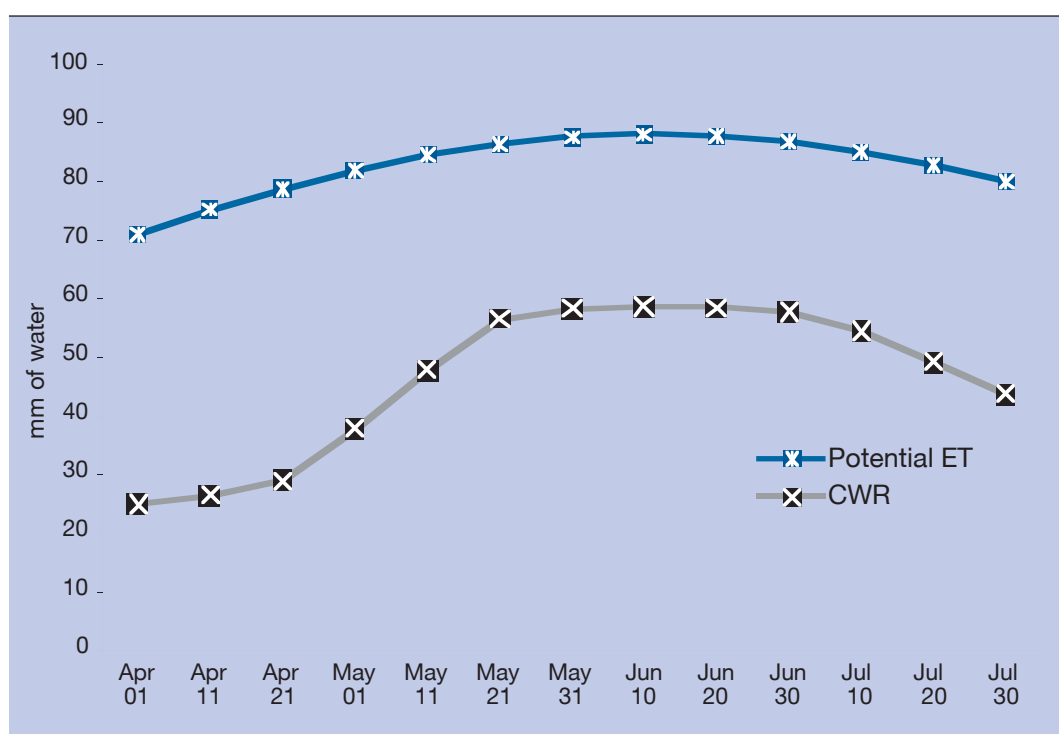
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	46.53	0.35	16.29	1.20	1.17	15.12
11/4	50.19	0.35	17.57	0.00	0.00	17.57
21/4	53.61	0.37	19.62	0.00	0.00	19.62
1/5	56.70	0.46	26.12	0.00	0.00	26.12
11/5	59.36	0.57	33.58	0.00	0.00	33.58
21/5	61.54	0.65	40.28	0.00	0.00	40.28
31/5	63.17	0.66	42.01	0.00	0.00	42.01
10/6	64.20	0.66	42.70	0.00	0.00	42.70
20/6	64.62	0.66	42.97	0.91	0.89	42.09
30/6	64.41	0.66	42.84	3.08	3.00	39.84
10/7	63.58	0.64	40.65	4.00	3.89	36.77
20/7	62.15	0.59	36.84	3.77	3.68	33.16
30/7	60.16	0.55	32.86	1.76	1.72	31.13
Total	770.24	-	434.32	14.71	14.345	419.98



Onion

Khuzdar

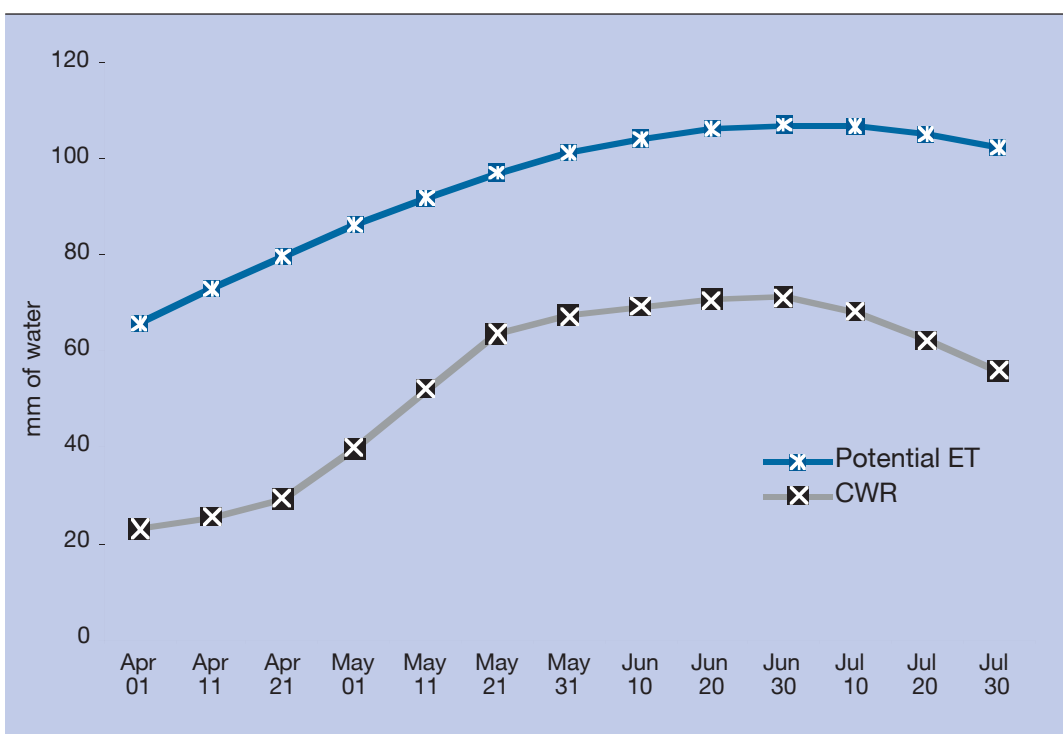
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	71.13	0.35	24.89	4.26	4.13	20.76
11/4	75.24	0.35	26.33	3.94	3.83	22.51
21/4	78.91	0.37	28.88	3.48	3.38	25.49
1/5	82.05	0.46	37.79	1.45	1.42	36.36
11/5	84.58	0.57	47.83	0.00	0.00	47.83
21/5	86.47	0.65	56.60	0.00	0.00	56.60
31/5	87.65	0.66	58.29	0.00	0.00	58.29
10/6	88.12	0.66	58.60	0.00	0.00	58.60
20/6	87.86	0.66	58.43	2.14	2.03	56.39
30/6	86.88	0.66	57.77	8.98	8.20	49.58
10/7	85.20	0.64	54.48	13.08	11.84	42.64
20/7	82.88	0.59	49.13	14.67	13.30	35.83
30/7	79.96	0.55	43.67	13.95	12.72	30.96
Total	1076.92	-	602.69	65.96	60.85	541.84



Onion

Quetta

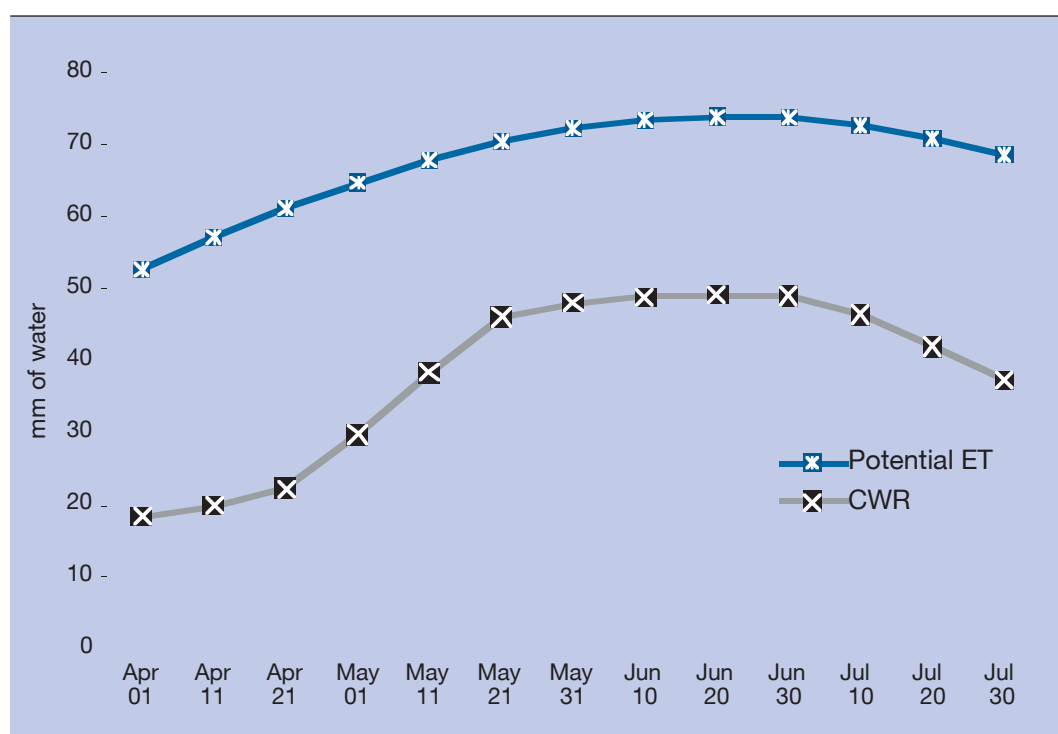
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	65.76	0.35	23.01	7.55	7.14	15.88
11/4	72.89	0.35	25.51	5.98	5.71	19.80
21/4	79.79	0.37	29.22	4.01	3.88	25.34
1/5	86.24	0.46	39.75	1.06	1.04	38.71
11/5	92.07	0.57	52.09	0.00	0.00	52.09
21/5	97.12	0.65	63.58	0.00	0.00	63.58
31/5	101.24	0.66	67.32	0.00	0.00	67.32
10/6	104.32	0.66	69.37	0.00	0.00	69.37
20/6	106.28	0.66	70.67	0.00	0.00	70.67
30/6	107.06	0.66	71.20	0.00	0.00	71.20
10/7	106.66	0.64	68.19	0.00	0.00	68.19
20/7	105.08	0.59	62.28	0.00	0.00	62.28
30/7	102.36	0.55	55.90	0.00	0.00	55.90
Total	1226.87	-	698.11	18.59	17.76	680.35



Onion

Barkhan

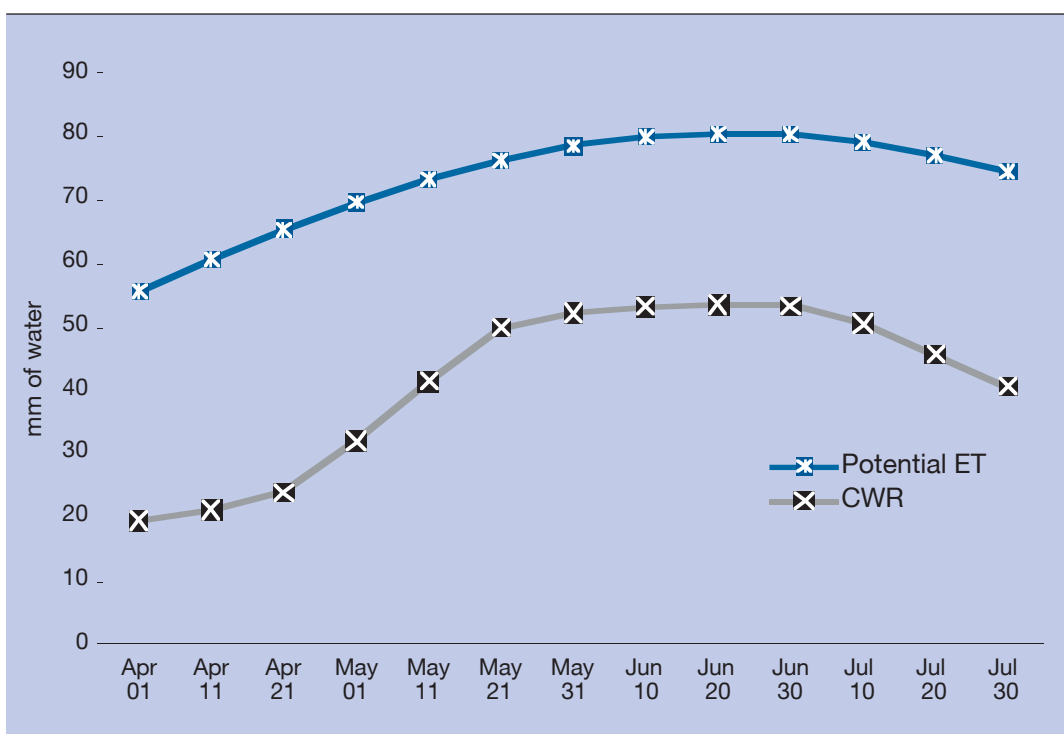
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	52.66	0.35	18.43	5.68	6.26	12.17
11/4	57.02	0.35	19.96	5.90	5.74	14.22
21/4	61.08	0.37	22.36	5.35	5.31	17.05
1/5	64.73	0.46	29.82	5.20	5.20	24.62
11/5	67.87	0.57	38.39	5.65	5.56	32.82
21/5	70.42	0.65	46.10	6.80	6.48	39.62
31/5	72.32	0.66	48.09	8.64	7.95	40.14
10/6	73.51	0.66	48.89	11.07	9.89	39.00
20/6	73.98	0.66	49.20	13.84	12.11	37.08
30/6	73.70	0.66	49.01	16.64	14.37	34.64
10/7	72.68	0.64	46.47	19.09	16.37	30.11
20/7	70.96	0.59	42.06	20.78	17.77	24.29
30/7	68.57	0.55	37.45	21.34	18.29	19.16
Total	879.49	-	496.22	145.88	131.30	364.92



Onion

Zhob

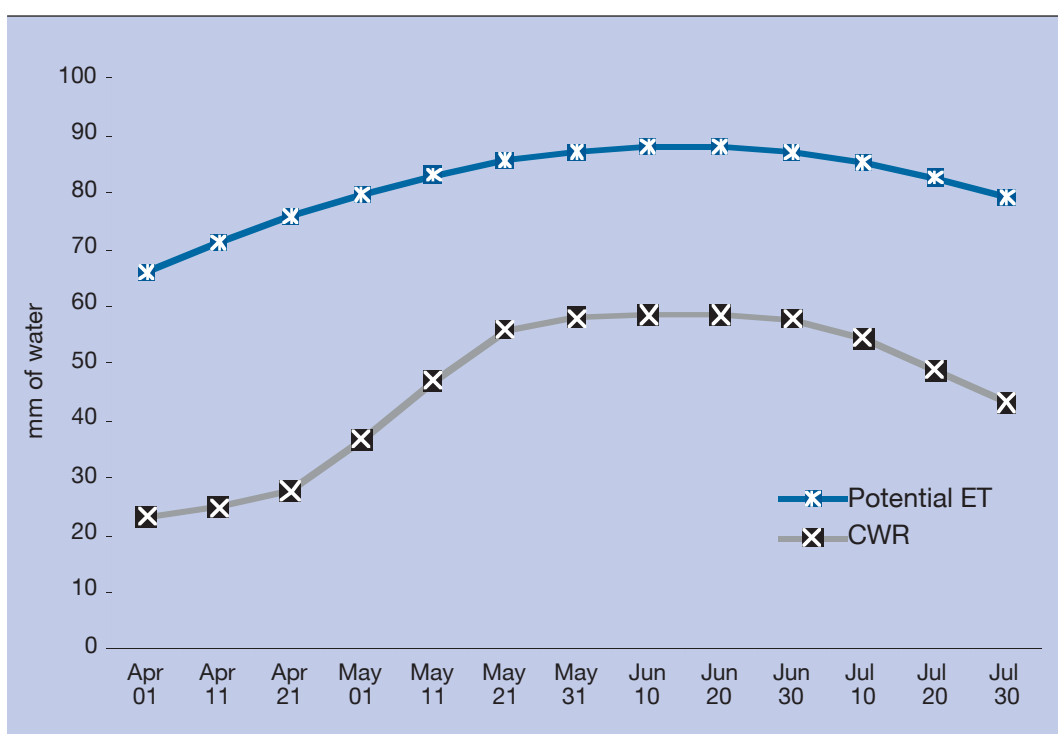
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	55.88	0.35	19.56	9.32	8.73	10.83
11/4	60.88	0.35	21.31	8.05	7.60	13.71
21/4	65.55	0.37	24.00	6.01	5.73	18.27
1/5	69.76	0.46	32.14	2.00	1.93	30.21
11/5	73.40	0.57	41.52	0.00	0.00	41.52
21/5	76.37	0.65	50.00	1.44	1.43	48.57
31/5	78.60	0.66	52.27	2.27	2.27	50.00
10/6	80.02	0.66	53.21	3.67	3.58	49.63
20/6	80.60	0.66	53.60	6.56	6.13	47.47
30/6	80.32	0.66	53.41	9.74	8.95	44.46
10/7	79.18	0.64	50.63	12.27	11.20	39.43
20/7	77.22	0.59	45.78	13.46	12.28	33.49
30/7	74.48	0.55	40.68	12.96	11.87	28.81
Total	952.26	-	538.10	87.74	81.70	456.40



Onion

Sibi

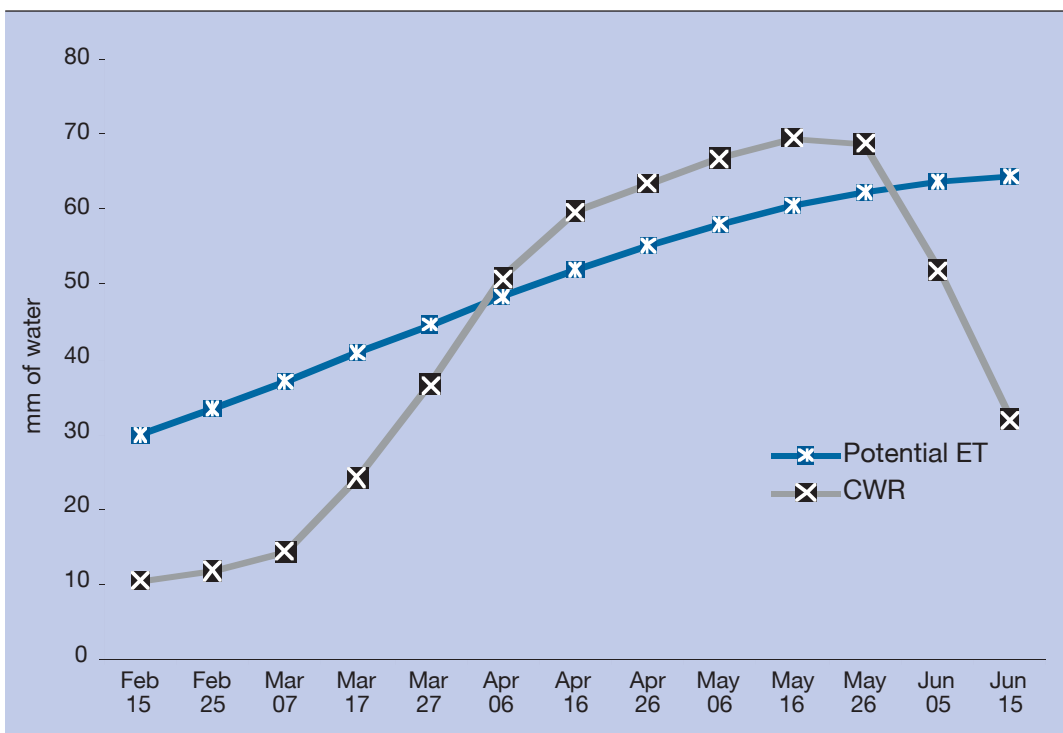
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/4	66.10	0.35	23.14	1.52	1.51	21.62
11/4	71.18	0.35	24.91	0.00	0.00	24.91
21/4	75.77	0.37	27.73	0.00	0.00	27.73
1/5	79.77	0.46	36.74	0.00	0.00	36.74
11/5	83.06	0.57	46.98	0.00	0.00	46.98
21/5	85.59	0.65	56.02	0.00	0.00	56.02
31/5	87.28	0.66	58.04	0.00	0.00	58.04
10/6	88.09	0.66	58.58	0.00	0.00	58.58
20/6	88.01	0.66	58.53	1.44	1.39	57.14
30/6	87.05	0.66	57.89	6.00	5.66	52.23
10/7	85.23	0.64	54.50	8.65	8.12	46.38
20/7	82.60	0.59	48.97	9.57	8.99	39.97
30/7	79.23	0.55	43.27	9.00	8.48	34.79
Total	1058.96	-	595.31	36.18	34.15	561.16



Sunflower

Kalat

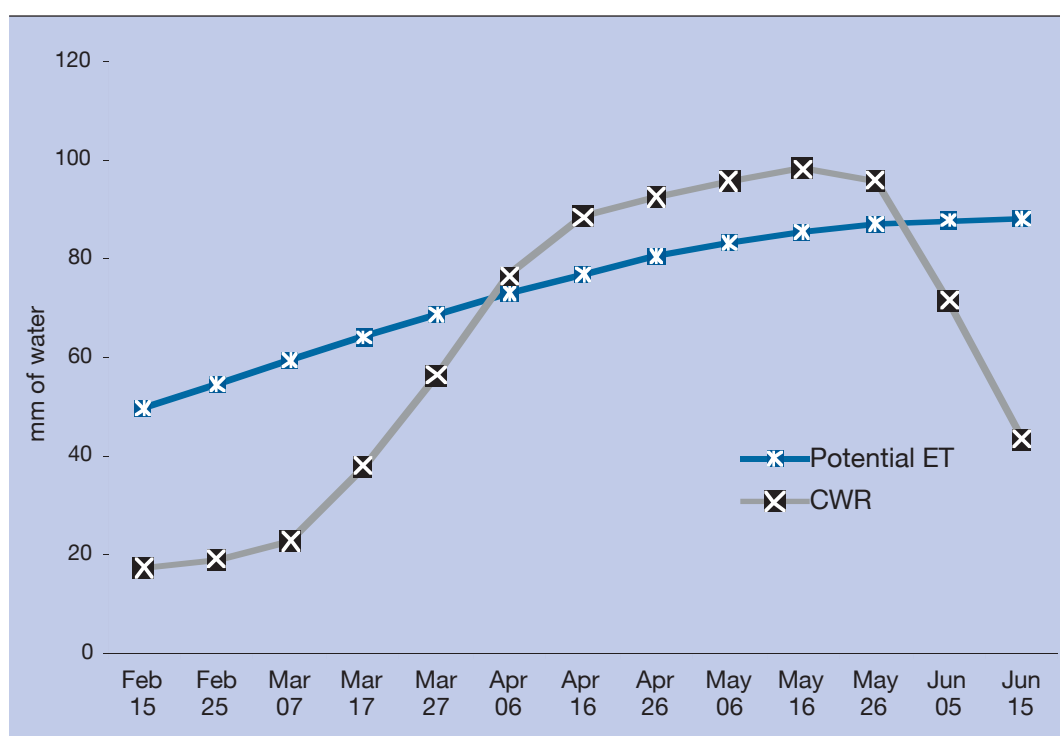
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	29.89	0.35	10.46	10.84	10.34	0.13
25/2	33.33	0.35	11.67	10.11	9.67	2.00
7/3	37.01	0.38	14.26	8.92	8.54	5.73
17/3	40.82	0.59	24.15	7.07	6.77	17.38
27/3	44.64	0.82	36.62	4.27	4.13	32.48
6/4	48.39	1.05	50.74	0.00	0.00	50.74
16/4	51.94	1.15	59.73	0.00	0.00	59.73
26/4	55.20	1.15	63.48	0.00	0.00	63.48
6/5	58.09	1.15	66.80	0.00	0.00	66.80
16/5	60.52	1.15	69.59	0.00	0.00	69.59
26/5	62.42	1.10	68.77	0.00	0.00	68.77
5/6	63.76	0.81	51.87	0.00	0.00	51.87
15/6	64.49	0.49	31.85	0.00	0.00	31.85
Total	650.51	-	560.00	41.22	39.45	520.55



Sunflower

Khuzdar

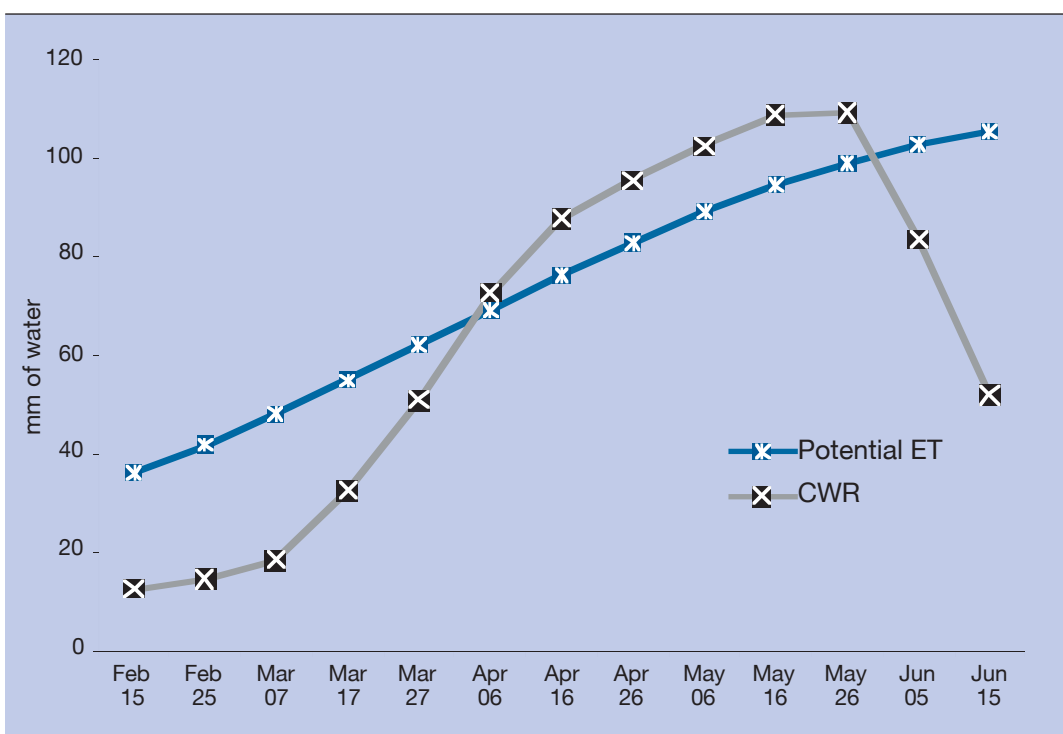
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	49.88	0.35	17.46	9.40	8.99	8.46
25/2	54.69	0.35	19.14	8.64	8.29	10.85
7/3	59.55	0.38	22.94	7.73	7.45	15.49
17/3	64.33	0.59	38.05	6.92	6.70	31.35
27/3	68.93	0.82	56.51	6.32	6.13	50.38
6/4	73.23	1.05	76.76	5.87	5.69	71.07
16/4	77.13	1.15	88.70	5.35	5.20	83.51
26/4	80.55	1.15	92.63	4.45	4.35	88.28
6/5	83.39	1.15	95.90	0.00	0.00	95.90
16/5	85.61	1.15	98.45	0.00	0.00	98.45
26/5	87.15	1.10	96.02	0.00	0.00	96.02
5/6	87.98	0.81	71.60	0.00	0.00	71.60
15/6	88.08	0.49	43.52	0.00	0.00	43.52
Total	960.51	-	817.69	54.68	52.80	764.89



Sunflower

Quetta

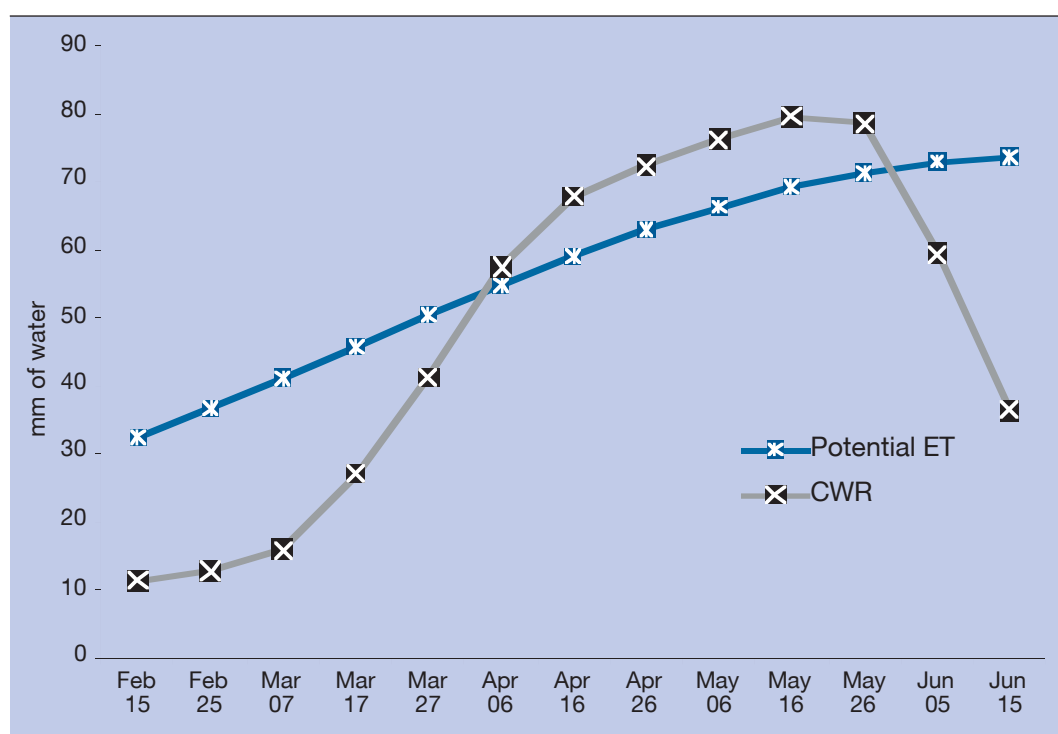
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	36.23	0.35	12.68	16.91	15.58	0.00
25/2	41.89	0.35	14.66	16.20	14.96	0.00
7/3	48.23	0.38	18.61	15.05	13.96	4.65
17/3	55.05	0.59	32.61	13.56	12.65	19.97
27/3	62.16	0.82	51.02	11.78	11.08	39.94
6/4	69.34	1.05	72.75	9.72	9.23	63.52
16/4	76.38	1.15	87.84	7.23	6.94	80.90
26/4	83.08	1.15	95.55	3.97	3.87	91.67
6/5	89.25	1.15	102.63	0.00	0.00	102.63
16/5	94.70	1.15	108.91	0.00	0.00	108.91
26/5	99.30	1.10	109.37	0.00	0.00	109.37
5/6	102.91	0.81	83.69	0.00	0.00	83.69
15/6	105.44	0.49	52.04	0.00	0.00	52.04
Total	963.98	-	842.35	94.40	88.26	757.29



Sunflower

Barkhan

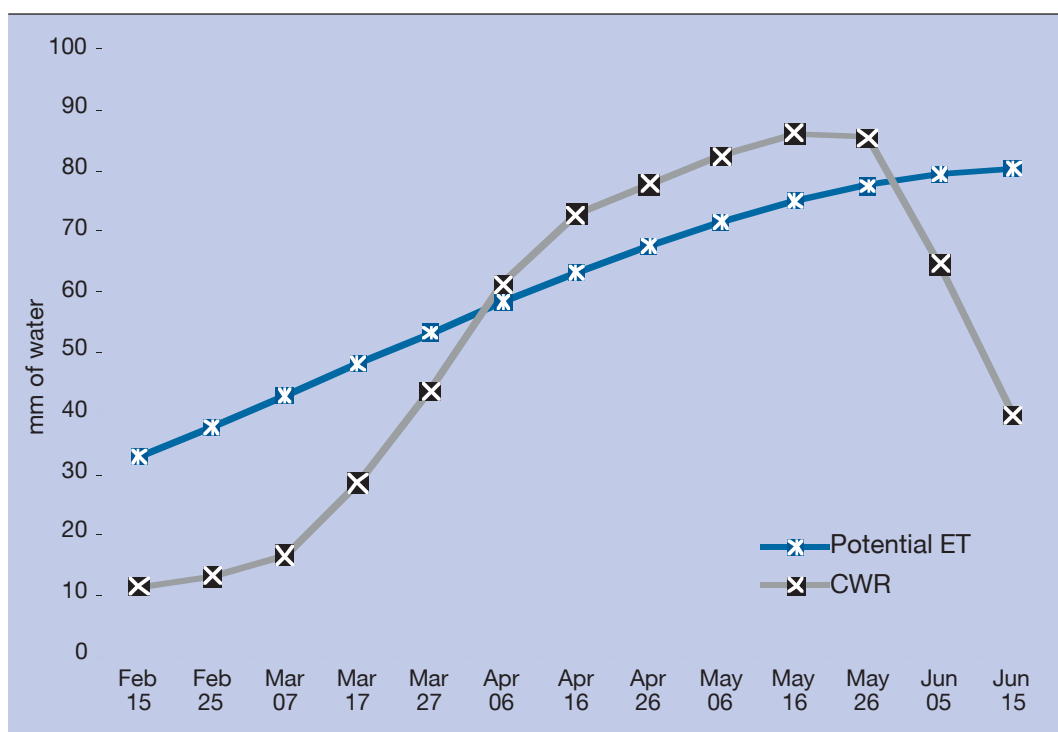
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	32.50	0.35	11.37	7.14	6.94	4.44
25/2	36.73	0.35	12.85	8.96	8.46	4.39
7/3	41.20	0.38	15.88	10.07	9.40	6.49
17/3	45.80	0.59	27.11	10.32	9.63	17.48
7/3	50.40	0.82	41.34	9.83	9.27	32.07
6/4	54.87	1.05	57.54	8.92	8.57	48.97
16/4	59.09	1.15	67.96	7.99	7.85	60.10
26/4	62.96	1.15	72.40	7.45	7.44	64.97
6/5	66.36	1.15	76.32	7.63	7.59	68.73
16/5	69.22	1.15	79.60	8.76	8.50	71.11
26/5	71.45	1.10	78.71	10.91	10.21	68.50
5/6	73.01	0.81	59.39	13.99	12.67	46.72
15/6	73.84	0.49	36.46	17.76	15.68	20.78
Total	737.43	-	636.93	129.73	122.21	514.75



Sunflower

Zhob

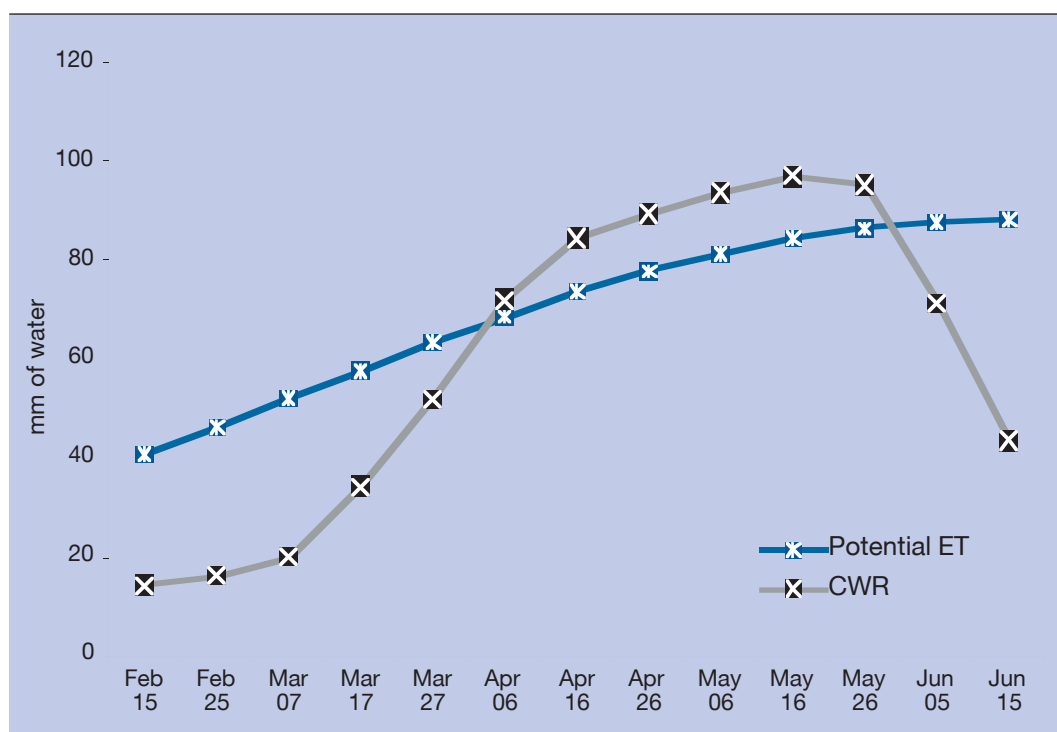
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	32.99	0.35	11.55	9.78	9.32	2.23
15/2	37.76	0.35	13.22	11.63	10.95	2.27
7/3	42.82	0.38	16.51	13.14	12.28	4.23
17/3	48.05	0.59	28.45	13.94	13.00	15.44
27/3	53.29	0.82	43.72	13.79	12.89	30.83
6/4	58.41	1.05	61.26	12.55	11.79	49.47
16/4	63.26	1.15	72.75	10.18	9.65	63.10
26/4	67.72	1.15	77.87	6.71	6.45	71.42
6/5	71.66	1.15	82.40	0.00	0.00	82.40
16/5	74.97	1.15	86.22	0.00	0.00	86.22
26/5	77.58	1.10	85.46	3.64	3.62	81.84
5/6	79.41	0.81	64.61	3.86	3.84	60.76
15/6	80.42	0.49	39.71	7.15	6.81	32.90
Total	788.35	-	683.74	106.38	100.60	583.13



Sunflower

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/2	40.84	0.35	14.29	0.87	0.85	13.44
25/2	46.41	0.35	16.24	5.04	4.80	11.44
7/3	52.13	0.38	20.10	5.71	5.49	14.61
17/3	57.85	0.59	34.24	5.63	5.59	28.65
27/3	63.42	0.82	52.01	4.68	4.67	47.34
6/4	68.69	1.05	72.03	0.00	0.00	72.03
16/4	73.54	1.15	84.58	0.00	0.00	84.58
26/4	77.85	1.15	89.53	0.00	0.00	89.53
6/5	81.51	1.15	93.73	0.00	0.00	93.73
16/5	84.43	1.15	97.09	0.00	0.00	97.09
26/5	86.54	1.10	95.34	0.00	0.00	95.34
5/6	87.79	0.81	71.44	0.00	0.00	71.44
15/6	88.16	0.49	43.55	0.00	0.00	43.55
Total	909.17	-	784.18	21.93	21.41	762.77



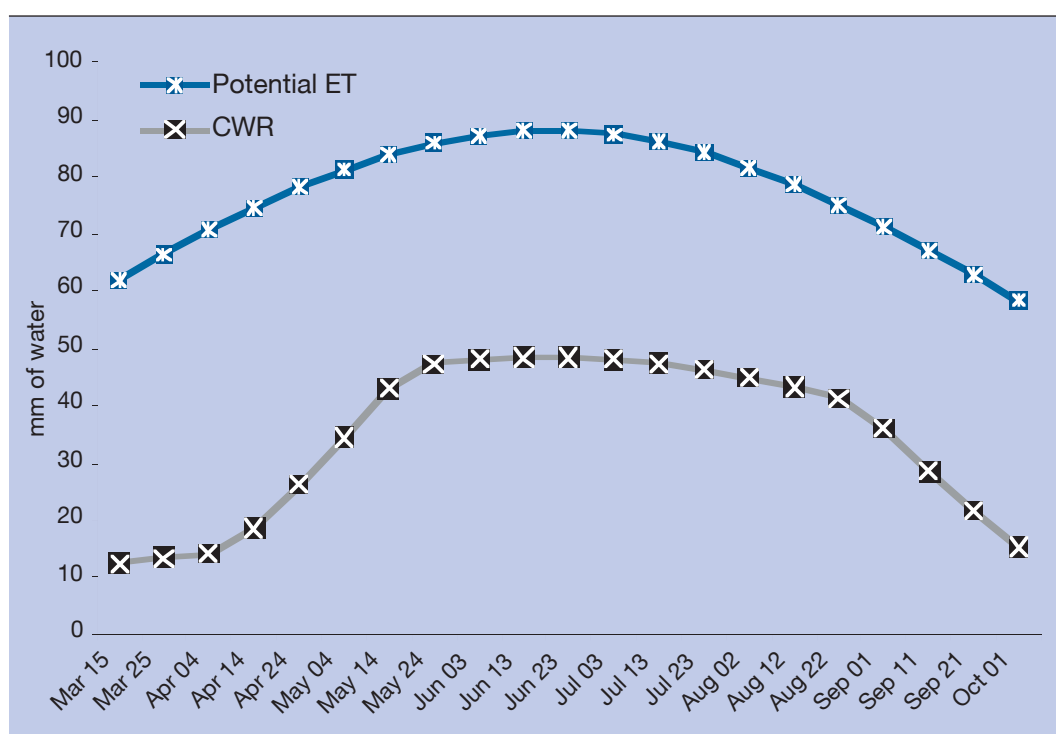
75

Water requirements
of major crops for different
agro-climatic zones of Balochistan

Grapes

Panjgur

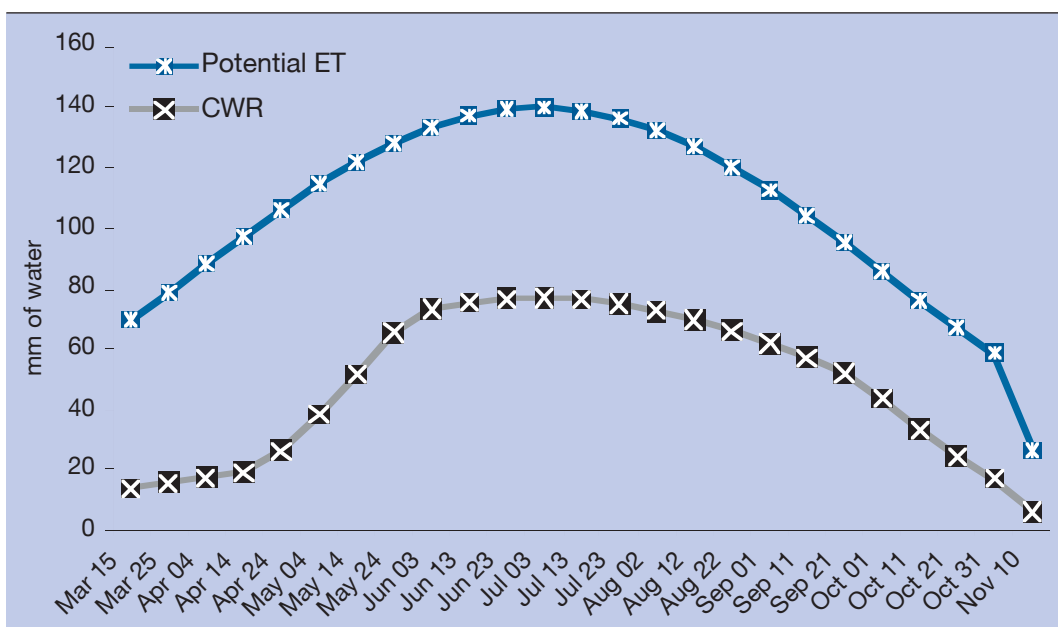
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	61.93	0.20	12.39	0.00	0.00	12.39
25/3	66.34	0.20	13.27	0.00	0.00	13.27
4/4	70.58	0.20	14.12	0.00	0.00	14.12
14/4	74.55	0.25	18.52	0.00	0.00	18.52
24/4	78.14	0.34	26.25	0.00	0.00	26.25
4/5	81.28	0.42	34.41	0.00	0.00	34.41
14/5	83.89	0.51	42.85	0.00	0.00	42.85
24/5	85.91	0.55	47.25	0.00	0.00	47.25
3/6	87.29	0.55	48.01	0.00	0.00	48.01
13/6	88.01	0.55	48.40	0.00	0.00	48.40
23/6	88.03	0.55	48.42	0.86	0.84	47.58
3/7	87.38	0.55	48.06	2.21	2.15	45.91
13/7	86.06	0.55	47.33	2.76	2.68	44.66
23/7	84.11	0.55	46.26	2.35	2.28	43.98
2/8	81.58	0.55	44.87	0.57	0.55	44.31
12/8	78.53	0.55	43.19	0.00	0.00	43.19
22/8	75.03	0.55	41.26	0.00	0.00	41.26
1/9	71.17	0.51	35.99	0.00	0.00	35.99
11/9	67.05	0.42	28.46	0.00	0.00	28.46
21/9	62.77	0.34	21.55	0.00	0.00	21.55
1/10	58.44	0.26	15.32	0.00	0.00	15.32
Total	1,618.10	-	726.20	8.74	8.51	717.69



Grapes

Nokundi

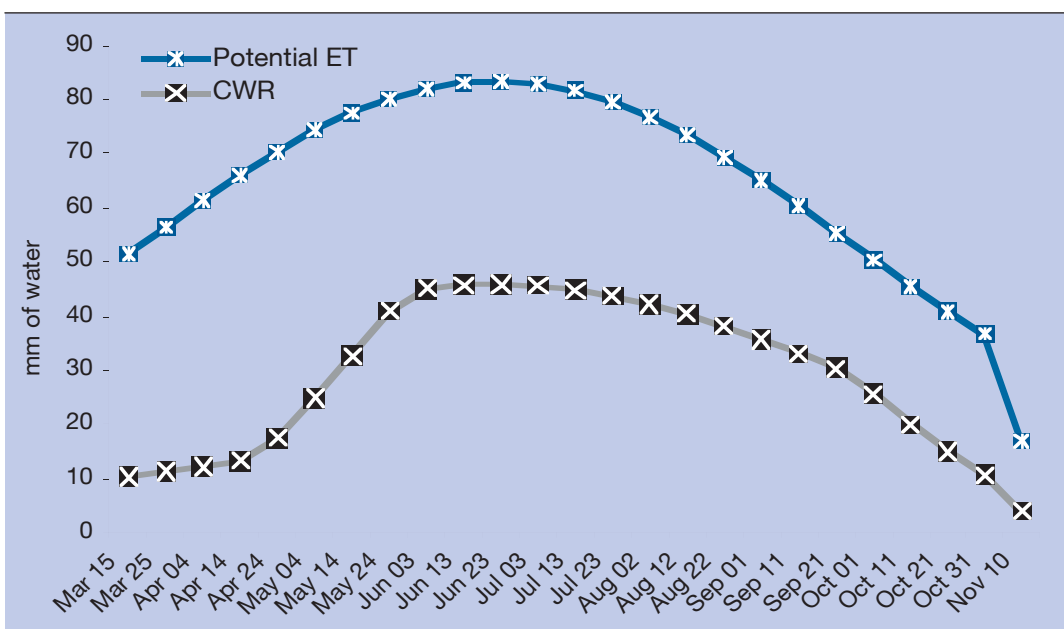
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	69.77	0.20	13.95	0.00	0.00	13.95
25/3	78.88	0.20	15.78	0.00	0.00	15.78
4/4	88.20	0.20	17.64	0.00	0.00	17.64
14/4	97.44	0.20	19.49	0.00	0.00	19.49
24/4	106.33	0.25	26.45	0.00	0.00	26.45
4/5	114.61	0.34	38.52	0.00	0.00	38.52
14/5	122.02	0.42	51.68	0.00	0.00	51.68
24/5	128.37	0.51	65.59	0.00	0.00	65.59
3/6	133.45	0.55	73.40	0.00	0.00	73.40
13/6	137.13	0.55	75.42	0.00	0.00	75.42
23/6	139.30	0.55	76.62	0.00	0.00	76.62
3/7	139.91	0.55	76.95	0.00	0.00	76.95
13/7	138.92	0.55	76.41	0.00	0.00	76.41
23/7	136.37	0.55	75.00	0.00	0.00	75.00
2/8	132.33	0.55	72.78	0.00	0.00	72.78
12/8	126.92	0.55	69.80	0.00	0.00	69.80
22/8	120.28	0.55	66.15	0.00	0.00	66.15
1/9	112.60	0.55	61.93	0.00	0.00	61.93
11/9	104.12	0.55	57.26	0.00	0.00	57.26
21/9	95.07	0.55	52.29	0.00	0.00	52.29
1/10	85.73	0.51	43.80	0.00	0.00	43.80
11/10	76.38	0.44	33.51	0.00	0.00	33.51
21/10	67.30	0.37	24.67	0.00	0.00	24.67
31/10	58.77	0.29	17.30	0.00	0.00	17.30
10/11	26.43	0.24	6.33	0.00	0.00	6.33
Total	2,636.63		1,208.74	0.00	0.00	1,208.74



Grapes

Dalbandin

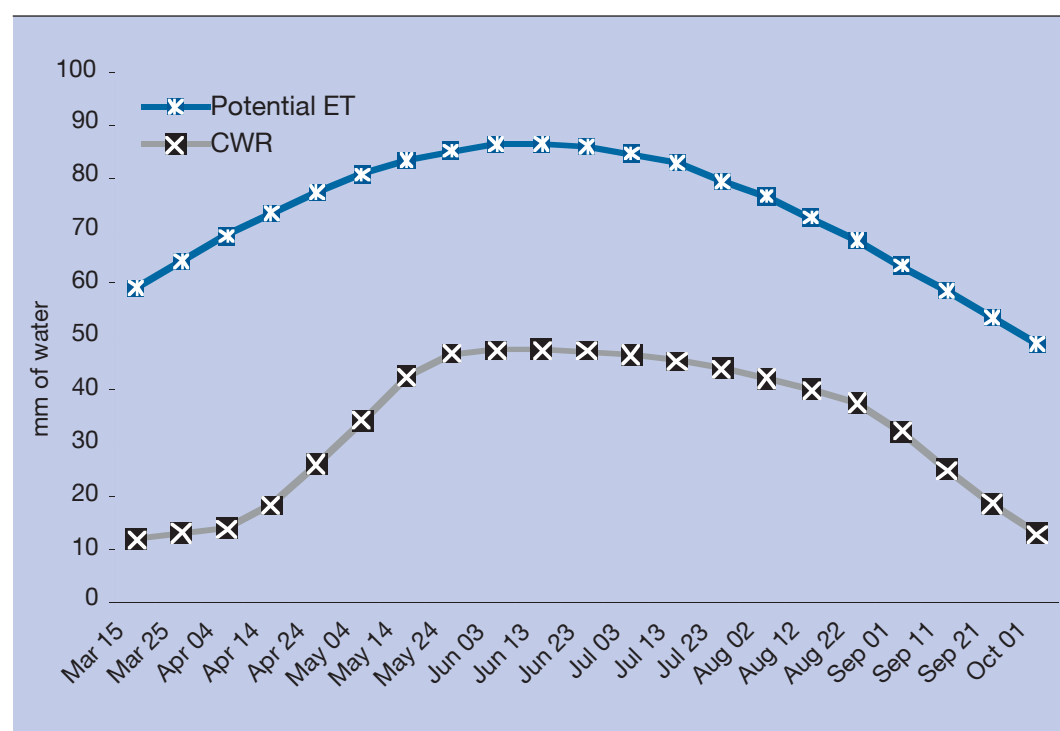
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	51.49	0.20	10.30	2.99	2.89	7.40
25/3	56.45	0.20	11.29	2.27	2.21	9.08
4/4	61.34	0.20	12.27	0.26	0.25	12.02
14/4	66.01	0.20	13.20	0.00	0.00	13.20
24/4	70.34	0.25	17.48	0.00	0.00	17.48
4/5	74.21	0.34	24.93	0.00	0.00	24.93
14/5	77.50	0.42	32.82	0.00	0.00	32.82
24/5	80.14	0.51	40.94	0.00	0.00	40.94
3/6	82.05	0.55	45.13	0.00	0.00	45.13
13/6	83.17	0.55	45.74	0.00	0.00	45.74
23/6	83.48	0.55	45.92	0.00	0.00	45.92
3/7	82.98	0.55	45.64	0.00	0.00	45.64
13/7	81.67	0.55	44.92	0.00	0.00	44.92
23/7	79.59	0.55	43.77	0.00	0.00	43.77
2/8	76.79	0.55	42.24	0.00	0.00	42.24
12/8	73.36	0.55	40.35	0.00	0.00	40.35
22/8	69.38	0.55	38.16	0.00	0.00	38.16
1/9	64.97	0.55	35.73	0.00	0.00	35.73
11/9	60.25	0.55	33.14	0.00	0.00	33.14
21/9	55.35	0.55	30.44	0.00	0.00	30.44
1/10	50.41	0.51	25.75	0.00	0.00	25.75
11/10	45.57	0.44	19.99	0.00	0.00	19.99
21/10	40.98	0.37	15.02	0.00	0.00	15.02
31/10	36.76	0.29	10.82	0.00	0.00	10.82
10/11	16.95	0.24	4.06	0.00	0.00	4.06
Total	1,621.20	-	730.04	5.51	5.35	724.69



Grapes

Lasbela

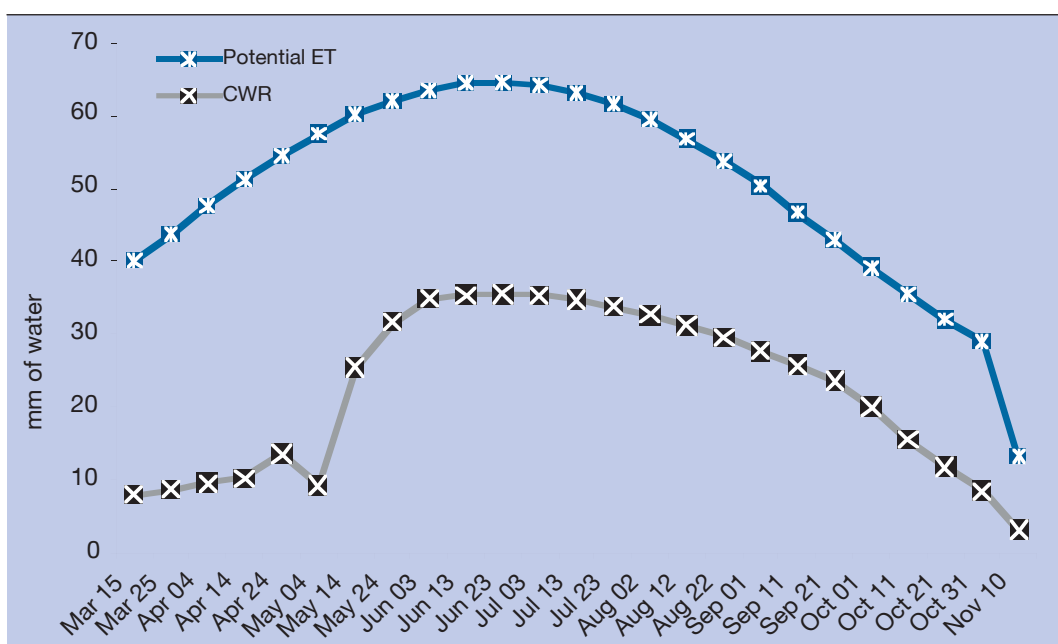
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	59.31	0.20	11.86	5.17	4.82	7.05
25/3	64.31	0.20	12.86	4.99	4.69	8.17
4/4	69.05	0.20	13.81	4.56	4.36	9.45
14/4	73.40	0.25	18.24	4.08	3.99	14.25
24/4	77.26	0.34	25.95	3.75	3.74	22.21
4/5	80.52	0.42	34.09	3.76	3.75	30.34
14/5	83.13	0.51	42.46	4.23	4.13	38.34
24/5	85.00	0.55	46.75	5.20	4.90	41.85
3/6	86.10	0.55	47.36	6.66	6.06	41.29
13/6	86.40	0.55	47.52	8.48	7.52	40.00
23/6	85.90	0.55	47.25	10.50	9.14	38.10
3/7	84.61	0.55	46.54	12.45	10.72	35.81
13/7	82.57	0.55	45.41	14.07	12.05	33.37
23/7	79.82	0.55	43.90	15.06	12.88	31.02
2/8	76.44	0.55	42.04	15.17	13.03	29.02
12/8	72.52	0.55	39.89	14.24	12.34	27.55
22/8	68.16	0.55	37.49	12.25	10.78	26.70
1/9	63.46	0.51	32.10	9.37	8.48	23.62
11/9	58.57	0.42	24.87	6.07	5.76	19.11
21/9	53.59	0.34	18.41	3.18	3.17	15.23
1/10	48.68	0.26	12.76	0.97	0.96	11.81
Total	1,538.81	-	691.57	164.20	147.28	544.29



Grapes

Kalat

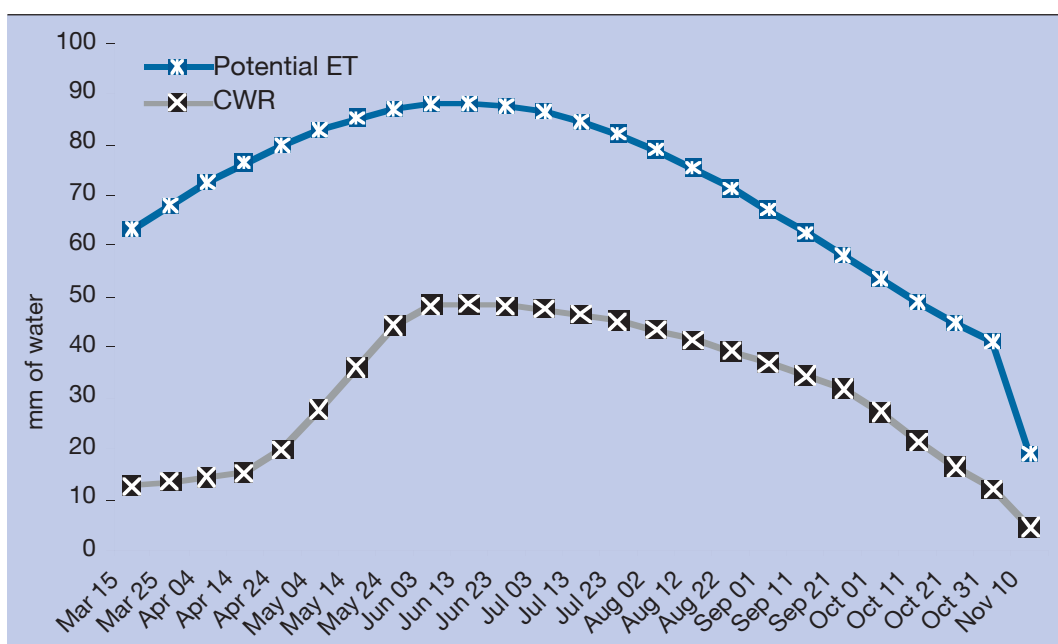
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	40.05	0.20	8.01	6.94	6.47	1.54
25/3	43.88	0.20	8.78	6.08	5.71	3.07
4/4	47.65	0.20	9.53	5.08	4.81	4.72
14/4	51.25	0.20	10.25	3.89	3.72	6.53
24/4	54.58	0.25	13.56	2.35	2.29	11.28
4/5	57.54	0.34	19.33	0.24	0.24	19.10
14/5	60.07	0.42	25.43	0.00	0.00	25.43
24/5	62.09	0.51	31.72	0.00	0.00	31.72
3/6	63.54	0.55	34.95	0.00	0.00	34.95
13/6	64.40	0.55	35.42	0.00	0.00	35.42
23/6	64.63	0.55	35.54	0.00	0.00	35.54
3/7	64.23	0.55	35.33	0.00	0.00	35.33
13/7	63.21	0.55	34.77	0.00	0.00	34.77
23/7	61.61	0.55	33.89	0.00	0.00	33.89
2/8	59.46	0.55	32.70	0.00	0.00	32.70
12/8	56.82	0.55	31.25	0.00	0.00	31.25
22/8	53.77	0.55	29.57	0.00	0.00	29.57
1/9	50.39	0.55	27.71	0.00	0.00	27.71
11/9	46.77	0.55	25.73	0.00	0.00	25.73
21/9	43.02	0.55	23.66	0.00	0.00	23.66
1/10	39.25	0.51	20.05	0.00	0.00	20.05
11/10	35.56	0.44	15.60	0.00	0.00	15.60
21/10	32.06	0.37	11.75	0.00	0.00	11.75
31/10	28.86	0.29	8.49	0.00	0.00	8.49
10/11	13.35	0.24	3.20	0.00	0.00	3.20
Total	1,258.04	-	566.22	24.57	23.23	542.99



Grapes

Khuzdar

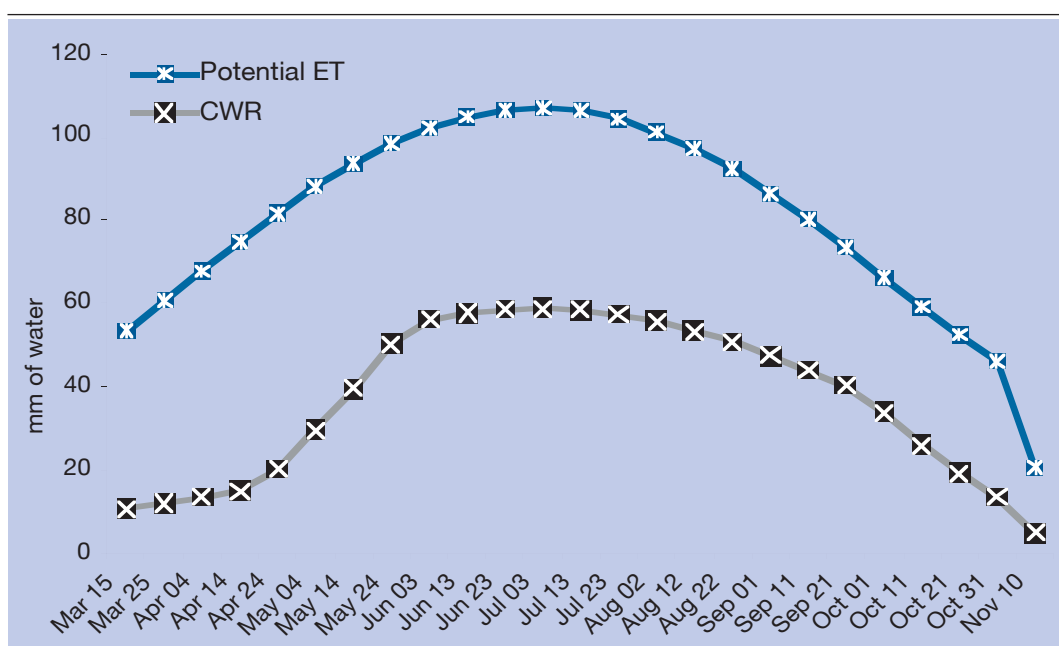
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	63.39	0.20	12.68	3.53	3.42	9.26
25/3	68.03	0.20	13.61	3.21	3.11	10.49
4/4	72.40	0.20	14.48	2.98	2.89	11.59
14/4	76.39	0.20	15.28	2.74	2.66	12.62
24/4	79.91	0.25	19.85	2.34	2.28	17.57
4/5	82.87	0.34	27.83	0.39	0.39	27.45
14/5	85.22	0.42	36.07	0.00	0.00	36.07
24/5	86.90	0.51	44.38	0.00	0.00	44.38
3/6	87.87	0.55	48.33	0.00	0.00	48.33
13/6	88.12	0.55	48.46	0.00	0.00	48.46
23/6	87.64	0.55	48.20	3.04	2.84	45.36
3/7	86.45	0.55	47.55	7.48	6.80	40.74
13/7	84.57	0.55	46.51	9.87	8.93	37.58
23/7	82.06	0.55	45.14	10.49	9.52	35.62
2/8	78.98	0.55	43.44	9.53	8.71	34.73
12/8	75.40	0.55	41.47	7.31	6.76	34.71
22/8	71.41	0.55	39.28	4.32	4.07	35.20
1/9	67.11	0.55	36.91	0.97	0.94	35.97
11/9	62.61	0.55	34.43	0.00	0.00	34.43
21/9	58.01	0.55	31.91	0.00	0.00	31.91
1/10	53.43	0.51	27.29	0.00	0.00	27.29
11/10	49.00	0.44	21.49	0.00	0.00	21.49
21/10	44.81	0.37	16.42	0.00	0.00	16.42
31/10	40.98	0.29	12.05	0.00	0.00	12.05
10/11	19.19	0.24	4.60	0.00	0.00	4.60
Total	1,752.77	-	777.67	68.20	63.32	714.34



Grapes

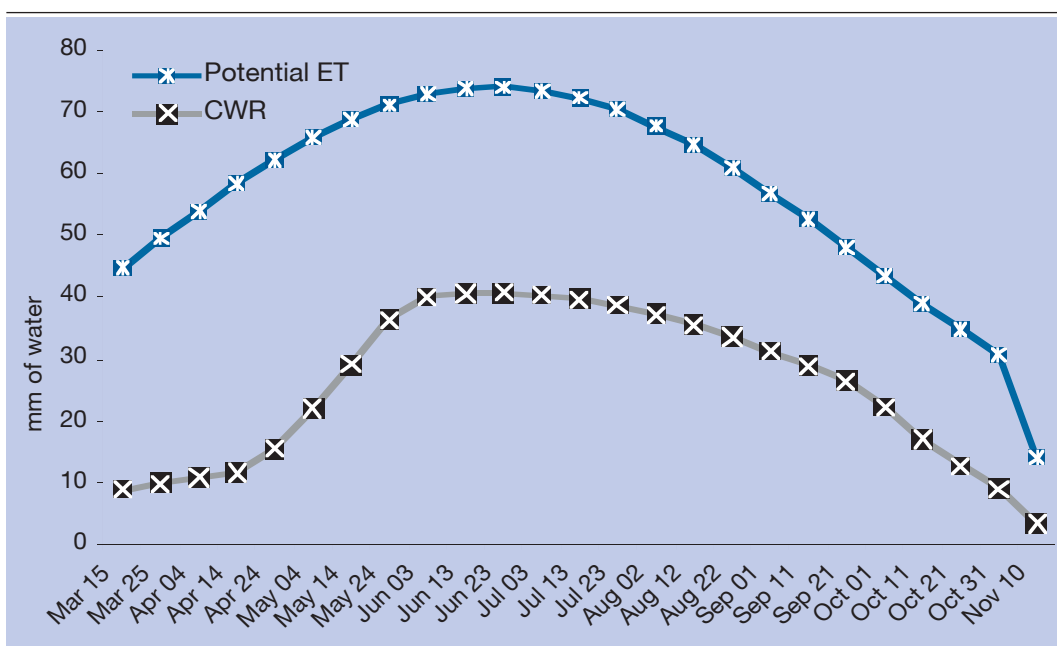
Quetta

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	53.66	0.20	10.73	6.94	6.47	4.27
25/3	60.73	0.20	12.15	6.08	5.71	6.44
4/4	67.91	0.20	13.58	5.08	4.81	8.77
14/4	75.00	0.20	15.00	3.89	3.72	11.28
24/4	81.78	0.25	20.34	2.35	2.29	18.05
4/5	88.07	0.34	29.60	0.24	0.24	29.36
14/5	93.68	0.42	39.67	0.00	0.00	39.67
24/5	98.46	0.51	50.31	0.00	0.00	50.31
3/6	102.27	0.55	56.25	0.00	0.00	56.25
13/6	105.03	0.55	57.76	0.00	0.00	57.76
23/6	106.64	0.55	58.65	0.00	0.00	58.65
3/7	107.07	0.55	58.89	0.00	0.00	58.89
13/7	106.31	0.55	58.47	0.00	0.00	58.47
23/7	104.38	0.55	57.41	0.00	0.00	57.41
2/8	101.34	0.55	55.73	0.00	0.00	55.73
12/8	97.27	0.55	53.50	0.00	0.00	53.50
22/8	92.29	0.55	50.76	0.00	0.00	50.76
1/9	86.54	0.55	47.59	0.00	0.00	47.59
11/9	80.18	0.55	44.10	0.00	0.00	44.10
21/9	73.39	0.55	40.37	0.00	0.00	40.37
1/10	66.38	0.51	33.92	0.00	0.00	33.92
11/10	59.34	0.44	26.04	0.00	0.00	26.04
21/10	52.49	0.37	19.24	0.00	0.00	19.24
31/10	46.02	0.29	13.55	0.00	0.00	13.55
10/11	20.75	0.24	4.97	0.00	0.00	4.97
Total	2,026.95	-	928.57	24.57	23.23	905.34



Barkhan

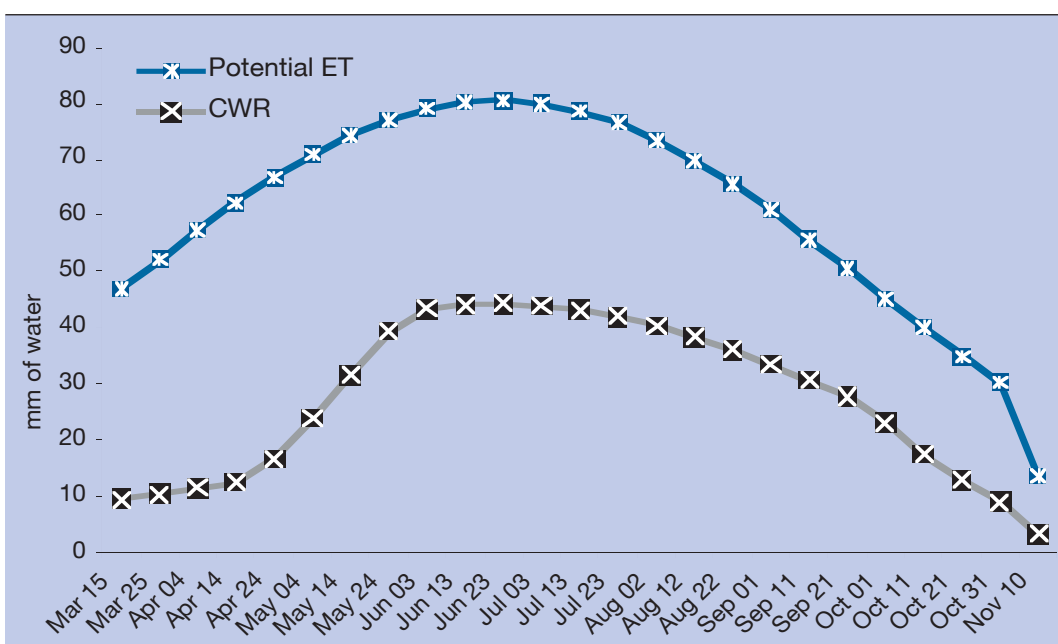
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	44.88	0.20	8.98	5.17	4.82	4.16
25/3	49.49	0.20	9.90	4.99	4.69	5.21
4/4	53.99	0.20	10.80	4.56	4.36	6.44
14/4	58.27	0.20	11.65	4.08	3.99	7.66
24/4	62.22	0.25	15.47	3.75	3.74	11.72
4/5	65.72	0.34	22.08	3.76	3.75	18.33
14/5	68.70	0.42	29.09	4.23	4.13	24.96
24/5	71.06	0.51	36.30	5.20	4.90	31.40
3/6	72.75	0.55	40.01	6.66	6.06	33.95
13/6	73.73	0.55	40.55	8.48	7.52	33.03
23/6	73.97	0.55	40.68	10.50	9.14	31.54
3/7	73.47	0.55	40.41	12.45	10.72	29.69
13/7	72.24	0.55	39.73	14.07	12.05	27.69
23/7	70.31	0.55	38.67	15.06	12.88	25.79
2/8	67.74	0.55	37.25	15.17	13.03	24.23
12/8	64.58	0.55	35.52	14.24	12.34	23.18
22/8	60.93	0.55	33.51	12.25	10.78	22.73
1/9	56.88	0.55	31.29	9.37	8.48	22.81
11/9	52.55	0.55	28.90	6.07	5.76	23.14
21/9	48.04	0.55	26.42	3.18	3.17	23.25
1/10	43.48	0.51	22.21	0.97	0.96	21.25
11/10	38.99	0.44	17.11	0.00	0.00	17.11
21/10	34.71	0.37	12.72	0.00	0.00	12.72
31/10	30.75	0.29	9.05	0.00	0.00	9.05
10/11	14.02	0.24	3.36	0.00	0.00	3.36
Total	1,423.48	-	641.67	164.20	147.28	494.39



Grapes

Zhob

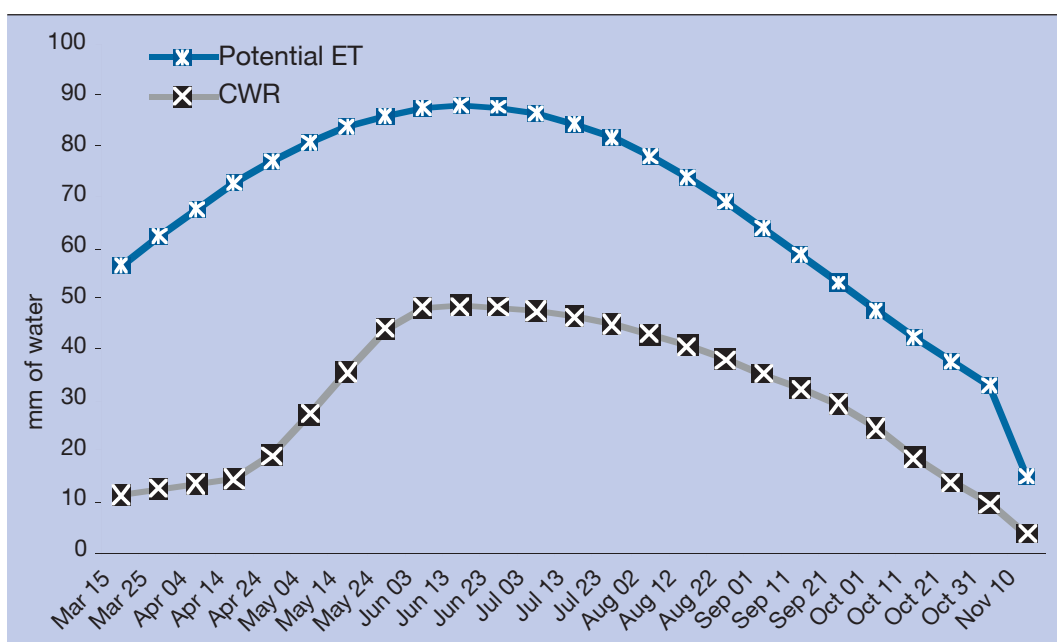
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	47.00	0.20	9.40	6.93	6.46	2.94
25/3	52.25	0.20	10.45	6.95	6.49	3.96
4/4	57.40	0.20	11.48	6.44	6.05	5.43
14/4	62.32	0.20	12.46	5.37	5.08	7.38
24/4	66.86	0.25	16.62	3.75	3.59	13.03
4/5	70.91	0.34	23.83	0.51	0.49	23.34
14/5	74.36	0.42	31.49	0.00	0.00	31.49
24/5	77.12	0.51	39.40	1.51	1.50	37.89
3/6	79.11	0.55	43.51	1.75	1.75	41.76
13/6	80.29	0.55	44.16	3.17	3.05	41.11
23/6	80.61	0.55	44.33	5.38	4.99	39.34
3/7	80.07	0.55	44.04	7.57	6.94	37.10
13/7	78.68	0.55	43.27	9.13	8.33	34.94
23/7	76.48	0.55	42.06	9.64	8.80	33.26
2/8	73.52	0.55	40.44	8.91	8.18	32.26
12/8	69.88	0.55	38.43	7.05	6.54	31.90
22/8	65.65	0.55	36.11	4.46	4.23	31.88
1/9	60.95	0.55	33.52	1.24	1.21	32.31
11/9	55.89	0.55	30.74	0.00	0.00	30.74
21/9	50.63	0.55	27.84	0.00	0.00	27.84
1/10	45.28	0.51	23.14	0.00	0.00	23.14
11/10	40.02	0.44	17.56	0.00	0.00	17.56
21/10	34.98	0.37	12.83	0.00	0.00	12.83
31/10	30.31	0.29	8.93	0.00	0.00	8.93
10/11	13.55	0.24	3.25	0.00	0.00	3.25
Total	1,524.14	-	689.30	89.77	83.68	605.61



Grapes

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	56.72	0.20	11.34	2.86	2.82	8.52
25/3	62.32	0.20	12.46	2.47	2.47	9.99
4/4	67.67	0.20	13.53	0.41	0.40	13.13
14/4	72.61	0.20	14.52	0.00	0.00	14.52
24/4	77.04	0.25	19.14	0.00	0.00	19.14
4/5	80.83	0.34	27.15	0.00	0.00	27.15
14/5	83.91	0.42	35.52	0.00	0.00	35.52
24/5	86.18	0.51	44.02	0.00	0.00	44.02
3/6	87.61	0.55	48.19	0.00	0.00	48.19
13/6	88.16	0.55	48.49	0.00	0.00	48.49
23/6	87.82	0.55	48.30	2.04	1.95	46.35
3/7	86.60	0.55	47.63	4.99	4.69	42.93
13/7	84.53	0.55	46.49	6.50	6.10	40.39
23/7	81.66	0.55	44.91	6.82	6.41	38.51
2/8	78.08	0.55	42.95	6.13	5.79	37.15
12/8	73.88	0.55	40.63	4.75	4.53	36.10
22/8	69.15	0.55	38.03	3.12	3.02	35.02
1/9	64.04	0.55	35.22	1.03	1.01	34.21
11/9	58.67	0.55	32.27	0.00	0.00	32.27
21/9	53.18	0.55	29.25	0.00	0.00	29.25
1/10	47.72	0.51	24.38	0.00	0.00	24.38
11/10	42.45	0.44	18.63	0.00	0.00	18.63
21/10	37.50	0.37	13.75	0.00	0.00	13.75
31/10	33.02	0.29	9.72	0.00	0.00	9.72
10/11	15.00	0.24	3.60	0.00	0.00	3.60
Total	1,676.34		750.13	41.10	39.19	710.94



Dates

Gwadar

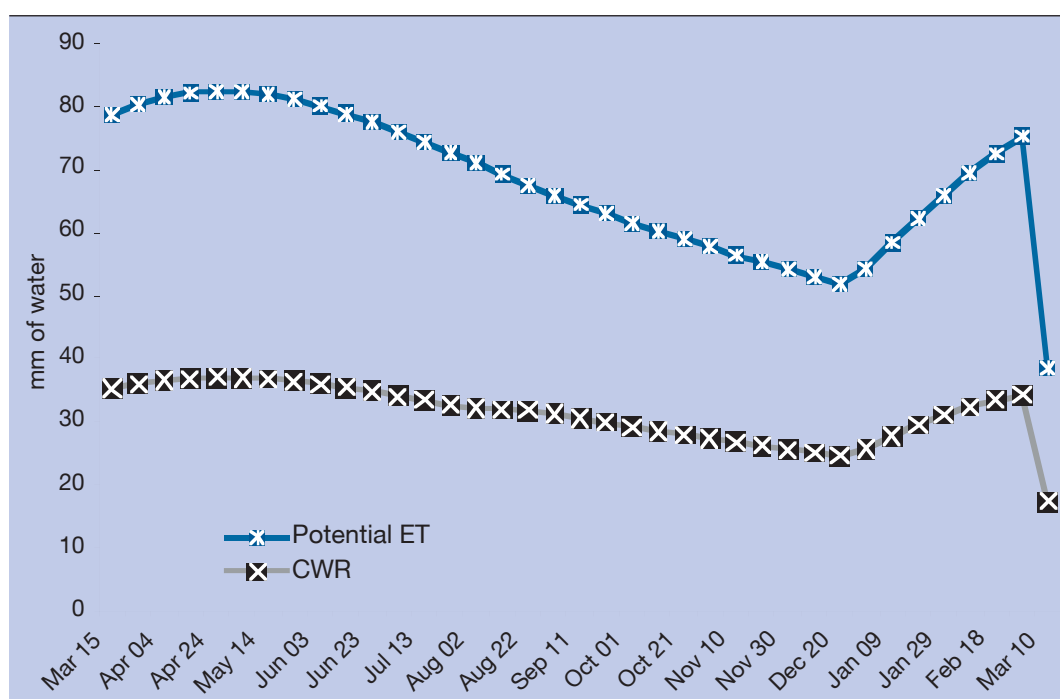
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	78.58	0.45	35.36	0.00	0.00	35.36
25/3	80.21	0.45	36.09	0.00	0.00	36.09
4/4	81.37	0.45	36.62	0.00	0.00	36.62
14/4	82.10	0.45	36.94	0.00	0.00	36.94
24/4	82.39	0.45	37.08	0.00	0.00	37.08
4/5	82.30	0.45	37.04	0.00	0.00	37.04
14/5	81.86	0.45	36.84	0.00	0.00	36.84
24/5	81.11	0.45	36.50	0.00	0.00	36.50
3/6	80.10	0.45	36.04	0.00	0.00	36.04
13/6	78.86	0.45	35.49	0.00	0.00	35.49
23/6	77.46	0.45	34.86	0.00	0.00	34.86
3/7	75.93	0.45	34.17	0.00	0.00	34.17
13/7	74.30	0.45	33.44	0.00	0.00	33.44
23/7	72.63	0.45	32.68	0.00	0.00	32.68
2/8	70.94	0.45	32.25	0.00	0.00	32.25
12/8	69.25	0.46	32.06	0.00	0.00	32.06
22/8	67.60	0.47	31.85	0.00	0.00	31.85
1/9	65.99	0.47	31.35	0.00	0.00	31.35
11/9	64.45	0.47	30.61	0.00	0.00	30.61
21/9	62.96	0.47	29.91	0.00	0.00	29.91
1/10	61.55	0.47	29.24	0.00	0.00	29.24
11/10	60.20	0.47	28.60	0.00	0.00	28.60
21/10	58.91	0.47	27.98	0.00	0.00	27.98
31/10	57.68	0.47	27.40	0.00	0.00	27.40
10/11	56.48	0.47	26.83	0.00	0.00	26.83
20/11	55.31	0.47	26.27	0.00	0.00	26.27
30/11	54.16	0.47	25.72	0.00	0.00	25.72
10/12	53.02	0.47	25.18	0.00	0.00	25.18

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	51.90	0.47	24.65	0.50	0.50	24.15
30/12	54.30	0.47	25.79	2.13	2.13	23.66
9/1	58.45	0.47	27.76	2.99	2.92	24.84
19/1	62.25	0.47	29.57	1.56	1.42	28.15
29/1	65.94	0.47	31.12	0.01	0.01	31.11
8/2	69.40	0.47	32.36	0.00	0.00	32.36
18/2	72.53	0.46	33.42	0.00	0.00	33.42
28/2	75.28	0.46	34.27	0.00	0.00	34.27
10/3	38.54	0.45	17.38	0.00	0.00	17.38
Total	2516.26	-	1160.72	7.19	6.98	1153.74

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Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Turbat

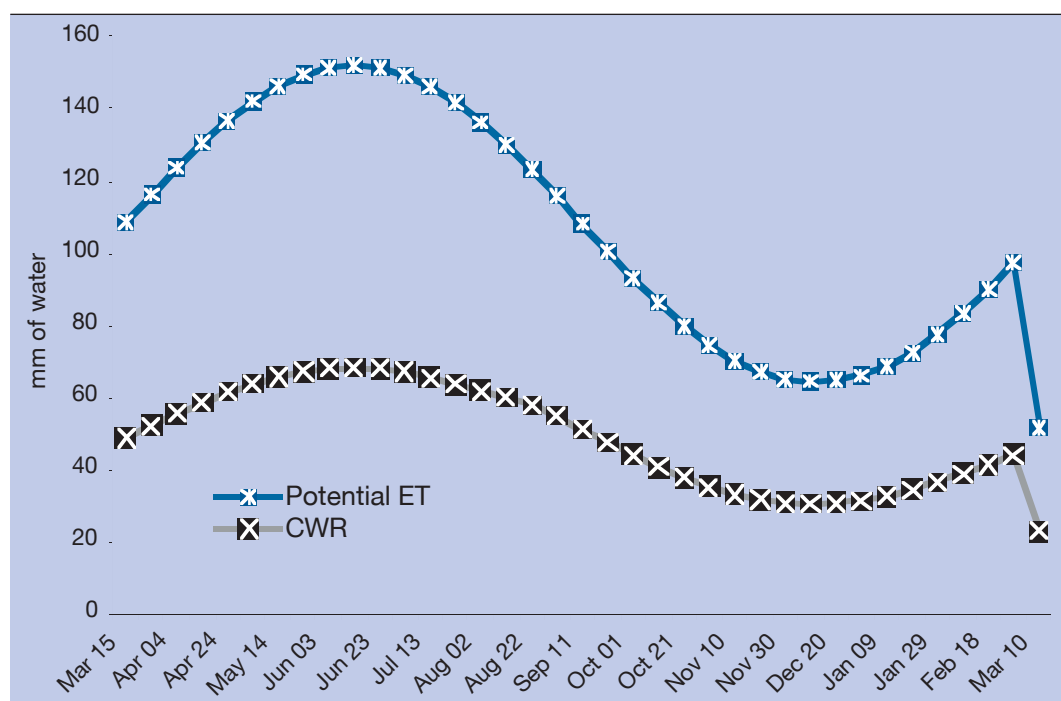
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	108.70	0.45	48.91	3.35	3.02	45.89
25/3	116.32	0.45	52.34	1.57	1.14	51.20
4/4	123.68	0.45	55.65	0.08	0.07	55.58
14/4	130.55	0.45	58.75	0.00	0.00	58.75
24/4	136.74	0.45	61.53	0.00	0.00	61.53
4/5	142.05	0.45	63.92	0.00	0.00	63.92
14/5	146.34	0.45	65.85	0.00	0.00	65.85
24/5	149.48	0.45	67.27	0.00	0.00	67.27
3/6	151.38	0.45	68.12	0.00	0.00	68.12
13/6	151.98	0.45	68.39	0.00	0.00	68.39
23/6	151.28	0.45	68.07	0.00	0.00	68.07
3/7	149.28	0.45	67.17	0.00	0.00	67.17
13/7	146.04	0.45	65.72	0.00	0.00	65.72
23/7	141.67	0.45	63.75	0.00	0.00	63.75
2/8	136.28	0.45	61.95	0.00	0.00	61.95
12/8	130.04	0.46	60.19	0.00	0.00	60.19
22/8	123.12	0.47	58.01	0.00	0.00	58.01
1/9	115.73	0.47	54.97	0.00	0.00	54.97
11/9	108.11	0.47	51.35	0.00	0.00	51.35
21/9	100.48	0.47	47.73	0.00	0.00	47.73
1/10	93.07	0.47	44.21	0.00	0.00	44.21
11/10	86.14	0.47	40.92	0.00	0.00	40.92
21/10	79.89	0.47	37.95	0.00	0.00	37.95
31/10	74.52	0.47	35.40	0.00	0.00	35.40
10/11	70.21	0.47	33.35	0.00	0.00	33.35
20/11	67.08	0.47	31.86	0.00	0.00	31.86
30/11	65.18	0.47	30.96	0.00	0.00	30.96
10/12	64.53	0.47	30.65	0.00	0.00	30.65

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	65.04	0.47	30.89	0.00	0.00	30.89
30/12	66.26	0.47	31.47	0.00	0.00	31.47
9/1	68.77	0.47	32.67	0.00	0.00	32.67
19/1	72.58	0.47	34.47	0.00	0.00	34.47
29/1	77.50	0.47	36.57	0.00	0.00	36.57
8/2	83.39	0.47	38.89	0.00	0.00	38.89
18/2	90.06	0.46	41.50	0.80	0.80	40.70
28/2	97.30	0.46	44.29	3.36	3.36	40.93
10/3	51.48	0.45	23.22	1.98	1.97	21.26
Total	3932.26	-	1808.97	11.15	10.36	1798.61

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Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Panjgur

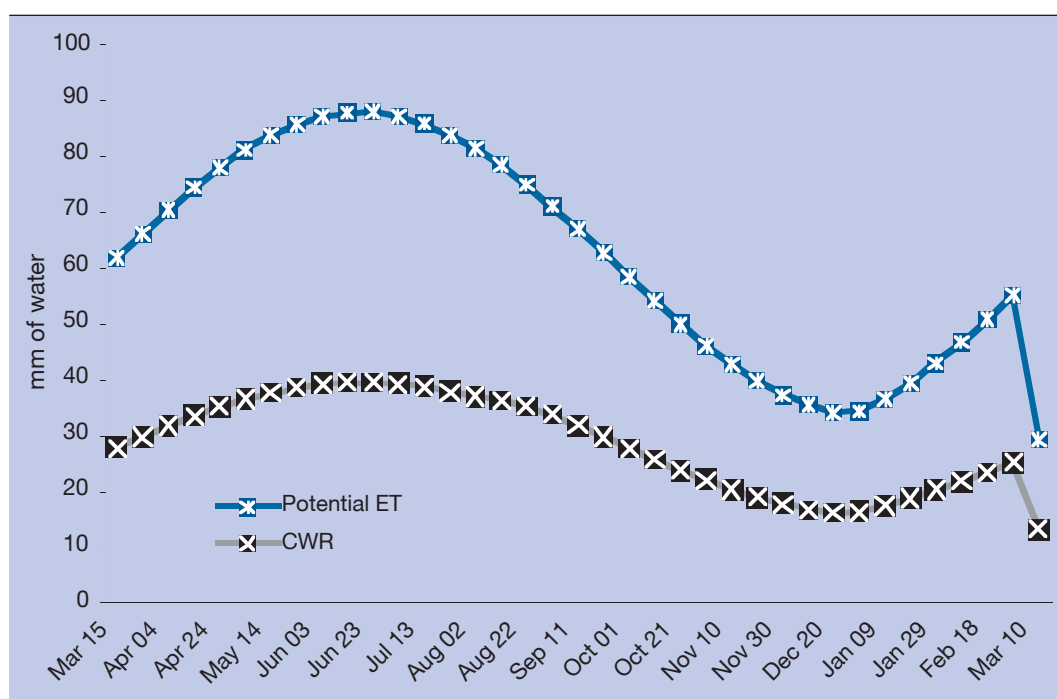
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	61.93	0.45	27.87	0.00	0.00	27.87
25/3	66.34	0.45	29.85	0.00	0.00	29.85
4/4	70.58	0.45	31.76	0.00	0.00	31.76
14/4	74.55	0.45	33.55	0.00	0.00	33.55
24/4	78.14	0.45	35.16	0.00	0.00	35.16
4/5	81.28	0.45	36.58	0.00	0.00	36.58
14/5	83.89	0.45	37.75	0.00	0.00	37.75
24/5	85.91	0.45	38.66	0.00	0.00	38.66
3/6	87.29	0.45	39.28	0.00	0.00	39.28
13/6	88.01	0.45	39.60	0.00	0.00	39.60
23/6	88.03	0.45	39.62	0.86	0.84	38.77
3/7	87.38	0.45	39.32	2.21	2.15	37.17
13/7	86.06	0.45	38.73	2.76	2.68	36.05
23/7	84.11	0.45	37.85	2.35	2.28	35.57
2/8	81.58	0.45	37.08	0.57	0.55	36.53
12/8	78.53	0.46	36.35	0.00	0.00	36.35
22/8	75.03	0.47	35.35	0.00	0.00	35.35
1/9	71.17	0.47	33.81	0.00	0.00	33.81
11/9	67.05	0.47	31.85	0.00	0.00	31.85
21/9	62.77	0.47	29.82	0.00	0.00	29.82
1/10	58.44	0.47	27.76	0.00	0.00	27.76
11/10	54.18	0.47	25.73	0.00	0.00	25.73
21/10	50.08	0.47	23.79	0.00	0.00	23.79
31/10	46.25	0.47	21.97	0.00	0.00	21.97
10/11	42.79	0.47	20.33	0.00	0.00	20.33
20/11	39.79	0.47	18.90	0.00	0.00	18.90
30/11	37.30	0.47	17.72	0.00	0.00	17.72
10/12	35.38	0.47	16.80	0.00	0.00	16.80

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	34.03	0.47	16.16	0.00	0.00	16.16
30/12	34.35	0.47	16.32	0.00	0.00	16.32
9/1	36.69	0.47	17.43	0.00	0.00	17.43
19/1	39.58	0.47	18.80	0.00	0.00	18.80
29/1	42.96	0.47	20.27	0.00	0.00	20.27
8/2	46.77	0.47	21.81	0.00	0.00	21.81
18/2	50.90	0.46	23.45	0.00	0.00	23.45
28/2	55.24	0.46	25.15	0.00	0.00	25.15
10/3	29.29	0.45	13.21	0.00	0.00	13.21
Total	2293.68	-	1055.45	8.74	8.51	1046.95

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Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Dalbandin

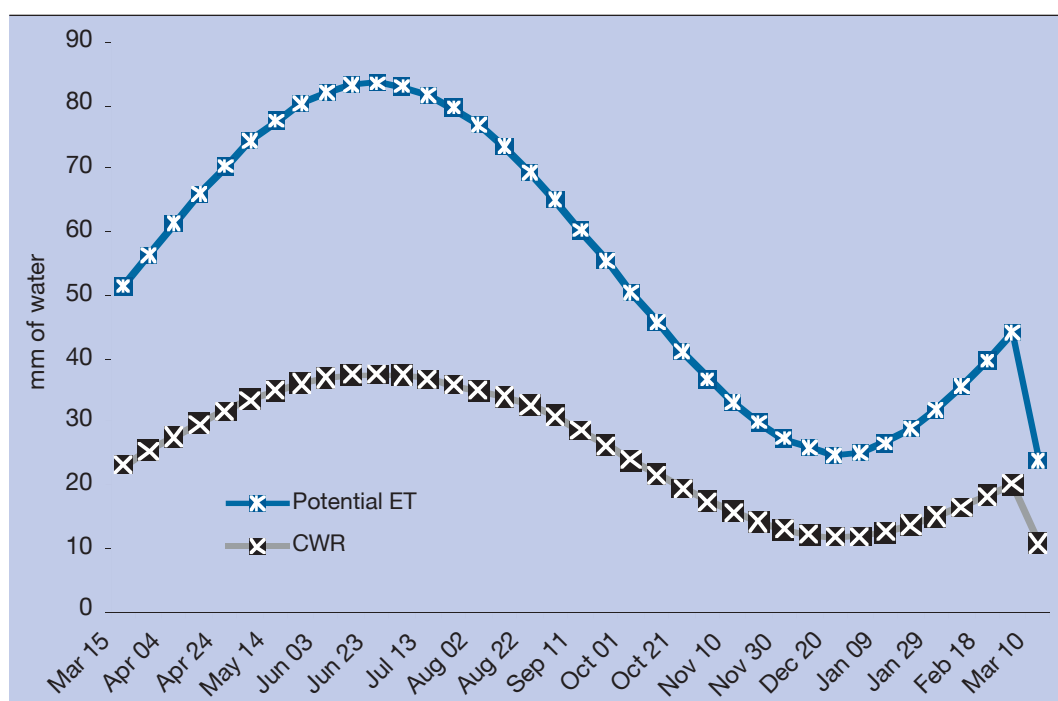
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	51.49	0.45	23.17	2.99	2.89	20.28
25/3	56.45	0.45	25.40	2.27	2.21	23.20
4/4	61.34	0.45	27.60	0.26	0.25	27.35
14/4	66.01	0.45	29.71	0.00	0.00	29.71
24/4	70.34	0.45	31.65	0.00	0.00	31.65
4/5	74.21	0.45	33.39	0.00	0.00	33.39
14/5	77.50	0.45	34.88	0.00	0.00	34.88
24/5	80.14	0.45	36.06	0.00	0.00	36.06
3/6	82.05	0.45	36.92	0.00	0.00	36.92
13/6	83.17	0.45	37.43	0.00	0.00	37.43
23/6	83.48	0.45	37.57	0.00	0.00	37.57
3/7	82.98	0.45	37.34	0.00	0.00	37.34
13/7	81.67	0.45	36.75	0.00	0.00	36.75
23/7	79.59	0.45	35.81	0.00	0.00	35.81
2/8	76.79	0.45	34.91	0.00	0.00	34.91
12/8	73.36	0.46	33.96	0.00	0.00	33.96
22/8	69.38	0.47	32.69	0.00	0.00	32.69
1/9	64.97	0.47	30.86	0.00	0.00	30.86
11/9	60.25	0.47	28.62	0.00	0.00	28.62
21/9	55.35	0.47	26.29	0.00	0.00	26.29
1/10	50.41	0.47	23.94	0.00	0.00	23.94
11/10	45.57	0.47	21.65	0.00	0.00	21.65
21/10	40.98	0.47	19.47	0.00	0.00	19.47
31/10	36.76	0.47	17.46	0.00	0.00	17.46
10/11	33.05	0.47	15.70	0.00	0.00	15.70
20/11	29.93	0.47	14.22	0.00	0.00	14.22
30/11	27.49	0.47	13.06	0.00	0.00	13.06
10/12	25.78	0.47	12.24	0.00	0.00	12.24

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	24.80	0.47	11.78	0.72	0.70	11.08
30/12	25.05	0.47	11.90	2.44	2.38	9.52
9/1	26.64	0.47	12.65	2.87	2.79	9.87
19/1	28.94	0.47	13.75	2.90	2.82	10.93
29/1	31.93	0.47	15.07	2.77	2.70	12.37
8/2	35.54	0.47	16.57	2.69	2.62	13.96
18/2	39.67	0.46	18.28	2.74	2.66	15.62
28/2	44.21	0.46	20.13	2.92	2.83	17.30
10/3	23.90	0.45	10.78	1.52	1.47	9.31
Total	2001.18	-	919.66	27.07	26.32	893.34

93

Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Lasbela

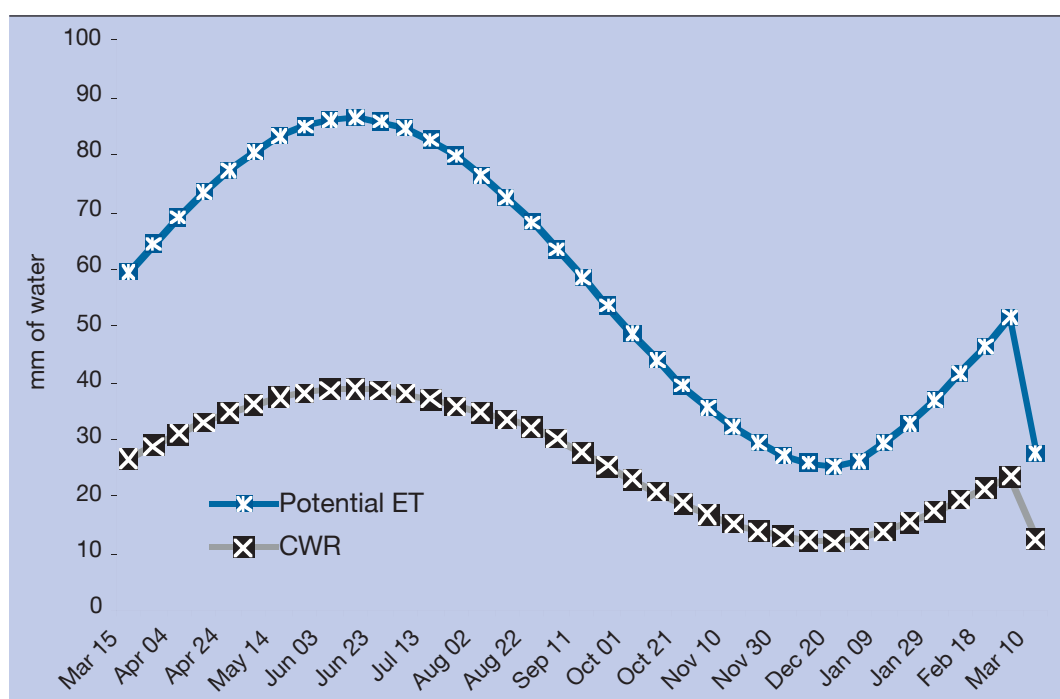
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	59.31	0.45	26.69	5.17	4.82	21.87
25/3	64.31	0.45	28.94	4.99	4.69	24.25
4/4	69.05	0.45	31.07	4.56	4.36	26.71
14/4	73.4	0.45	33.03	4.08	3.99	29.04
24/4	77.26	0.45	34.76	3.75	3.74	31.02
4/5	80.52	0.45	36.24	3.76	3.75	32.48
14/5	83.13	0.45	37.41	4.23	4.13	33.28
24/5	85	0.45	38.25	5.2	4.9	33.35
3/6	86.1	0.45	38.75	6.66	6.06	32.68
13/6	86.4	0.45	38.88	8.48	7.52	31.36
23/6	85.9	0.45	38.66	10.5	9.14	29.51
3/7	84.61	0.45	38.08	12.45	10.72	27.35
13/7	82.57	0.45	37.16	14.07	12.05	25.11
23/7	79.82	0.45	35.92	15.06	12.88	23.04
2/8	76.44	0.45	34.75	15.17	13.03	21.72
12/8	72.52	0.46	33.57	14.24	12.34	21.23
22/8	68.16	0.47	32.12	12.25	10.78	21.33
1/9	63.46	0.47	30.15	9.37	8.48	21.66
11/9	58.57	0.47	27.82	6.07	5.76	22.06
21/9	53.59	0.47	25.46	3.18	3.17	22.28
1/10	48.68	0.47	23.12	0.97	0.96	22.16
11/10	43.96	0.47	20.88	0	0	20.88
21/10	39.56	0.47	18.79	0	0	18.79
31/10	35.6	0.47	16.91	0	0	16.91
10/11	32.2	0.47	15.29	0	0	15.29
20/11	29.43	0.47	13.98	0	0	13.98
30/11	27.37	0.47	13	0	0	13
10/12	26.03	0.47	12.37	0	0	12.37

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	25.44	0.47	12.08	0	0	12.08
30/12	26.4	0.47	12.54	0	0	12.54
9/1	29.34	0.47	13.93	0	0	13.93
19/1	32.91	0.47	15.63	0.67	0.66	14.97
29/1	37.04	0.47	17.48	2.2	2.2	15.28
8/2	41.61	0.47	19.4	2.87	2.86	16.55
18/2	46.51	0.46	21.43	3.87	3.72	17.71
28/2	51.6	0.46	23.49	4.69	4.41	19.08
10/3	27.73	0.45	12.51	2.53	2.36	10.15
Total	2091.53	-	960.52	181.03	163.48	797.04

95

Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Khuzdar

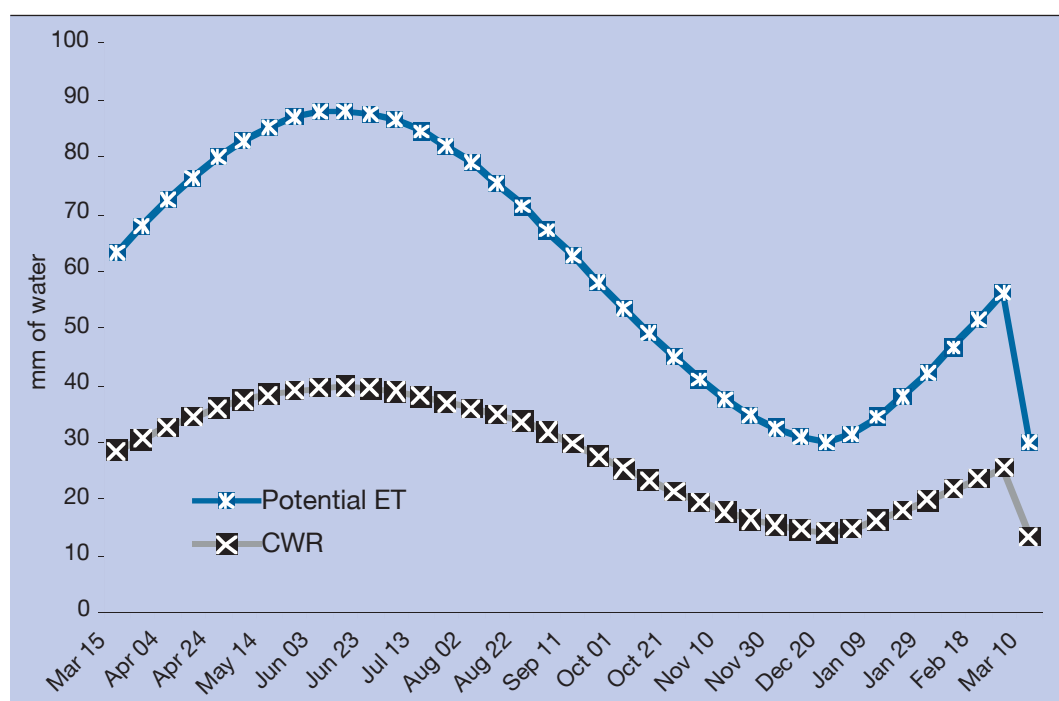
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	63.39	0.45	28.52	3.53	3.42	25.11
25/3	68.03	0.45	30.61	3.21	3.11	27.50
4/4	72.40	0.45	32.58	2.98	2.89	29.69
14/4	76.39	0.45	34.38	2.74	2.66	31.72
24/4	79.91	0.45	35.96	2.34	2.28	33.68
4/5	82.87	0.45	37.29	0.39	0.39	36.91
14/5	85.22	0.45	38.35	0.00	0.00	38.35
24/5	86.90	0.45	39.10	0.00	0.00	39.10
3/6	87.87	0.45	39.54	0.00	0.00	39.54
13/6	88.12	0.45	39.65	0.00	0.00	39.65
23/6	87.64	0.45	39.44	3.04	2.84	36.60
3/7	86.45	0.45	38.90	7.48	6.80	32.10
13/7	84.57	0.45	38.06	9.87	8.93	29.13
23/7	82.06	0.45	36.93	10.49	9.52	27.41
2/8	78.98	0.45	35.90	9.53	8.71	27.20
12/8	75.40	0.46	34.90	7.31	6.76	28.14
22/8	71.41	0.47	33.65	4.32	4.07	29.58
1/9	67.11	0.47	31.88	0.97	0.94	30.93
11/9	62.61	0.47	29.74	0.00	0.00	29.74
21/9	58.01	0.47	27.55	0.00	0.00	27.55
1/10	53.43	0.47	25.38	0.00	0.00	25.38
11/10	49.00	0.47	23.27	0.00	0.00	23.27
21/10	44.81	0.47	21.29	0.00	0.00	21.29
31/10	40.98	0.47	19.47	0.00	0.00	19.47
10/11	37.61	0.47	17.86	0.00	0.00	17.86
20/11	34.76	0.47	16.51	0.00	0.00	16.51
30/11	32.50	0.47	15.44	0.00	0.00	15.44
10/12	30.88	0.47	14.67	0.00	0.00	14.67

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	29.88	0.47	14.19	0.90	0.88	13.31
30/12	31.25	0.47	14.84	2.55	2.48	12.36
9/1	34.45	0.47	16.37	3.40	3.28	13.08
19/1	38.07	0.47	18.08	4.25	4.07	14.01
29/1	42.16	0.47	19.89	4.75	4.54	15.35
8/2	46.61	0.47	21.74	4.84	4.63	17.11
18/2	51.31	0.46	23.64	4.60	4.41	19.24
28/2	56.15	0.46	25.56	4.18	4.02	21.54
10/3	29.90	0.45	13.49	1.92	1.85	11.64
Total	2229.10	-	1024.64	99.60	93.49	931.15

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Water requirements
of major crops for different
agro-climatic zones of Balochistan



Dates

Sibi

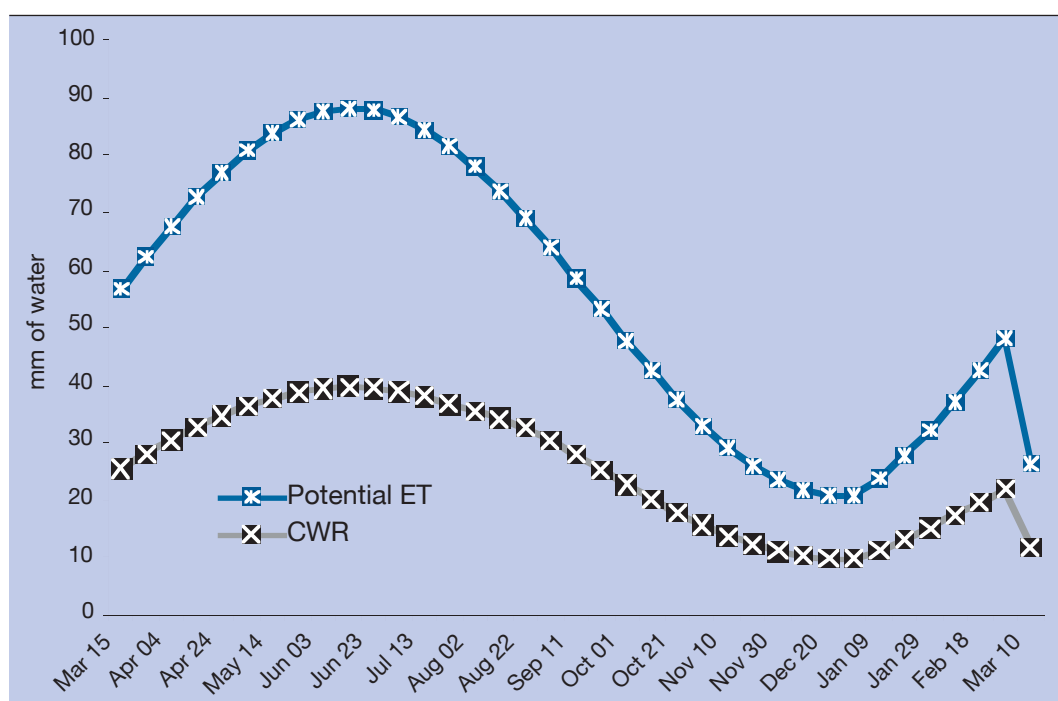
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	56.72	0.45	25.52	2.86	2.82	22.70
25/3	62.32	0.45	28.05	2.47	2.47	25.57
4/4	67.67	0.45	30.45	0.41	0.40	30.05
14/4	72.61	0.45	32.68	0.00	0.00	32.68
24/4	77.04	0.45	34.67	0.00	0.00	34.67
4/5	80.83	0.45	36.37	0.00	0.00	36.37
14/5	83.91	0.45	37.76	0.00	0.00	37.76
24/5	86.18	0.45	38.78	0.00	0.00	38.78
3/6	87.61	0.45	39.43	0.00	0.00	39.43
13/6	88.16	0.45	39.67	0.00	0.00	39.67
23/6	87.82	0.45	39.52	2.04	1.95	37.57
3/7	86.60	0.45	38.97	4.99	4.69	34.27
13/7	84.53	0.45	38.04	6.50	6.10	31.94
23/7	81.66	0.45	36.75	6.82	6.41	30.34
2/8	78.08	0.45	35.49	6.13	5.79	29.70
12/8	73.88	0.46	34.20	4.75	4.53	29.67
22/8	69.15	0.47	32.59	3.12	3.02	29.57
1/9	64.04	0.47	30.42	1.03	1.01	29.41
11/9	58.67	0.47	27.87	0.00	0.00	27.87
1/9	53.18	0.47	25.26	0.00	0.00	25.26
1/10	47.72	0.47	22.67	0.00	0.00	22.67
11/10	42.45	0.47	20.16	0.00	0.00	20.16
21/10	37.50	0.47	17.81	0.00	0.00	17.81
31/10	33.02	0.47	15.68	0.00	0.00	15.68
10/11	29.11	0.47	13.83	0.00	0.00	13.83
20/11	25.89	0.47	12.30	0.00	0.00	12.30
30/11	23.43	0.47	11.13	0.00	0.00	11.13
10/12	21.77	0.47	10.34	0.00	0.00	10.34

Dates

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
20/12	20.91	0.47	9.93	0.00	0.00	9.93
30/12	20.85	0.47	9.90	0.00	0.00	9.90
9/1	23.75	0.47	11.28	0.00	0.00	11.28
19/1	27.61	0.47	13.11	0.00	0.00	13.11
29/1	32.10	0.47	15.15	0.00	0.00	15.15
8/2	37.10	0.47	17.30	0.00	0.00	17.30
18/2	42.49	0.46	19.58	1.14	1.10	18.48
28/2	48.12	0.46	21.91	2.65	2.52	19.38
10/3	26.21	0.45	11.82	1.44	1.38	10.44
Total	2040.66	-	936.36	46.33	44.20	892.16

99

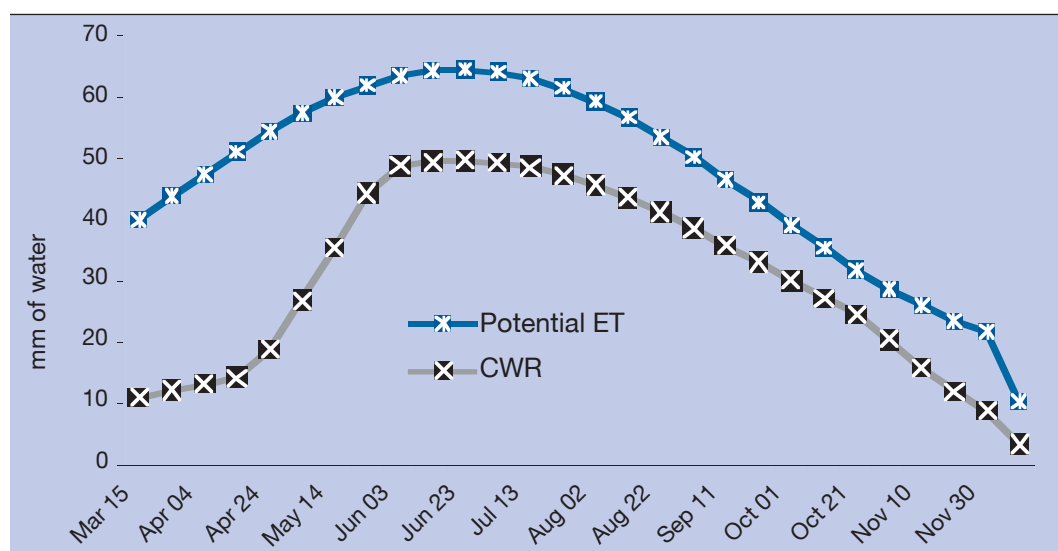
Water requirements
of major crops for different
agro-climatic zones of Balochistan



Apple/Cherry

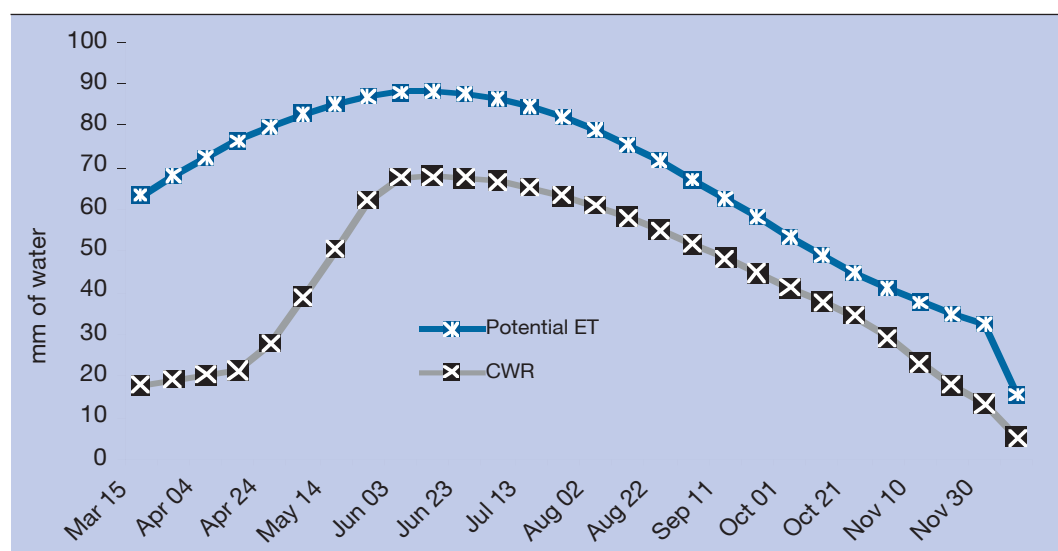
Kalat

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	40.05	0.28	11.21	9.72	9.05	2.16
25/3	43.88	0.28	12.29	8.51	7.99	4.30
4/4	47.65	0.28	13.34	7.11	6.74	6.61
14/4	51.25	0.28	14.35	5.44	5.21	9.14
24/4	54.58	0.35	18.99	3.30	3.20	15.79
4/5	57.54	0.47	27.07	0.33	0.33	26.74
14/5	60.07	0.59	35.61	0.00	0.00	35.61
24/5	62.09	0.71	44.40	0.00	0.00	44.40
3/6	63.54	0.77	48.93	0.00	0.00	48.93
13/6	64.40	0.77	49.59	0.00	0.00	49.59
23/6	64.63	0.77	49.76	0.00	0.00	49.76
3/7	64.23	0.77	49.46	0.00	0.00	49.46
13/7	63.21	0.77	48.67	0.00	0.00	48.67
23/7	61.61	0.77	47.44	0.00	0.00	47.44
2/8	59.46	0.77	45.78	0.00	0.00	45.78
12/8	56.82	0.77	43.75	0.00	0.00	43.75
22/8	53.77	0.77	41.40	0.00	0.00	41.40
1/9	50.39	0.77	38.80	0.00	0.00	38.80
11/9	46.77	0.77	36.02	0.00	0.00	36.02
21/9	43.02	0.77	33.13	0.00	0.00	33.13
1/10	39.25	0.77	30.22	0.00	0.00	30.22
11/10	35.56	0.77	27.38	0.00	0.00	27.38
21/10	32.06	0.77	24.69	0.00	0.00	24.69
31/10	28.86	0.71	20.64	0.00	0.00	20.64
10/11	26.04	0.61	15.99	0.00	0.00	15.99
20/11	23.69	0.51	12.15	0.99	0.97	11.18
30/11	21.87	0.41	9.00	4.68	4.50	4.50
10/12	10.43	0.34	3.50	3.46	3.29	0.21
Total	1,326.73		853.57	43.53	41.29	812.27



Khuzdar

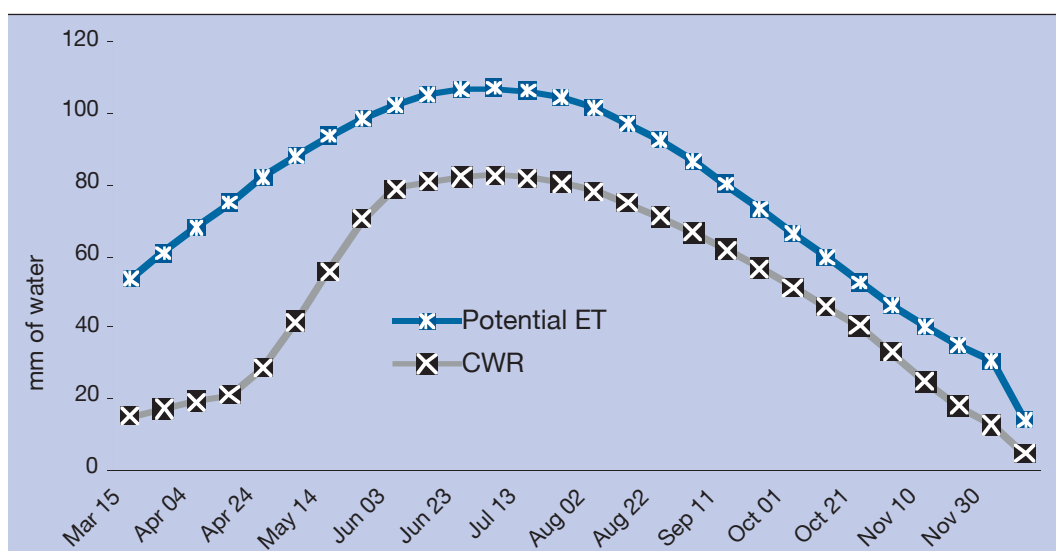
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	63.39	0.28	17.75	4.95	4.78	12.97
25/3	68.03	0.28	19.05	4.50	4.36	14.69
4/4	72.40	0.28	20.27	4.17	4.04	16.23
14/4	76.39	0.28	21.39	3.83	3.72	17.67
24/4	79.91	0.35	27.79	3.28	3.19	24.60
4/5	82.87	0.47	38.97	0.55	0.54	38.42
14/5	85.22	0.59	50.50	0.00	0.00	50.50
24/5	86.90	0.71	62.13	0.00	0.00	62.13
3/6	87.87	0.77	67.66	0.00	0.00	67.66
13/6	88.12	0.77	67.85	0.00	0.00	67.85
23/6	87.64	0.77	67.48	4.25	3.97	63.51
3/7	86.45	0.77	66.56	10.48	9.53	57.04
13/7	84.57	0.77	65.12	13.81	12.50	52.62
23/7	82.06	0.77	63.19	14.68	13.32	49.87
2/8	78.98	0.77	60.82	13.34	12.19	48.63
12/8	75.40	0.77	58.06	10.23	9.47	48.60
22/8	71.41	0.77	54.99	6.04	5.70	49.28
1/9	67.11	0.77	51.68	1.36	1.32	50.36
11/9	62.61	0.77	48.21	0.00	0.00	48.21
21/9	58.01	0.77	44.67	0.00	0.00	44.67
1/10	53.43	0.77	41.14	0.00	0.00	41.14
11/10	49.00	0.77	37.73	0.00	0.00	37.73
21/10	44.81	0.77	34.51	0.00	0.00	34.51
31/10	40.98	0.71	29.31	0.00	0.00	29.31
10/11	37.61	0.61	23.09	0.00	0.00	23.09
20/11	34.76	0.51	17.82	0.00	0.00	17.82
30/11	32.50	0.41	13.38	0.00	0.00	13.38
10/12	15.60	0.34	5.23	0.00	0.00	5.23
Total	1,854.05	-	1,176.35	95.47	88.65	1,087.69



Apple/Cherry

Quetta

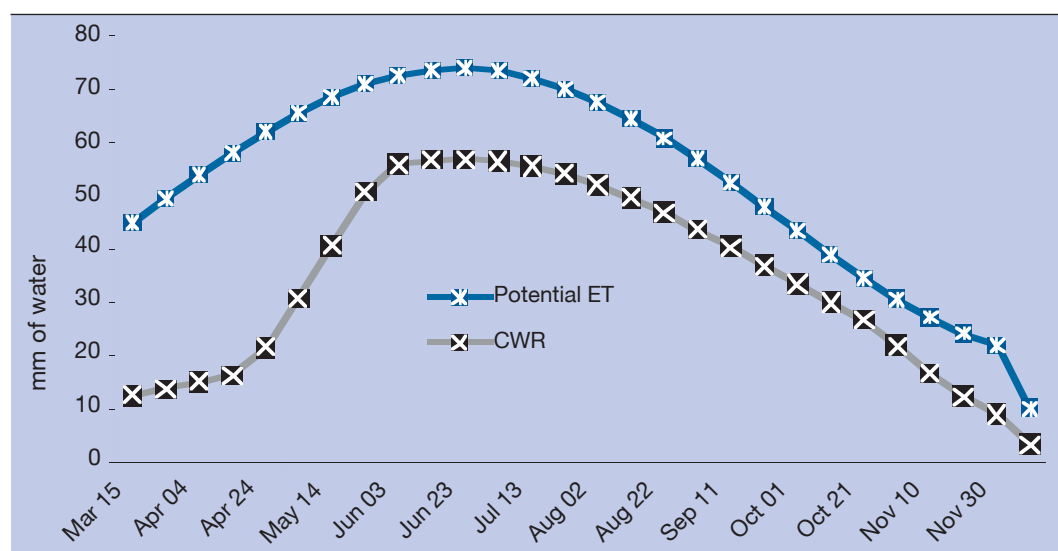
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	53.66	0.28	15.02	9.72	9.05	5.97
25/3	60.73	0.28	17.00	8.51	7.99	9.02
4/4	67.91	0.28	19.02	7.11	6.74	12.28
14/4	75.00	0.28	21.00	5.44	5.21	15.79
24/4	81.78	0.35	28.47	3.30	3.20	25.27
4/5	88.07	0.47	41.44	0.33	0.33	41.11
14/5	93.68	0.59	55.54	0.00	0.00	55.54
24/5	98.46	0.71	70.43	0.00	0.00	70.43
3/6	102.27	0.77	78.75	0.00	0.00	78.75
13/6	105.03	0.77	80.87	0.00	0.00	80.87
23/6	106.64	0.77	82.11	0.00	0.00	82.11
3/7	107.07	0.77	82.44	0.00	0.00	82.44
13/7	106.31	0.77	81.86	0.00	0.00	81.86
23/7	104.38	0.77	80.37	0.00	0.00	80.37
2/8	101.34	0.77	78.03	0.00	0.00	78.03
12/8	97.27	0.77	74.90	0.00	0.00	74.90
22/8	92.29	0.77	71.06	0.00	0.00	71.06
1/9	86.54	0.77	66.63	0.00	0.00	66.63
11/9	80.18	0.77	61.74	0.00	0.00	61.74
21/9	73.39	0.77	56.51	0.00	0.00	56.51
1/10	66.38	0.77	51.11	0.00	0.00	51.11
11/10	59.34	0.77	45.70	0.00	0.00	45.70
21/10	52.49	0.77	40.42	0.00	0.00	40.42
31/10	46.02	0.71	32.93	0.00	0.00	32.93
10/11	40.12	0.61	24.65	0.00	0.00	24.65
20/11	34.96	0.51	17.94	0.99	0.97	16.97
30/11	30.67	0.41	12.64	4.68	4.50	8.14
10/12	14.03	0.34	4.71	3.46	3.29	1.42
Total	2,125.97		1,393.29	43.53	41.29	1,352.00



Apple/Cherry

Barkhan

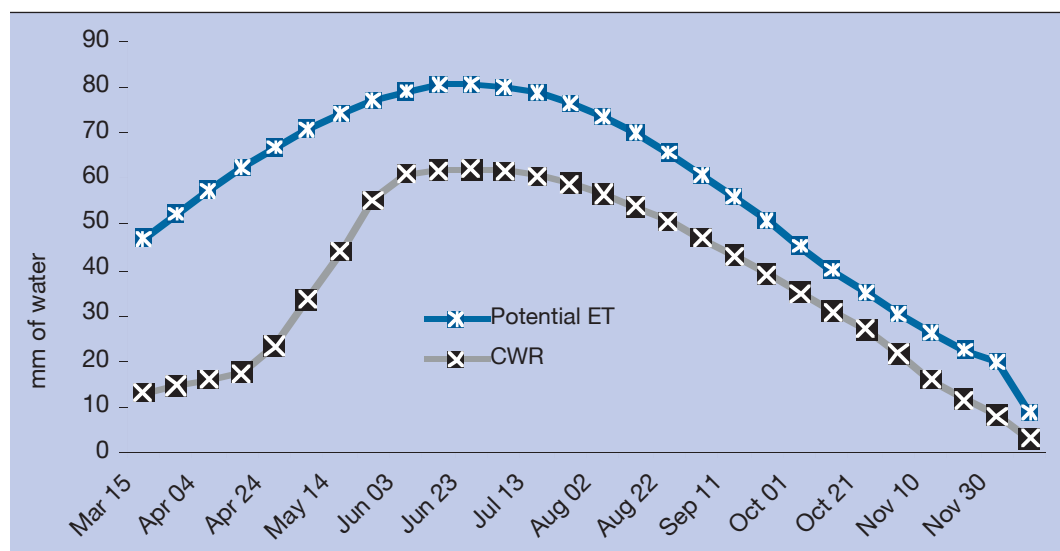
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	44.88	0.28	12.57	7.24	6.74	5.82
25/3	49.49	0.28	13.86	6.98	6.56	7.29
4/4	53.99	0.28	15.12	6.38	6.10	9.01
14/4	58.27	0.28	16.32	5.71	5.59	10.73
24/4	62.22	0.35	21.65	5.26	5.24	16.41
4/5	65.72	0.47	30.92	5.27	5.25	25.66
14/5	68.70	0.59	40.72	5.92	5.78	34.94
24/5	71.06	0.71	50.82	7.28	6.86	43.96
3/6	72.75	0.77	56.02	9.32	8.49	47.53
13/6	73.73	0.77	56.77	11.88	10.53	46.24
23/6	73.97	0.77	56.96	14.70	12.80	44.16
3/7	73.47	0.77	56.57	17.43	15.01	41.56
13/7	72.24	0.77	55.62	19.70	16.86	38.76
23/7	70.31	0.77	54.14	21.08	18.03	36.11
2/8	67.74	0.77	52.16	21.24	18.24	33.92
12/8	64.58	0.77	49.73	19.94	17.28	32.45
22/8	60.93	0.77	46.92	17.15	15.10	31.82
1/9	56.88	0.77	43.80	13.12	11.87	31.93
11/9	52.55	0.77	40.46	8.50	8.06	32.40
21/9	48.04	0.77	36.99	4.45	4.44	32.55
1/10	43.48	0.77	33.48	1.35	1.34	32.14
11/10	38.99	0.77	30.03	0.00	0.00	30.03
21/10	34.71	0.77	26.73	0.00	0.00	26.73
31/10	30.75	0.71	22.00	0.00	0.00	22.00
10/11	27.23	0.61	16.72	0.00	0.00	16.72
20/11	24.22	0.51	12.43	0.00	0.00	12.43
30/11	21.82	0.41	8.98	0.00	0.00	8.98
10/12	10.21	0.34	3.42	0.00	0.00	3.42
Total	1,492.93	-	961.90	229.87	206.19	755.70



Apple/Cherry

Zhob

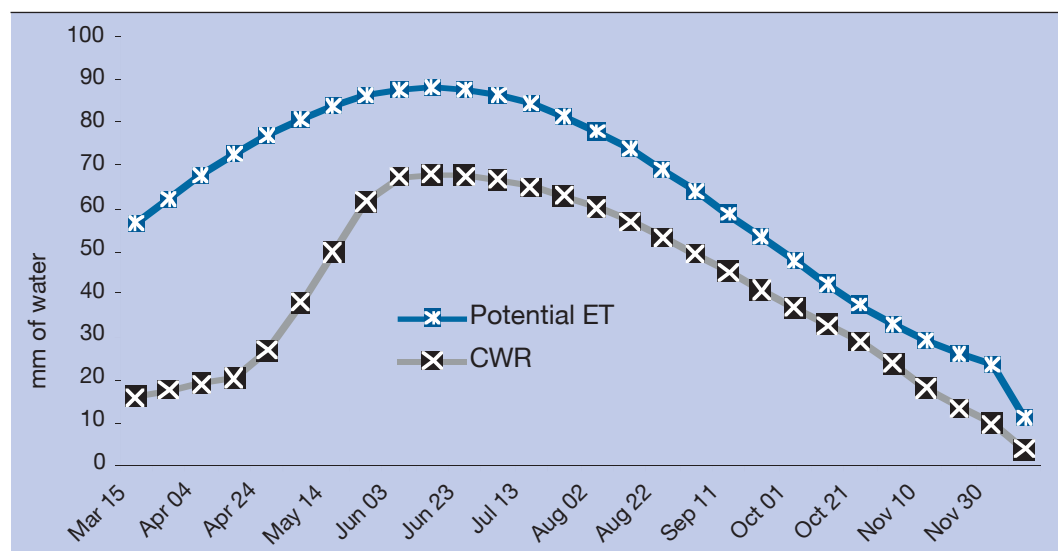
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	47.00	0.28	13.16	9.70	9.04	4.12
25/3	52.25	0.28	14.63	9.73	9.09	5.54
4/4	57.40	0.28	16.07	9.02	8.46	7.61
14/4	62.32	0.28	17.45	7.52	7.11	10.34
24/4	66.86	0.35	23.27	5.24	5.02	18.25
4/5	70.91	0.47	33.36	0.71	0.69	32.67
14/5	74.36	0.59	44.08	0.00	0.00	44.08
24/5	77.12	0.71	55.16	2.12	2.10	53.05
3/6	79.11	0.77	60.92	2.46	2.45	58.46
13/6	80.29	0.77	61.82	4.44	4.26	57.56
23/6	80.61	0.77	62.07	7.53	6.99	55.08
3/7	80.07	0.77	61.65	10.60	9.72	51.94
13/7	78.68	0.77	60.58	12.79	11.67	48.92
23/7	76.48	0.77	58.89	13.49	12.32	46.57
2/8	73.52	0.77	56.61	12.47	11.45	45.16
12/8	69.88	0.77	53.81	9.86	9.15	44.65
22/8	65.65	0.77	50.55	6.25	5.92	44.63
1/9	60.95	0.77	46.93	1.74	1.69	45.24
11/9	55.89	0.77	43.04	0.00	0.00	43.04
21/9	50.63	0.77	38.98	0.00	0.00	38.98
1/10	45.28	0.77	34.87	0.00	0.00	34.87
11/10	40.02	0.77	30.82	0.00	0.00	30.82
21/10	34.98	0.77	26.94	0.00	0.00	26.94
31/10	30.31	0.71	21.69	0.00	0.00	21.69
10/11	26.13	0.61	16.06	0.00	0.00	16.06
20/11	22.56	0.51	11.58	0.00	0.00	11.58
30/11	19.70	0.41	8.12	0.00	0.00	8.12
10/12	9.01	0.34	3.02	0.00	0.00	3.02
Total	1,587.98	-	1,026.12	125.67	117.16	908.97



Apple/Cherry

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	56.72	0.28	15.88	4.00	3.95	11.93
25/3	62.32	0.28	17.45	3.46	3.46	13.99
4/4	67.67	0.28	18.95	0.57	0.57	18.38
14/4	72.61	0.28	20.33	0.00	0.00	20.33
24/4	77.04	0.35	26.80	0.00	0.00	26.80
4/5	80.83	0.47	38.02	0.00	0.00	38.02
14/5	83.91	0.59	49.73	0.00	0.00	49.73
24/5	86.18	0.71	61.63	0.00	0.00	61.63
3/6	87.61	0.77	67.46	0.00	0.00	67.46
13/6	88.16	0.77	67.88	0.00	0.00	67.88
23/6	87.82	0.77	67.62	2.85	2.73	64.89
3/7	86.60	0.77	66.68	6.98	6.57	60.11
13/7	84.53	0.77	65.08	9.10	8.54	56.54
23/7	81.66	0.77	62.88	9.54	8.97	53.91
2/8	78.08	0.77	60.12	8.58	8.11	52.02
12/8	73.88	0.77	56.89	6.65	6.34	50.55
22/8	69.15	0.77	53.25	4.36	4.22	49.03
1/9	64.04	0.77	49.31	1.44	1.41	47.90
11/9	58.67	0.77	45.17	0.00	0.00	45.17
21/9	53.18	0.77	40.95	0.00	0.00	40.95
1/10	47.72	0.77	36.75	0.00	0.00	36.75
11/10	42.45	0.77	32.69	0.00	0.00	32.69
21/10	37.50	0.77	28.88	0.00	0.00	28.88
31/10	33.02	0.71	23.62	0.00	0.00	23.62
10/11	29.11	0.61	17.88	0.00	0.00	17.88
20/11	25.89	0.51	13.28	0.00	0.00	13.28
30/11	23.43	0.41	9.65	0.00	0.00	9.65
10/12	11.04	0.34	3.70	0.00	0.00	3.70
Total	1,750.81		1,118.53	57.54	54.87	1,063.66



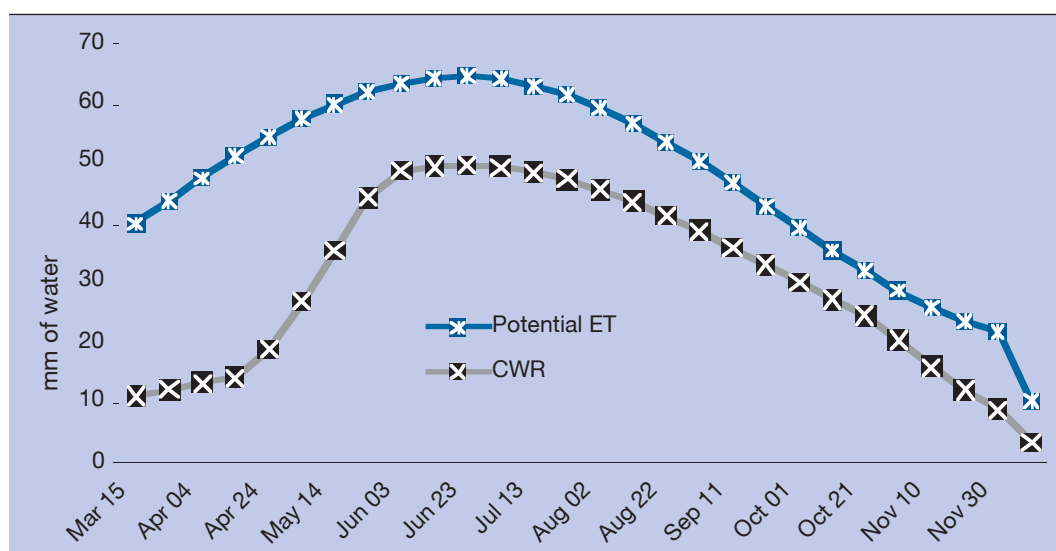
105

Water requirements
of major crops for different
agro-climatic zones of Balochistan

Apricot/Almonds

Kalat

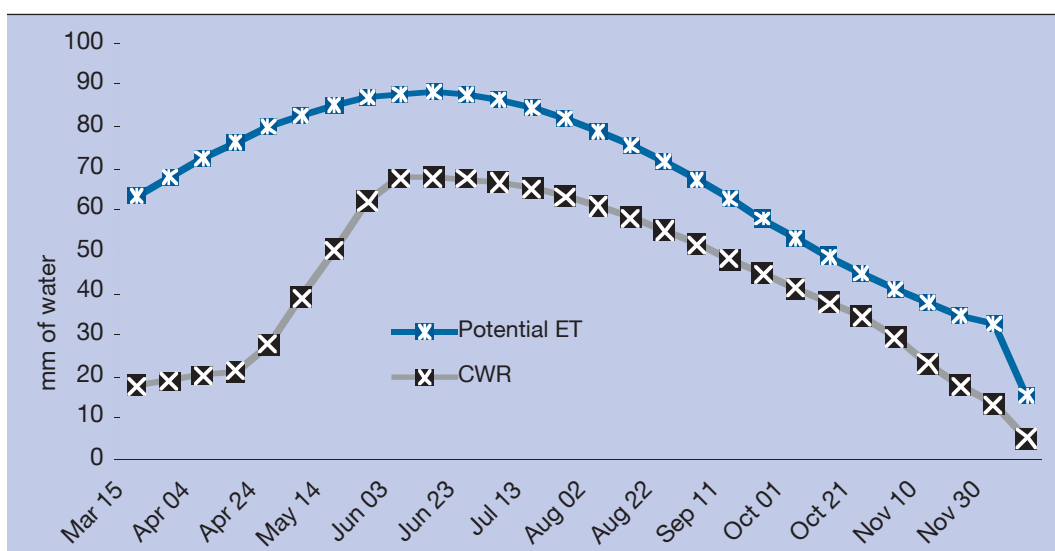
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	40.05	0.28	11.21	9.72	9.05	2.16
25/3	43.88	0.28	12.29	8.51	7.99	4.30
4/4	47.65	0.28	13.34	7.11	6.74	6.61
14/4	51.25	0.28	14.35	5.44	5.21	9.14
24/4	54.58	0.35	18.99	3.30	3.20	15.79
4/5	57.54	0.47	27.07	0.33	0.33	26.74
14/5	60.07	0.59	35.61	0.00	0.00	35.61
24/5	62.09	0.71	44.40	0.00	0.00	44.40
3/6	63.54	0.77	48.93	0.00	0.00	48.93
13/6	64.40	0.77	49.59	0.00	0.00	49.59
23/6	64.63	0.77	49.76	0.00	0.00	49.76
3/7	64.23	0.77	49.46	0.00	0.00	49.46
13/7	63.21	0.77	48.67	0.00	0.00	48.67
23/7	61.61	0.77	47.44	0.00	0.00	47.44
2/8	59.46	0.77	45.78	0.00	0.00	45.78
12/8	56.82	0.77	43.75	0.00	0.00	43.75
22/8	53.77	0.77	41.40	0.00	0.00	41.40
1/9	50.39	0.77	38.80	0.00	0.00	38.80
11/9	46.77	0.77	36.02	0.00	0.00	36.02
21/9	43.02	0.77	33.13	0.00	0.00	33.13
1/10	39.25	0.77	30.22	0.00	0.00	30.22
11/10	35.56	0.77	27.38	0.00	0.00	27.38
21/10	32.06	0.77	24.69	0.00	0.00	24.69
31/10	28.86	0.71	20.64	0.00	0.00	20.64
10/11	26.04	0.61	15.99	0.00	0.00	15.99
20/11	23.69	0.51	12.15	0.99	0.97	11.18
30/11	21.87	0.41	9.00	4.68	4.50	4.50
10/12	10.43	0.34	3.50	3.46	3.29	0.21
Total	1,326.73	-	853.57	43.53	41.29	812.27



Apricot/Almonds

Khuzdar

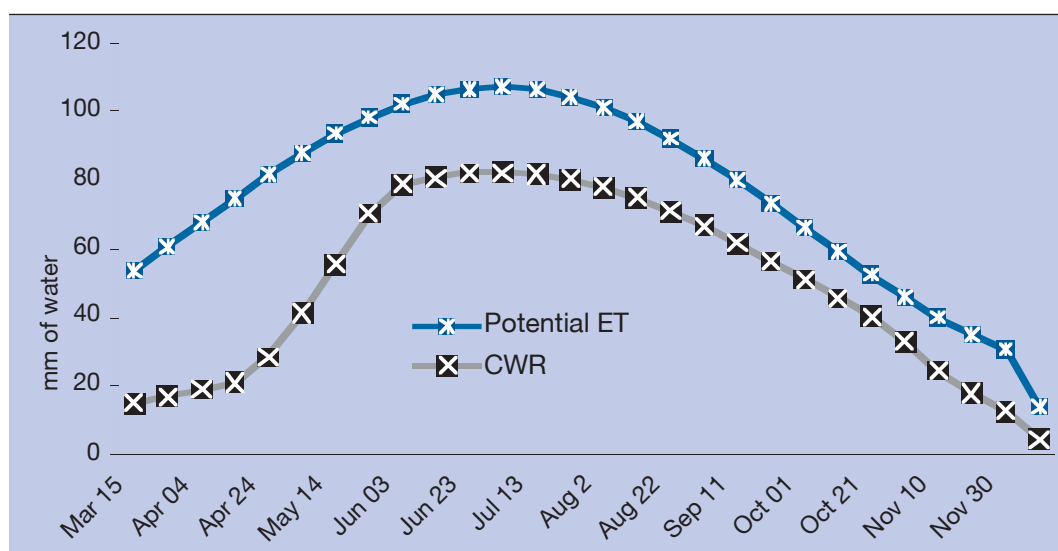
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	63.39	0.28	17.75	4.95	4.78	12.97
25/3	68.03	0.28	19.05	4.50	4.36	14.69
4/4	72.40	0.28	20.27	4.17	4.04	16.23
14/4	76.39	0.28	21.39	3.83	3.72	17.67
24/4	79.91	0.35	27.79	3.28	3.19	24.60
4/5	82.87	0.47	38.97	0.55	0.54	38.42
14/5	85.22	0.59	50.50	0.00	0.00	50.50
24/5	86.90	0.71	62.13	0.00	0.00	62.13
3/6	87.87	0.77	67.66	0.00	0.00	67.66
13/6	88.12	0.77	67.85	0.00	0.00	67.85
23/6	87.64	0.77	67.48	4.25	3.97	63.51
3/7	86.45	0.77	66.56	10.48	9.53	57.04
13/7	84.57	0.77	65.12	13.81	12.50	52.62
23/7	82.06	0.77	63.19	14.68	13.32	49.87
2/8	78.98	0.77	60.82	13.34	12.19	48.63
12/8	75.40	0.77	58.06	10.23	9.47	48.60
22/8	71.41	0.77	54.99	6.04	5.70	49.28
1/9	67.11	0.77	51.68	1.36	1.32	50.36
11/9	62.61	0.77	48.21	0.00	0.00	48.21
21/9	58.01	0.77	44.67	0.00	0.00	44.67
1/10	53.43	0.77	41.14	0.00	0.00	41.14
11/10	49.00	0.77	37.73	0.00	0.00	37.73
21/10	44.81	0.77	34.51	0.00	0.00	34.51
31/10	40.98	0.71	29.31	0.00	0.00	29.31
10/11	37.61	0.61	23.09	0.00	0.00	23.09
20/11	34.76	0.51	17.82	0.00	0.00	17.82
30/11	32.50	0.41	13.38	0.00	0.00	13.38
10/12	15.60	0.34	5.23	0.00	0.00	5.23
Total	1,854.05	-	1,176.35	95.47	88.65	1,087.69



Apricot/Almonds

Quetta

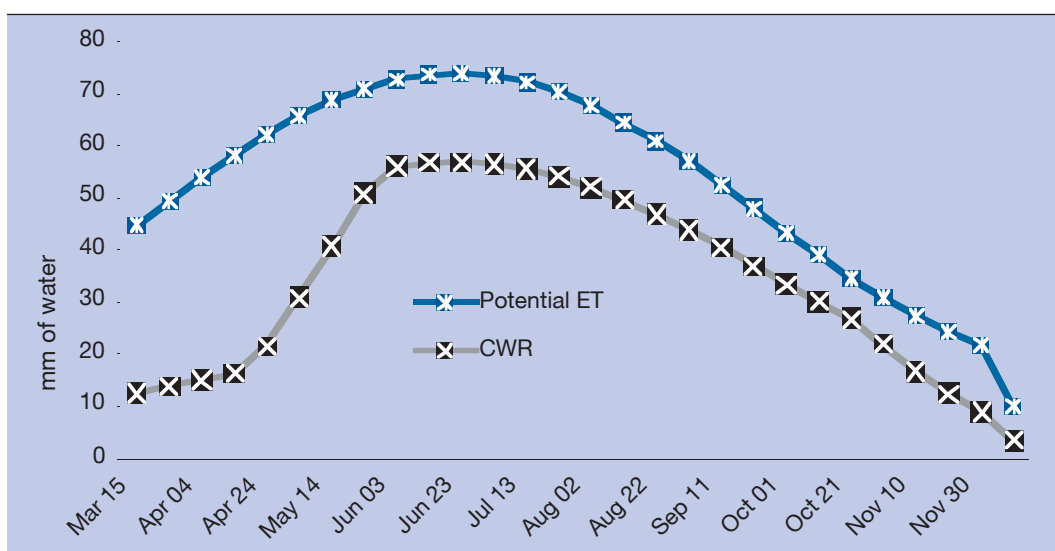
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	53.66	0.28	15.02	9.72	9.05	5.97
25/3	60.73	0.28	17.00	8.51	7.99	9.02
4/4	67.91	0.28	19.02	7.11	6.74	12.28
14/4	75.00	0.28	21.00	5.44	5.21	15.79
24/4	81.78	0.35	28.47	3.30	3.20	25.27
4/5	88.07	0.47	41.44	0.33	0.33	41.11
14/5	93.68	0.59	55.54	0.00	0.00	55.54
24/5	98.46	0.71	70.43	0.00	0.00	70.43
3/6	102.27	0.77	78.75	0.00	0.00	78.75
13/6	105.03	0.77	80.87	0.00	0.00	80.87
23/6	106.64	0.77	82.11	0.00	0.00	82.11
3/7	107.07	0.77	82.44	0.00	0.00	82.44
13/7	106.31	0.77	81.86	0.00	0.00	81.86
23/7	104.38	0.77	80.37	0.00	0.00	80.37
2/8	101.34	0.77	78.03	0.00	0.00	78.03
12/8	97.27	0.77	74.90	0.00	0.00	74.90
22/8	92.29	0.77	71.06	0.00	0.00	71.06
1/9	86.54	0.77	66.63	0.00	0.00	66.63
11/9	80.18	0.77	61.74	0.00	0.00	61.74
21/9	73.39	0.77	56.51	0.00	0.00	56.51
1/10	66.38	0.77	51.11	0.00	0.00	51.11
11/10	59.34	0.77	45.70	0.00	0.00	45.70
21/10	52.49	0.77	40.42	0.00	0.00	40.42
31/10	46.02	0.71	32.93	0.00	0.00	32.93
10/11	40.12	0.61	24.65	0.00	0.00	24.65
20/11	34.96	0.51	17.94	0.99	0.97	16.97
30/11	30.67	0.41	12.64	4.68	4.50	8.14
10/12	14.03	0.34	4.71	3.46	3.29	1.42
Total	2,125.97	-	1,393.29	43.53	41.29	1,352.00



Apricot/Almonds

Barkhan

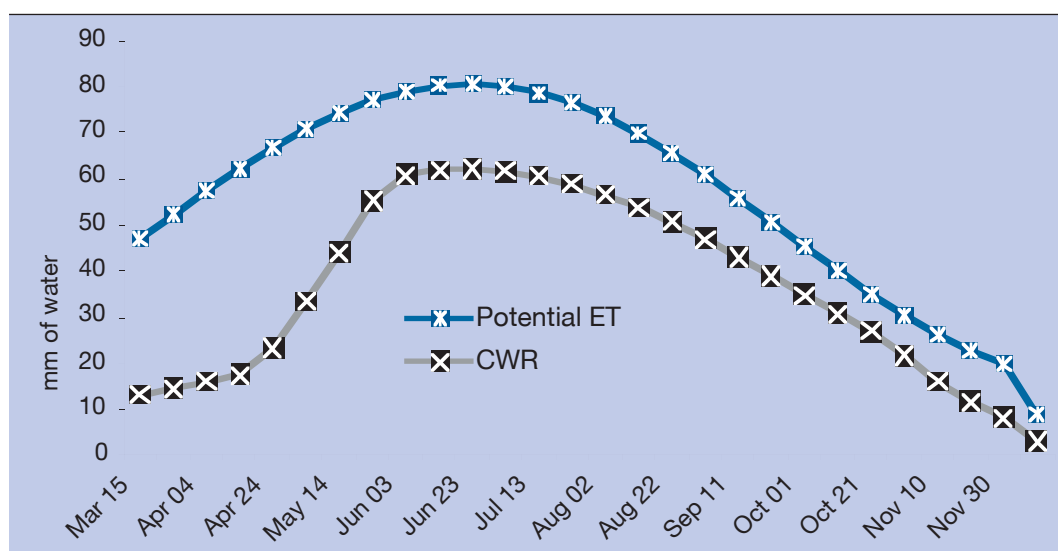
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	44.88	0.28	12.57	7.24	6.74	5.82
25/3	49.49	0.28	13.86	6.98	6.56	7.29
4/4	53.99	0.28	15.12	6.38	6.10	9.01
14/4	58.27	0.28	16.32	5.71	5.59	10.73
24/4	62.22	0.35	21.65	5.26	5.24	16.41
4/5	65.72	0.47	30.92	5.27	5.25	25.66
14/5	68.70	0.59	40.72	5.92	5.78	34.94
24/5	71.06	0.71	50.82	7.28	6.86	43.96
3/6	72.75	0.77	56.02	9.32	8.49	47.53
13/6	73.73	0.77	56.77	11.88	10.53	46.24
23/6	73.97	0.77	56.96	14.70	12.80	44.16
3/7	73.47	0.77	56.57	17.43	15.01	41.56
13/7	72.24	0.77	55.62	19.70	16.86	38.76
23/7	70.31	0.77	54.14	21.08	18.03	36.11
2/8	67.74	0.77	52.16	21.24	18.24	33.92
12/8	64.58	0.77	49.73	19.94	17.28	32.45
22/8	60.93	0.77	46.92	17.15	15.10	31.82
1/9	56.88	0.77	43.80	13.12	11.87	31.93
11/9	52.55	0.77	40.46	8.50	8.06	32.40
21/9	48.04	0.77	36.99	4.45	4.44	32.55
1/10	43.48	0.77	33.48	1.35	1.34	32.14
11/10	38.99	0.77	30.03	0.00	0.00	30.03
21/10	34.71	0.77	26.73	0.00	0.00	26.73
31/10	30.75	0.71	22.00	0.00	0.00	22.00
10/11	27.23	0.61	16.72	0.00	0.00	16.72
20/11	24.22	0.51	12.43	0.00	0.00	12.43
30/11	21.82	0.41	8.98	0.00	0.00	8.98
10/12	10.21	0.34	3.42	0.00	0.00	3.42
Total	1,492.93	-	961.90	229.87	206.19	755.70



Apricot/Almonds

Zhob

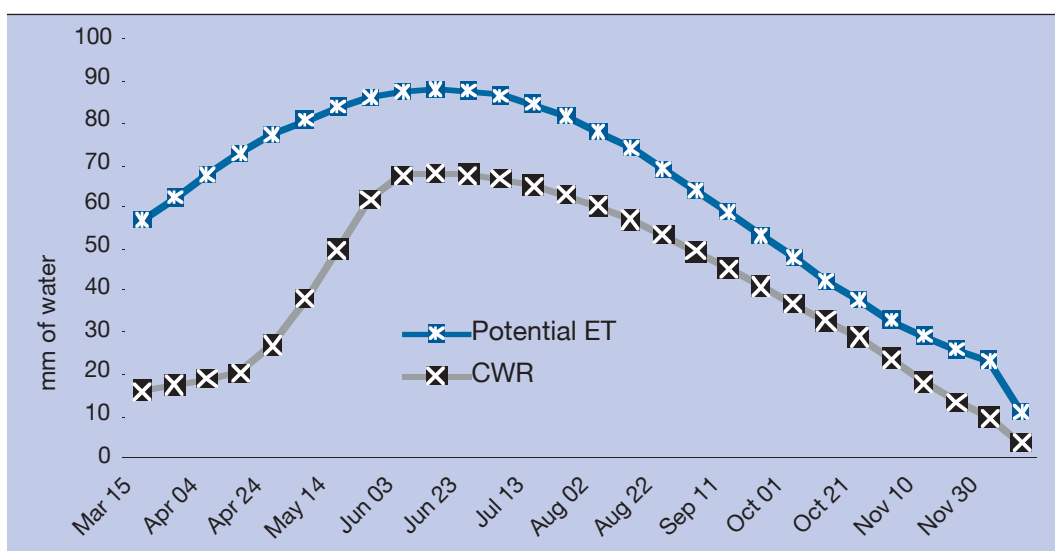
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	47.00	0.28	13.16	9.70	9.04	4.12
25/3	52.25	0.28	14.63	9.73	9.09	5.54
4/4	57.40	0.28	16.07	9.02	8.46	7.61
14/4	62.32	0.28	17.45	7.52	7.11	10.34
24/4	66.86	0.35	23.27	5.24	5.02	18.25
4/5	70.91	0.47	33.36	0.71	0.69	32.67
14/5	74.36	0.59	44.08	0.00	0.00	44.08
24/5	77.12	0.71	55.16	2.12	2.10	53.05
3/6	79.11	0.77	60.92	2.46	2.45	58.46
13/6	80.29	0.77	61.82	4.44	4.26	57.56
23/6	80.61	0.77	62.07	7.53	6.99	55.08
3/7	80.07	0.77	61.65	10.60	9.72	51.94
13/7	78.68	0.77	60.58	12.79	11.67	48.92
23/7	76.48	0.77	58.89	13.49	12.32	46.57
2/8	73.52	0.77	56.61	12.47	11.45	45.16
12/8	69.88	0.77	53.81	9.86	9.15	44.65
22/8	65.65	0.77	50.55	6.25	5.92	44.63
1/9	60.95	0.77	46.93	1.74	1.69	45.24
11/9	55.89	0.77	43.04	0.00	0.00	43.04
21/9	50.63	0.77	38.98	0.00	0.00	38.98
1/10	45.28	0.77	34.87	0.00	0.00	34.87
11/10	40.02	0.77	30.82	0.00	0.00	30.82
21/10	34.98	0.77	26.94	0.00	0.00	26.94
31/10	30.31	0.71	21.69	0.00	0.00	21.69
10/11	26.13	0.61	16.06	0.00	0.00	16.06
20/11	22.56	0.51	11.58	0.00	0.00	11.58
30/11	19.70	0.41	8.12	0.00	0.00	8.12
10/12	9.01	0.34	3.02	0.00	0.00	3.02
Total	1,587.98	-	1,026.12	125.67	117.16	908.97



Apricot/Almonds

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	56.72	0.28	15.88	4.00	3.95	11.93
25/3	62.32	0.28	17.45	3.46	3.46	13.99
4/4	67.67	0.28	18.95	0.57	0.57	18.38
14/4	72.61	0.28	20.33	0.00	0.00	20.33
24/4	77.04	0.35	26.80	0.00	0.00	26.80
4/5	80.83	0.47	38.02	0.00	0.00	38.02
14/5	83.91	0.59	49.73	0.00	0.00	49.73
24/5	86.18	0.71	61.63	0.00	0.00	61.63
3/6	87.61	0.77	67.46	0.00	0.00	67.46
13/6	88.16	0.77	67.88	0.00	0.00	67.88
23/6	87.82	0.77	67.62	2.85	2.73	64.89
3/7	86.60	0.77	66.68	6.98	6.57	60.11
13/7	84.53	0.77	65.08	9.10	8.54	56.54
23/7	81.66	0.77	62.88	9.54	8.97	53.91
2/8	78.08	0.77	60.12	8.58	8.11	52.02
12/8	73.88	0.77	56.89	6.65	6.34	50.55
22/8	69.15	0.77	53.25	4.36	4.22	49.03
1/9	64.04	0.77	49.31	1.44	1.41	47.90
11/9	58.67	0.77	45.17	0.00	0.00	45.17
21/9	53.18	0.77	40.95	0.00	0.00	40.95
1/10	47.72	0.77	36.75	0.00	0.00	36.75
11/10	42.45	0.77	32.69	0.00	0.00	32.69
21/10	37.50	0.77	28.88	0.00	0.00	28.88
31/10	33.02	0.71	23.62	0.00	0.00	23.62
10/11	29.11	0.61	17.88	0.00	0.00	17.88
20/11	25.89	0.51	13.28	0.00	0.00	13.28
30/11	23.43	0.41	9.65	0.00	0.00	9.65
10/12	11.04	0.34	3.70	0.00	0.00	3.70
Total	1,750.81	-	1,118.53	57.54	54.87	1,063.66



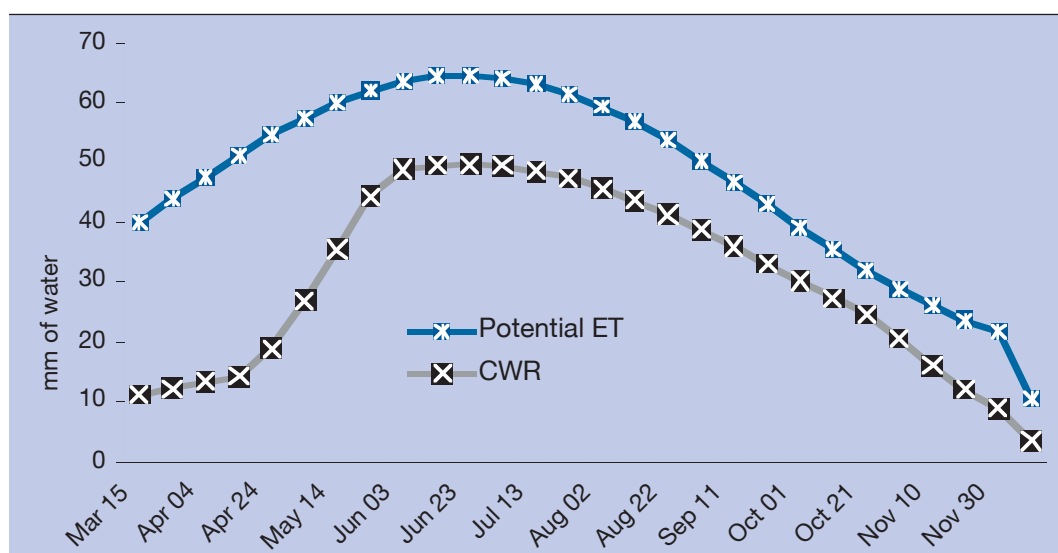
111

Water requirements
of major crops for different
agro-climatic zones of Balochistan

Pomegranate

Kalat

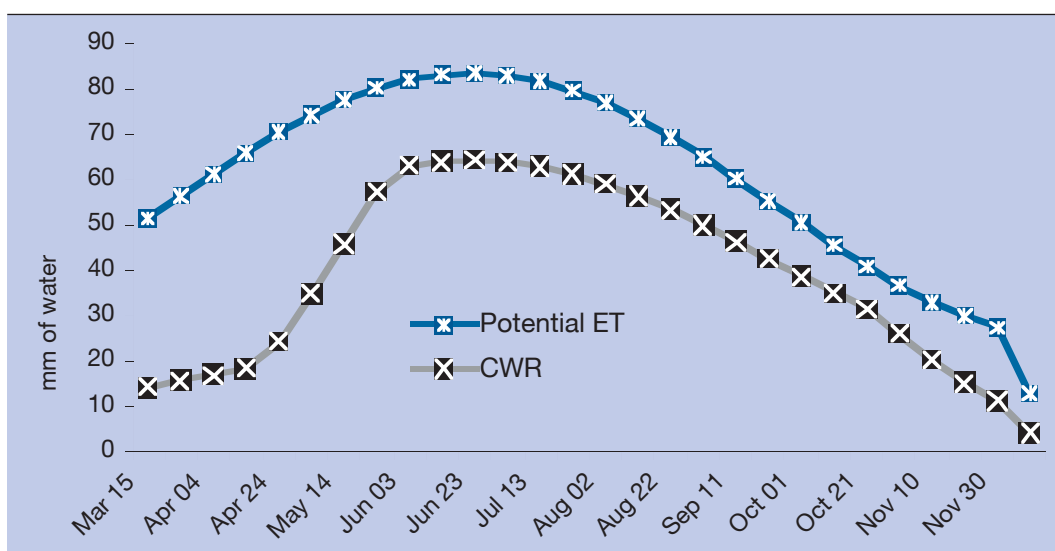
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	40.05	0.28	11.21	9.72	9.05	2.16
25/3	43.88	0.28	12.29	8.51	7.99	4.30
4/4	47.65	0.28	13.34	7.11	6.74	6.61
14/4	51.25	0.28	14.35	5.44	5.21	9.14
24/4	54.58	0.35	18.99	3.30	3.20	15.79
4/5	57.54	0.47	27.07	0.33	0.33	26.74
14/5	60.07	0.59	35.61	0.00	0.00	35.61
24/5	62.09	0.71	44.40	0.00	0.00	44.40
3/6	63.54	0.77	48.93	0.00	0.00	48.93
13/6	64.40	0.77	49.59	0.00	0.00	49.59
23/6	64.63	0.77	49.76	0.00	0.00	49.76
3/7	64.23	0.77	49.46	0.00	0.00	49.46
13/7	63.21	0.77	48.67	0.00	0.00	48.67
23/7	61.61	0.77	47.44	0.00	0.00	47.44
2/8	59.46	0.77	45.78	0.00	0.00	45.78
12/8	56.82	0.77	43.75	0.00	0.00	43.75
22/8	53.77	0.77	41.40	0.00	0.00	41.40
1/9	50.39	0.77	38.80	0.00	0.00	38.80
11/9	46.77	0.77	36.02	0.00	0.00	36.02
21/9	43.02	0.77	33.13	0.00	0.00	33.13
1/10	39.25	0.77	30.22	0.00	0.00	30.22
11/10	35.56	0.77	27.38	0.00	0.00	27.38
21/10	32.06	0.77	24.69	0.00	0.00	24.69
31/10	28.86	0.71	20.64	0.00	0.00	20.64
10/11	26.04	0.61	15.99	0.00	0.00	15.99
20/11	23.69	0.51	12.15	0.99	0.97	11.18
30/11	21.87	0.41	9.00	4.68	4.50	4.50
10/12	10.43	0.34	3.50	3.46	3.29	0.21
Total	1,326.73		853.57	43.53	41.29	812.27



Pomegranate

Dalbandin

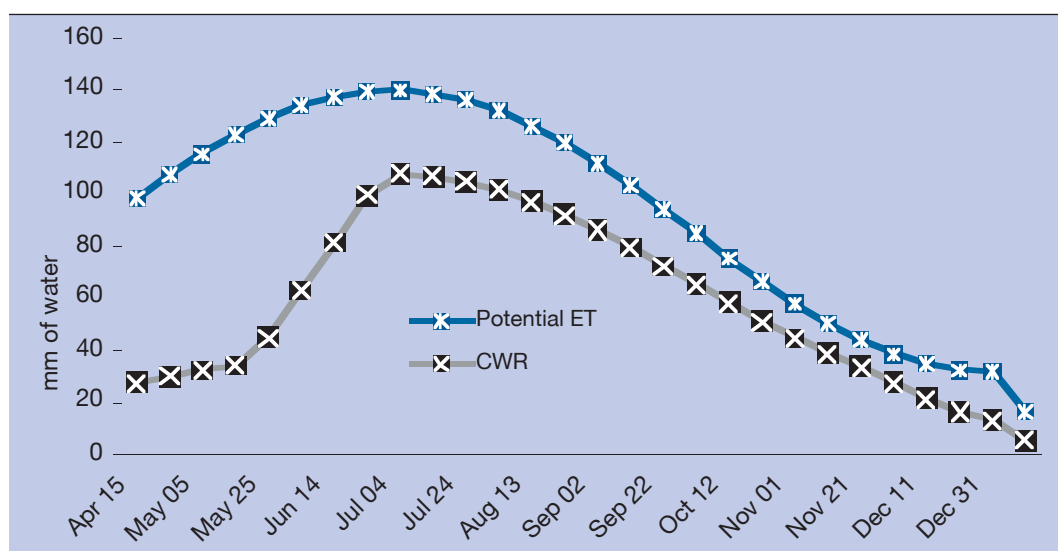
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	51.49	0.28	14.42	4.18	4.05	10.37
25/3	56.45	0.28	15.81	3.17	3.09	12.72
4/4	61.34	0.28	17.18	0.36	0.35	16.82
14/4	66.01	0.28	18.48	0.00	0.00	18.48
24/4	70.34	0.35	24.48	0.00	0.00	24.48
4/5	74.21	0.47	34.90	0.00	0.00	34.90
14/5	77.50	0.59	45.94	0.00	0.00	45.94
24/5	80.14	0.71	57.31	0.00	0.00	57.31
3/6	82.05	0.77	63.18	0.00	0.00	63.18
13/6	83.17	0.77	64.04	0.00	0.00	64.04
23/6	83.48	0.77	64.28	0.00	0.00	64.28
3/7	82.98	0.77	63.89	0.00	0.00	63.89
13/7	81.67	0.77	62.88	0.00	0.00	62.88
23/7	79.59	0.77	61.28	0.00	0.00	61.28
2/8	76.79	0.77	59.13	0.00	0.00	59.13
12/8	73.36	0.77	56.49	0.00	0.00	56.49
22/8	69.38	0.77	53.42	0.00	0.00	53.42
1/9	64.97	0.77	50.03	0.00	0.00	50.03
11/9	60.25	0.77	46.39	0.00	0.00	46.39
21/9	55.35	0.77	42.62	0.00	0.00	42.62
1/10	50.41	0.77	38.82	0.00	0.00	38.82
11/10	45.57	0.77	35.09	0.00	0.00	35.09
21/10	40.98	0.77	31.55	0.00	0.00	31.55
31/10	36.76	0.71	26.30	0.00	0.00	26.30
10/11	33.05	0.61	20.29	0.00	0.00	20.29
20/11	29.93	0.51	15.35	0.00	0.00	15.35
30/11	27.49	0.41	11.32	0.00	0.00	11.32
10/12	13.06	0.34	4.38	0.00	0.00	4.38
Total	1,707.77	-	1,099.26	7.71	7.49	1,091.76



Pomegranate

Nokundi

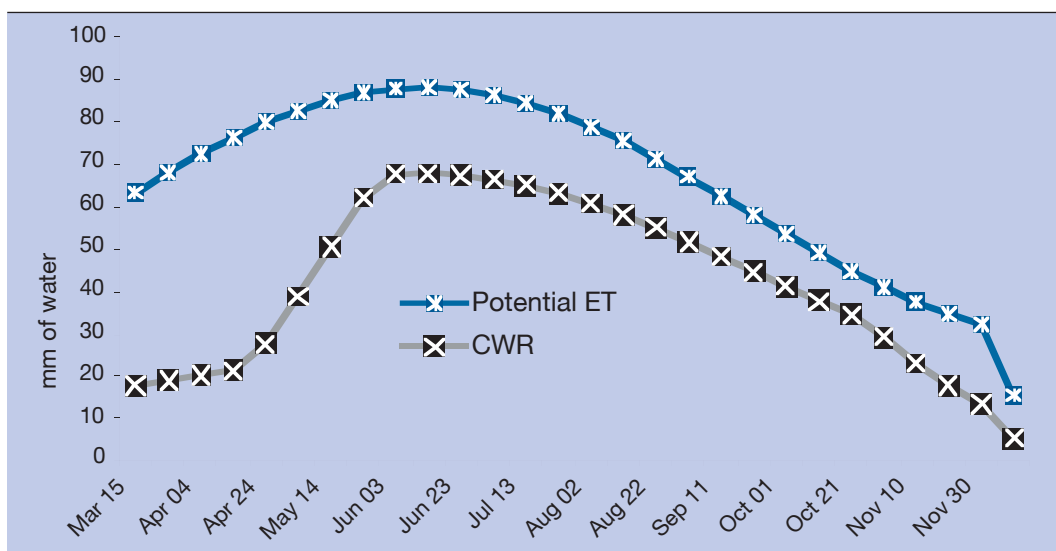
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/4	98.35	0.28	27.54	0.00	0.00	27.54
25/4	107.19	0.28	30.01	0.00	0.00	30.01
5/5	115.39	0.28	32.31	0.00	0.00	32.31
15/5	122.71	0.28	34.36	0.00	0.00	34.36
25/5	128.93	0.35	44.84	0.00	0.00	44.84
4/6	133.88	0.47	62.95	0.00	0.00	62.95
14/6	137.42	0.59	81.43	0.00	0.00	81.43
24/6	139.44	0.71	99.69	0.00	0.00	99.69
4/7	139.88	0.77	107.71	0.00	0.00	107.71
14/7	138.73	0.77	106.83	0.00	0.00	106.83
24/7	136.03	0.77	104.75	0.00	0.00	104.75
3/8	131.85	0.77	101.52	0.00	0.00	101.52
13/8	126.30	0.77	97.25	0.00	0.00	97.25
23/8	119.55	0.77	92.05	0.00	0.00	92.05
2/9	111.79	0.77	86.08	0.00	0.00	86.08
12/9	103.23	0.77	79.49	0.00	0.00	79.49
22/9	94.15	0.77	72.49	0.00	0.00	72.49
2/10	84.79	0.77	65.29	0.00	0.00	65.29
12/10	75.45	0.77	58.10	0.00	0.00	58.10
22/10	66.42	0.77	51.14	0.00	0.00	51.14
1/11	57.96	0.77	44.63	0.00	0.00	44.63
11/11	50.34	0.77	38.77	0.00	0.00	38.77
21/11	43.81	0.77	33.73	0.00	0.00	33.73
1/12	38.53	0.71	27.57	0.00	0.00	27.57
11/12	34.67	0.61	21.29	0.00	0.00	21.29
21/12	32.28	0.51	16.55	0.00	0.00	16.55
31/12	31.95	0.41	13.13	0.00	0.00	13.13
10/1	16.23	0.34	5.44	0.00	0.00	5.44
Total	2,617.26	-	1,636.93	0.00	0.00	1,636.93



Pomegranate

Khuzdar

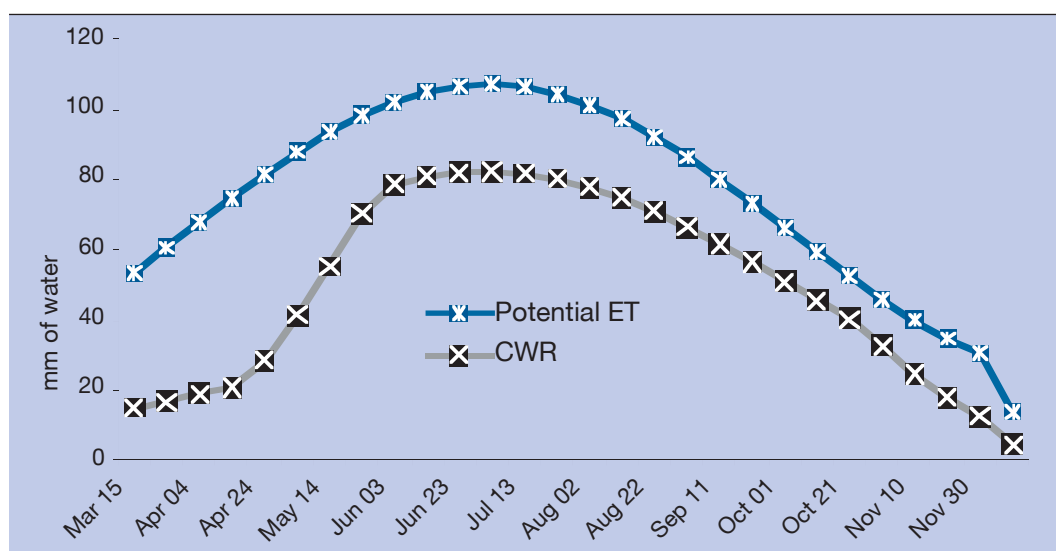
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	63.39	0.28	17.75	4.95	4.78	12.97
25/3	68.03	0.28	19.05	4.50	4.36	14.69
4/4	72.40	0.28	20.27	4.17	4.04	16.23
14/4	76.39	0.28	21.39	3.83	3.72	17.67
24/4	79.91	0.35	27.79	3.28	3.19	24.60
4/5	82.87	0.47	38.97	0.55	0.54	38.42
14/5	85.22	0.59	50.50	0.00	0.00	50.50
24/5	86.90	0.71	62.13	0.00	0.00	62.13
3/6	87.87	0.77	67.66	0.00	0.00	67.66
13/6	88.12	0.77	67.85	0.00	0.00	67.85
23/6	87.64	0.77	67.48	4.25	3.97	63.51
3/7	86.45	0.77	66.56	10.48	9.53	57.04
13/7	84.57	0.77	65.12	13.81	12.50	52.62
23/7	82.06	0.77	63.19	14.68	13.32	49.87
2/8	78.98	0.77	60.82	13.34	12.19	48.63
12/8	75.40	0.77	58.06	10.23	9.47	48.60
22/8	71.41	0.77	54.99	6.04	5.70	49.28
1/9	67.11	0.77	51.68	1.36	1.32	50.36
11/9	62.61	0.77	48.21	0.00	0.00	48.21
21/9	58.01	0.77	44.67	0.00	0.00	44.67
1/10	53.43	0.77	41.14	0.00	0.00	41.14
11/10	49.00	0.77	37.73	0.00	0.00	37.73
21/10	44.81	0.77	34.51	0.00	0.00	34.51
31/10	40.98	0.71	29.31	0.00	0.00	29.31
10/11	37.61	0.61	23.09	0.00	0.00	23.09
20/11	34.76	0.51	17.82	0.00	0.00	17.82
30/11	32.50	0.41	13.38	0.00	0.00	13.38
10/12	15.60	0.34	5.23	0.00	0.00	5.23
Total	1,854.05	-	1176.35	95.47	88.65	1,087.69



Pomegranate

Quetta

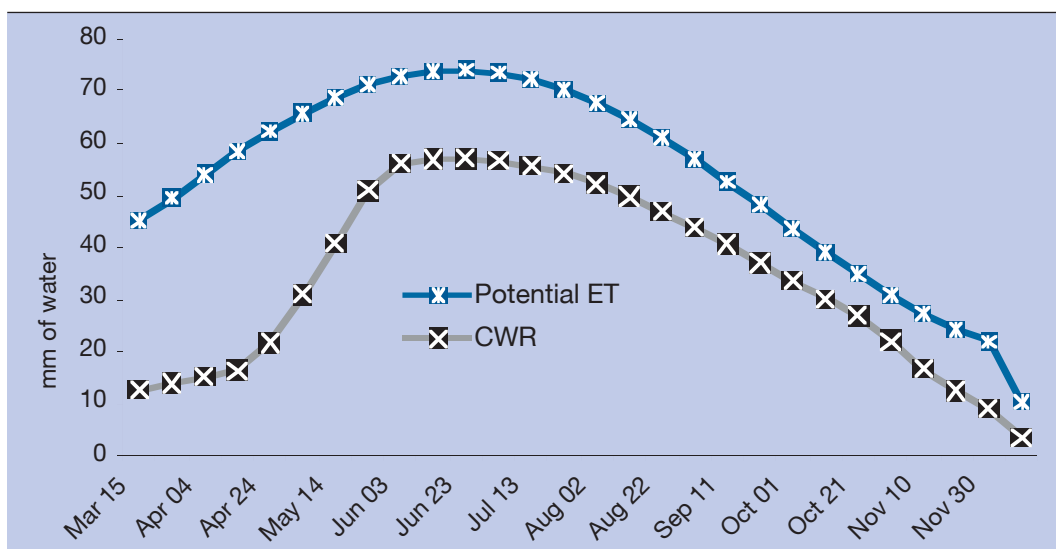
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	53.66	0.28	15.02	9.72	9.05	5.97
25/3	60.73	0.28	17.00	8.51	7.99	9.02
4/4	67.91	0.28	19.02	7.11	6.74	12.28
14/4	75.00	0.28	21.00	5.44	5.21	15.79
24/4	81.78	0.35	28.47	3.30	3.20	25.27
4/5	88.07	0.47	41.44	0.33	0.33	41.11
14/5	93.68	0.59	55.54	0.00	0.00	55.54
24/5	98.46	0.71	70.43	0.00	0.00	70.43
3/6	102.27	0.77	78.75	0.00	0.00	78.75
13/6	105.03	0.77	80.87	0.00	0.00	80.87
23/6	106.64	0.77	82.11	0.00	0.00	82.11
3/7	107.07	0.77	82.44	0.00	0.00	82.44
13/7	106.31	0.77	81.86	0.00	0.00	81.86
23/7	104.38	0.77	80.37	0.00	0.00	80.37
2/8	101.34	0.77	78.03	0.00	0.00	78.03
12/8	97.27	0.77	74.90	0.00	0.00	74.90
22/8	92.29	0.77	71.06	0.00	0.00	71.06
1/9	86.54	0.77	66.63	0.00	0.00	66.63
11/9	80.18	0.77	61.74	0.00	0.00	61.74
21/9	73.39	0.77	56.51	0.00	0.00	56.51
1/10	66.38	0.77	51.11	0.00	0.00	51.11
11/10	59.34	0.77	45.70	0.00	0.00	45.70
21/10	52.49	0.77	40.42	0.00	0.00	40.42
31/10	46.02	0.71	32.93	0.00	0.00	32.93
10/11	40.12	0.61	24.65	0.00	0.00	24.65
20/11	34.96	0.51	17.94	0.99	0.97	16.97
30/11	30.67	0.41	12.64	4.68	4.50	8.14
10/12	14.03	0.34	4.71	3.46	3.29	1.42
Total	2,125.97	-	1,393.29	43.53	41.29	1,352.00



Pomegranate

Barkhan

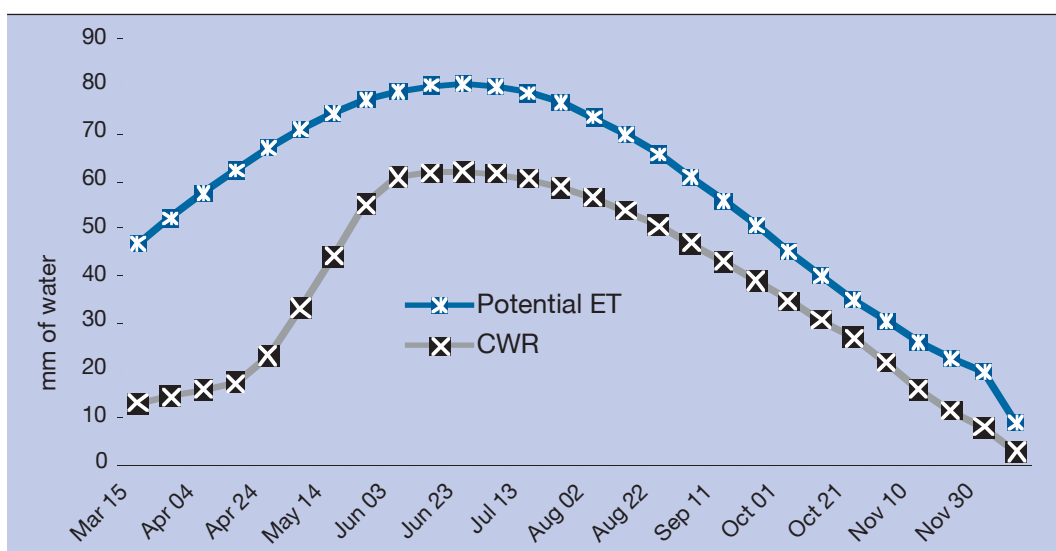
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	44.88	0.28	12.57	7.24	6.74	5.82
25/3	49.49	0.28	13.86	6.98	6.56	7.29
4/4	53.99	0.28	15.12	6.38	6.10	9.01
14/4	58.27	0.28	16.32	5.71	5.59	10.73
24/4	62.22	0.35	21.65	5.26	5.24	16.41
4/5	65.72	0.47	30.92	5.27	5.25	25.66
14/5	68.70	0.59	40.72	5.92	5.78	34.94
24/5	71.06	0.71	50.82	7.28	6.86	43.96
3/6	72.75	0.77	56.02	9.32	8.49	47.53
13/6	73.73	0.77	56.77	11.88	10.53	46.24
23/6	73.97	0.77	56.96	14.70	12.80	44.16
3/7	73.47	0.77	56.57	17.43	15.01	41.56
13/7	72.24	0.77	55.62	19.70	16.86	38.76
23/7	70.31	0.77	54.14	21.08	18.03	36.11
2/8	67.74	0.77	52.16	21.24	18.24	33.92
12/8	64.58	0.77	49.73	19.94	17.28	32.45
22/8	60.93	0.77	46.92	17.15	15.10	31.82
1/9	56.88	0.77	43.80	13.12	11.87	31.93
11/9	52.55	0.77	40.46	8.50	8.06	32.40
21/9	48.04	0.77	36.99	4.45	4.44	32.55
1/10	43.48	0.77	33.48	1.35	1.34	32.14
11/10	38.99	0.77	30.03	0.00	0.00	30.03
21/10	34.71	0.77	26.73	0.00	0.00	26.73
31/10	30.75	0.71	22.00	0.00	0.00	22.00
10/11	27.23	0.61	16.72	0.00	0.00	16.72
20/11	24.22	0.51	12.43	0.00	0.00	12.43
30/11	21.82	0.41	8.98	0.00	0.00	8.98
10/12	10.21	0.34	3.42	0.00	0.00	3.42
Total	1,492.93	-	961.90	229.87	206.19	755.70



Pomegranate

Zhob

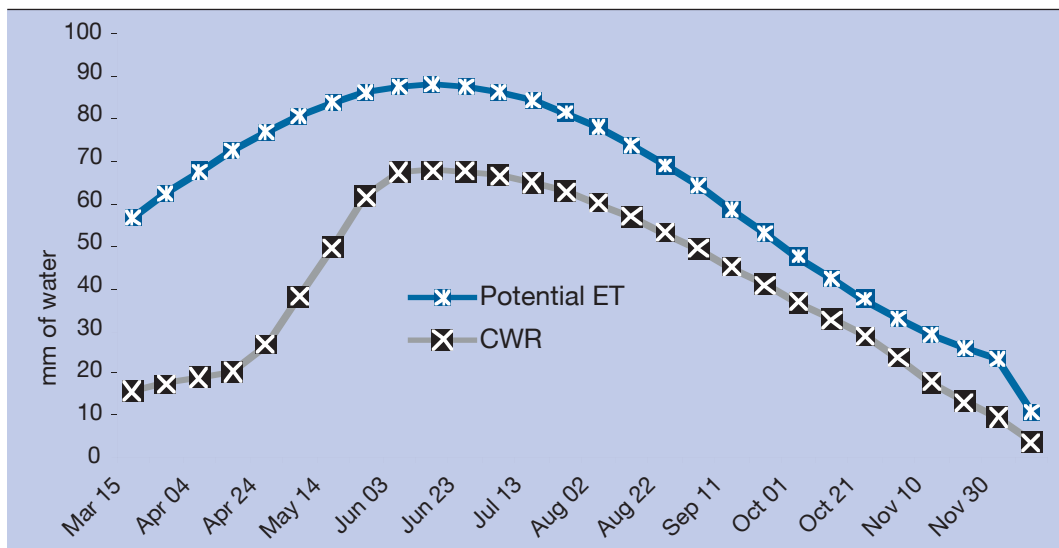
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	47.00	0.28	13.16	9.70	9.04	4.12
25/3	52.25	0.28	14.63	9.73	9.09	5.54
4/4	57.40	0.28	16.07	9.02	8.46	7.61
14/4	62.32	0.28	17.45	7.52	7.11	10.34
24/4	66.86	0.35	23.27	5.24	5.02	18.25
4/5	70.91	0.47	33.36	0.71	0.69	32.67
14/5	74.36	0.59	44.08	0.00	0.00	44.08
24/5	77.12	0.71	55.16	2.12	2.10	53.05
3/6	79.11	0.77	60.92	2.46	2.45	58.46
13/6	80.29	0.77	61.82	4.44	4.26	57.56
23/6	80.61	0.77	62.07	7.53	6.99	55.08
3/7	80.07	0.77	61.65	10.60	9.72	51.94
13/7	78.68	0.77	60.58	12.79	11.67	48.92
23/7	76.48	0.77	58.89	13.49	12.32	46.57
2/8	73.52	0.77	56.61	12.47	11.45	45.16
12/8	69.88	0.77	53.81	9.86	9.15	44.65
22/8	65.65	0.77	50.55	6.25	5.92	44.63
1/9	60.95	0.77	46.93	1.74	1.69	45.24
11/9	55.89	0.77	43.04	0.00	0.00	43.04
21/9	50.63	0.77	38.98	0.00	0.00	38.98
1/10	45.28	0.77	34.87	0.00	0.00	34.87
11/10	40.02	0.77	30.82	0.00	0.00	30.82
21/10	34.98	0.77	26.94	0.00	0.00	26.94
31/10	30.31	0.71	21.69	0.00	0.00	21.69
10/11	26.13	0.61	16.06	0.00	0.00	16.06
20/11	22.56	0.51	11.58	0.00	0.00	11.58
30/11	19.70	0.41	8.12	0.00	0.00	8.12
10/12	9.01	0.34	3.02	0.00	0.00	3.02
Total	1,587.98	-	1,026.12	125.67	117.16	908.97



Pomegranate

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
15/3	56.72	0.28	15.88	4.00	3.95	11.93
25/3	62.32	0.28	17.45	3.46	3.46	13.99
4/4	67.67	0.28	18.95	0.57	0.57	18.38
14/4	72.61	0.28	20.33	0.00	0.00	20.33
24/4	77.04	0.35	26.80	0.00	0.00	26.80
4/5	80.83	0.47	38.02	0.00	0.00	38.02
14/5	83.91	0.59	49.73	0.00	0.00	49.73
24/5	86.18	0.71	61.63	0.00	0.00	61.63
3/6	87.61	0.77	67.46	0.00	0.00	67.46
13/6	88.16	0.77	67.88	0.00	0.00	67.88
23/6	87.82	0.77	67.62	2.85	2.73	64.89
3/7	86.60	0.77	66.68	6.98	6.57	60.11
13/7	84.53	0.77	65.08	9.10	8.54	56.54
23/7	81.66	0.77	62.88	9.54	8.97	53.91
2/8	78.08	0.77	60.12	8.58	8.11	52.02
12/8	73.88	0.77	56.89	6.65	6.34	50.55
22/8	69.15	0.77	53.25	4.36	4.22	49.03
1/9	64.04	0.77	49.31	1.44	1.41	47.90
11/9	58.67	0.77	45.17	0.00	0.00	45.17
21/9	53.18	0.77	40.95	0.00	0.00	40.95
1/10	47.72	0.77	36.75	0.00	0.00	36.75
11/10	42.45	0.77	32.69	0.00	0.00	32.69
21/10	37.50	0.77	28.88	0.00	0.00	28.88
31/10	33.02	0.71	23.62	0.00	0.00	23.62
10/11	29.11	0.61	17.88	0.00	0.00	17.88
20/11	25.89	0.51	13.28	0.00	0.00	13.28
30/11	23.43	0.41	9.65	0.00	0.00	9.65
10/12	11.04	0.34	3.70	0.00	0.00	3.70
Total	1,750.81	-	1,118.53	57.54	54.87	1,063.66



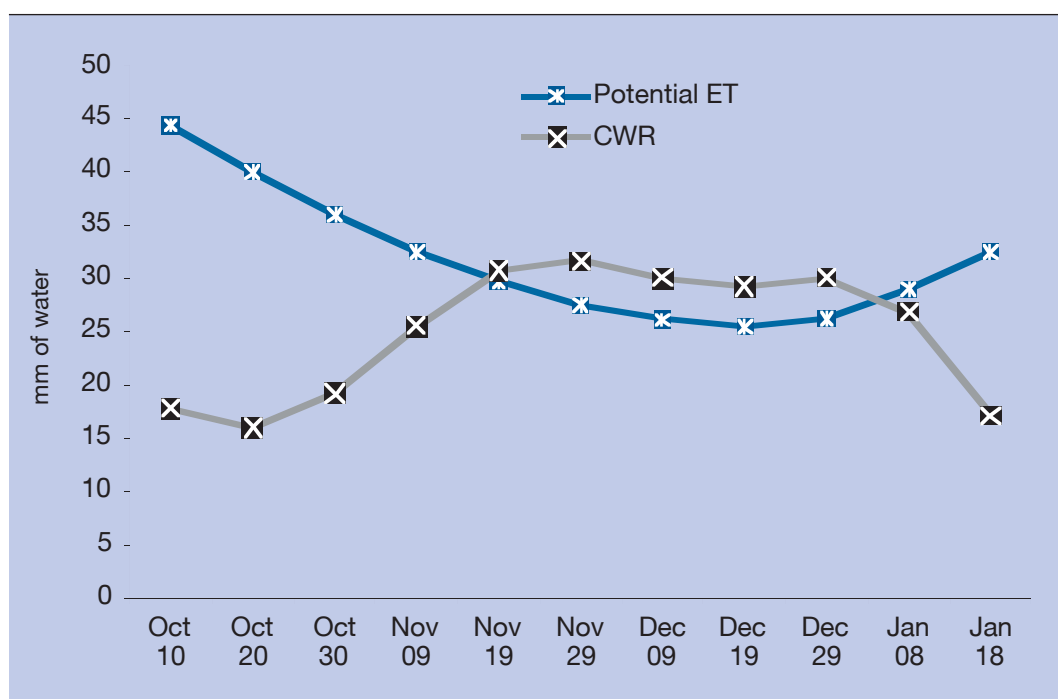
119

Water requirements
of major crops for different
agro-climatic zones of Balochistan

Pulses

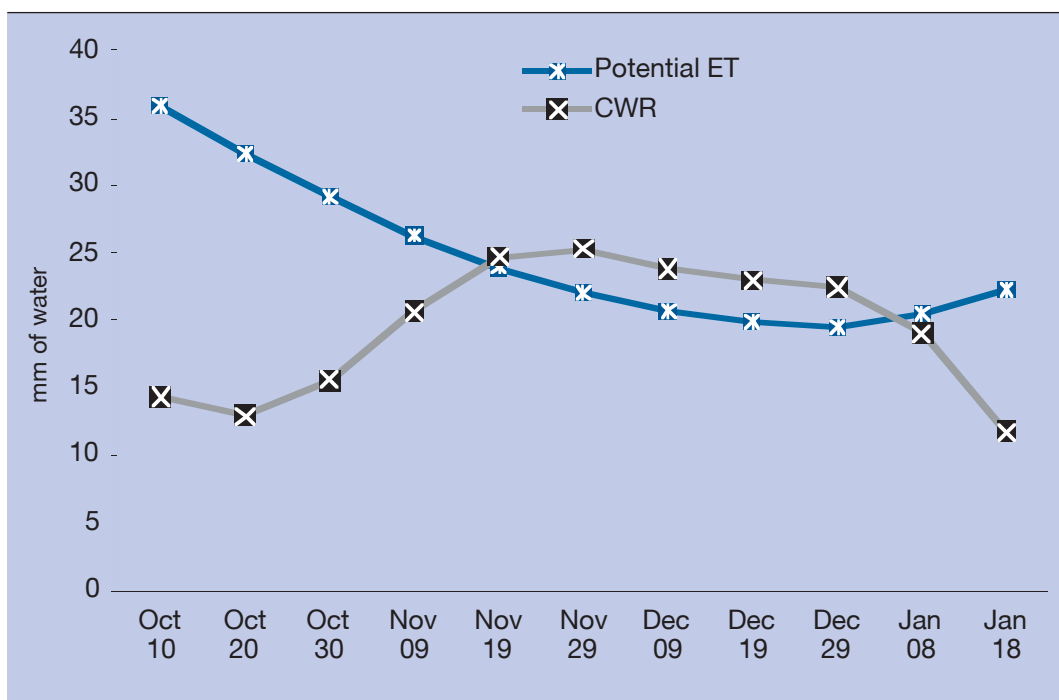
Lasbela

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	44.42	0.40	17.77	0.00	0.00	17.77
20/10	39.98	0.40	15.99	0.00	0.00	15.99
30/10	35.98	0.54	19.26	0.00	0.00	19.26
9/11	32.51	0.79	25.54	0.00	0.00	25.54
19/11	29.68	1.04	30.74	0.00	0.00	30.74
29/11	27.54	1.15	31.67	0.00	0.00	31.67
9/12	26.13	1.15	30.05	0.00	0.00	30.05
19/12	25.46	1.15	29.28	0.00	0.00	29.28
29/12	26.18	1.15	30.10	0.00	0.00	30.10
8/1	29.01	0.93	26.88	0.00	0.00	26.88
18/1	32.53	0.53	17.11	0.91	0.89	16.22
Total	349.42	9.23	274.39	0.91	0.89	273.51



Kalat

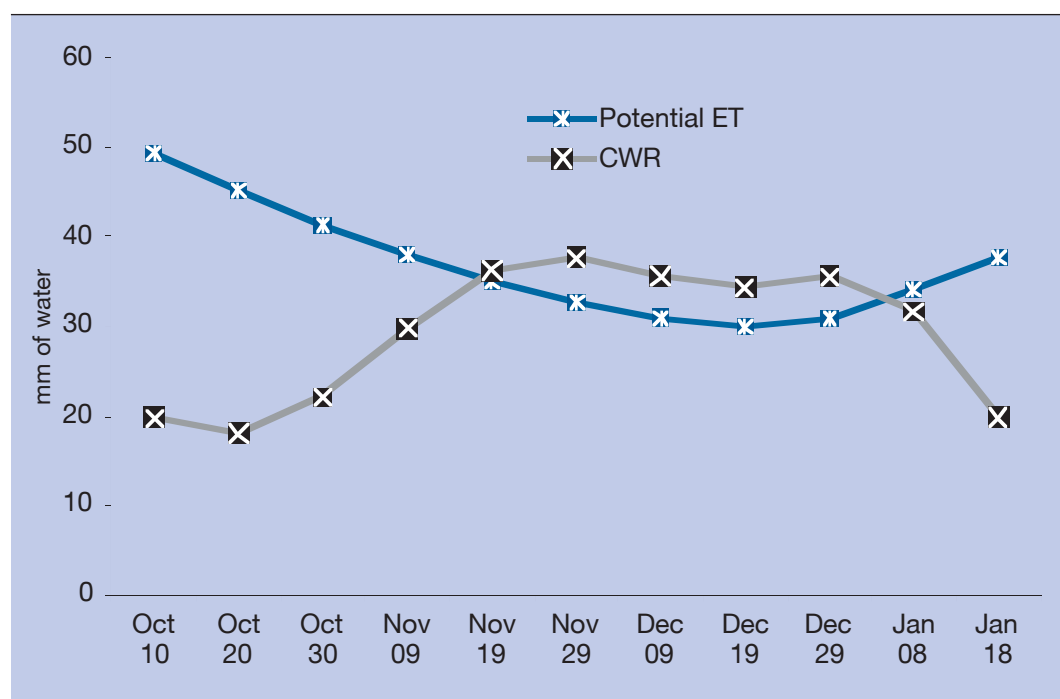
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	35.92	0.40	14.37	0.00	0.00	14.37
20/10	32.40	0.40	12.96	0.00	0.00	12.96
30/10	29.16	0.54	15.61	0.00	0.00	15.61
9/11	26.30	0.79	20.66	0.00	0.00	20.66
19/11	23.91	1.04	24.76	1.10	1.08	23.68
29/11	22.03	1.15	25.33	6.78	6.48	18.86
9/12	20.71	1.15	23.82	10.25	9.72	14.10
19/12	19.97	1.15	22.97	11.64	11.02	11.95
29/12	19.53	1.15	22.46	11.31	10.67	11.79
8/1	20.51	0.93	19.03	11.24	10.60	8.43
18/1	22.29	0.53	11.75	11.38	10.74	1.01
Total	272.74	-	213.72	63.70	60.31	153.41



Pulses

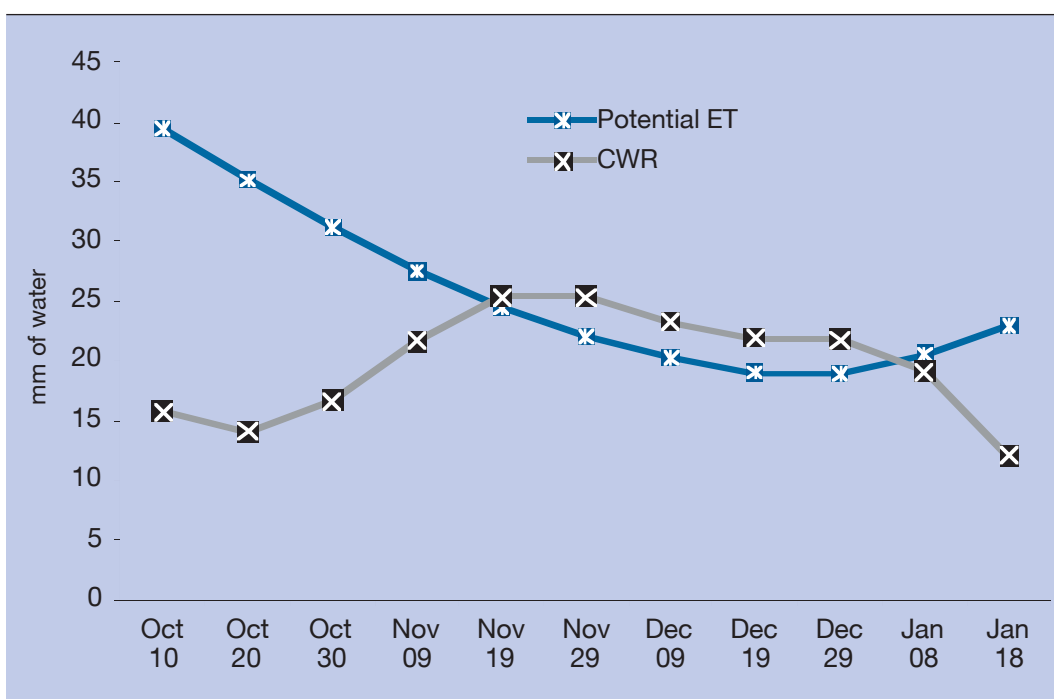
Khuzdar

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	49.43	0.40	19.77	0.00	0.00	19.77
20/10	45.22	0.40	18.09	0.00	0.00	18.09
30/10	41.35	0.54	22.15	0.00	0.00	22.15
9/11	37.92	0.79	29.80	0.00	0.00	29.80
19/11	35.02	1.04	36.28	0.00	0.00	36.28
29/11	32.70	1.15	37.61	0.00	0.00	37.61
9/12	31.01	1.15	35.66	0.00	0.00	35.66
19/12	29.95	1.15	34.44	1.35	1.32	33.12
29/12	30.94	1.15	35.58	4.96	4.85	30.73
8/1	34.12	0.93	31.63	6.62	6.40	25.23
18/1	37.69	0.53	19.85	8.36	8.01	11.84
Total	405.34	-	320.85	21.29	20.57	300.27



Barkhan

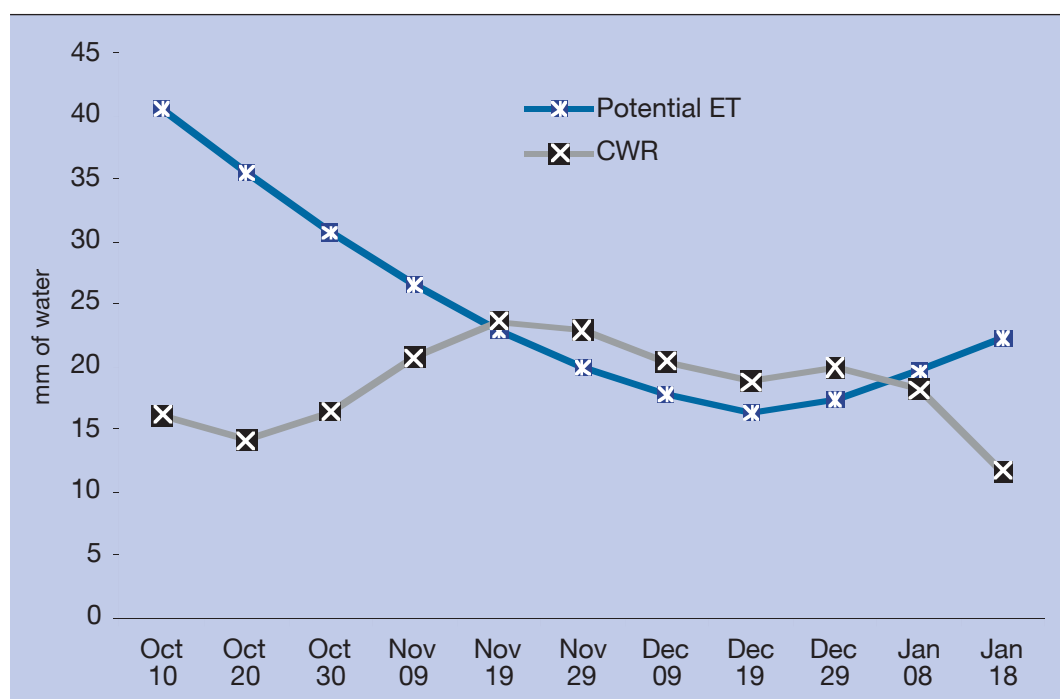
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	39.44	0.40	15.77	0.00	0.00	15.77
20/10	35.13	0.40	14.05	0.00	0.00	14.05
30/10	31.13	0.54	16.66	0.00	0.00	16.66
9/11	27.56	0.79	21.63	0.00	0.00	21.63
19/11	24.50	1.04	25.36	0.00	0.00	25.36
29/11	22.03	1.15	25.33	0.00	0.00	25.33
9/12	20.20	1.15	23.23	0.00	0.00	23.23
19/12	19.04	1.15	21.89	0.00	0.00	21.89
29/12	18.92	1.15	21.76	0.00	0.00	21.76
8/1	20.56	0.93	19.05	0.00	0.00	19.05
18/1	22.91	0.53	12.06	0.91	0.89	11.17
Total	281.42	-	216.80	0.91	0.89	215.91



Pulses

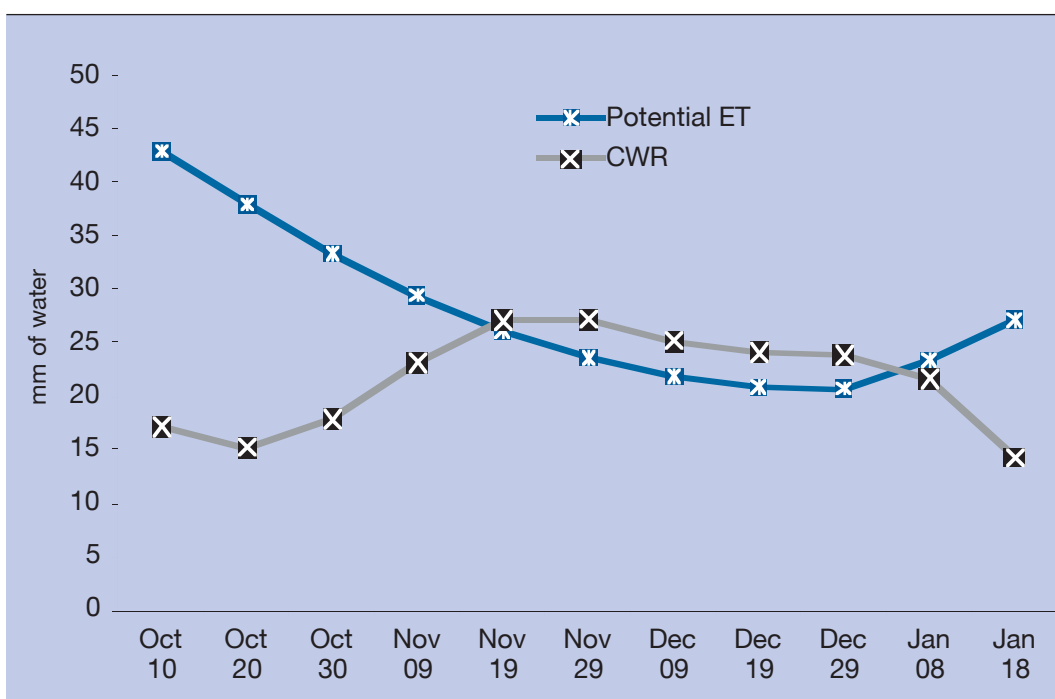
Zhob

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	40.54	0.40	16.22	0.00	0.00	16.22
20/10	35.47	0.40	14.19	0.00	0.00	14.19
30/10	30.75	0.54	16.44	0.00	0.00	16.44
9/11	26.52	0.79	20.80	0.00	0.00	20.80
19/11	22.89	1.04	23.68	0.00	0.00	23.68
29/11	19.95	1.15	22.94	0.00	0.00	22.94
9/12	17.77	1.15	20.43	0.00	0.00	20.43
19/12	16.38	1.15	18.84	1.14	1.11	17.73
29/12	17.37	1.15	19.98	4.76	4.56	15.42
8/1	19.68	0.93	18.23	5.39	5.21	13.02
18/1	22.28	0.53	11.71	5.87	5.75	5.96
Total	269.60	-	203.45	17.16	16.62	186.83



Sibi

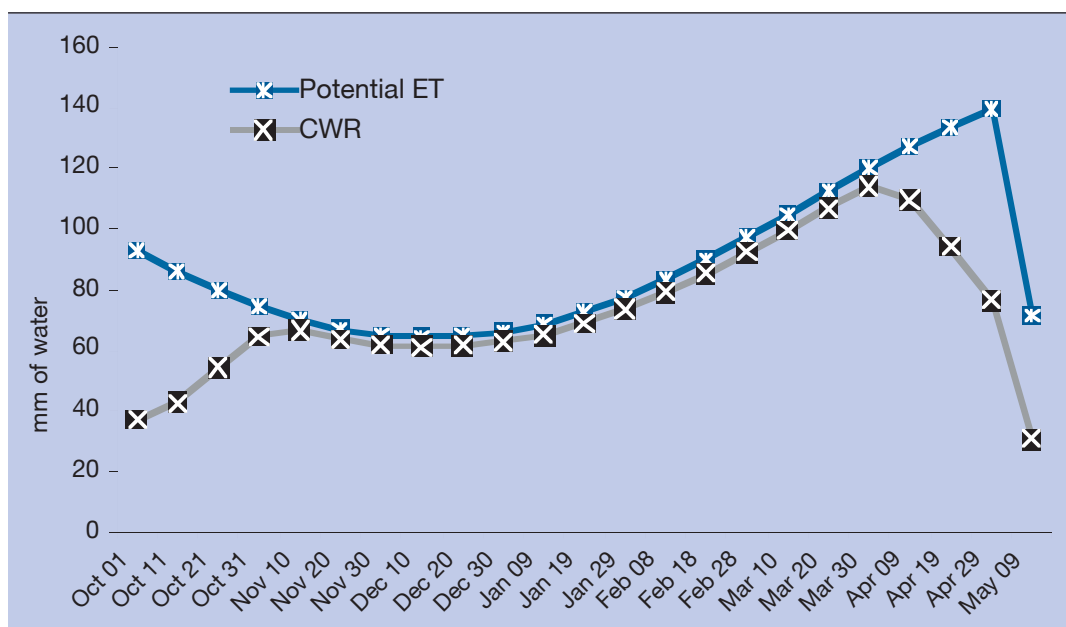
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/10	42.96	0.40	17.19	0.00	0.00	17.19
20/10	37.98	0.40	15.19	0.00	0.00	15.19
30/10	33.44	0.54	17.89	0.00	0.00	17.89
9/11	29.47	0.79	23.13	0.00	0.00	23.13
19/11	26.18	1.04	27.10	0.00	0.00	27.10
29/11	23.64	1.15	27.18	0.00	0.00	27.18
9/12	21.90	1.15	25.18	0.00	0.00	25.18
19/12	20.96	1.15	24.10	0.00	0.00	24.10
29/12	20.73	1.15	23.84	0.00	0.00	23.84
8/1	23.40	0.93	21.65	0.00	0.00	21.65
18/1	27.19	0.53	14.28	0.00	0.00	14.28
Total	307.85	-	236.73	0.00	0.00	236.73



Alfalfa

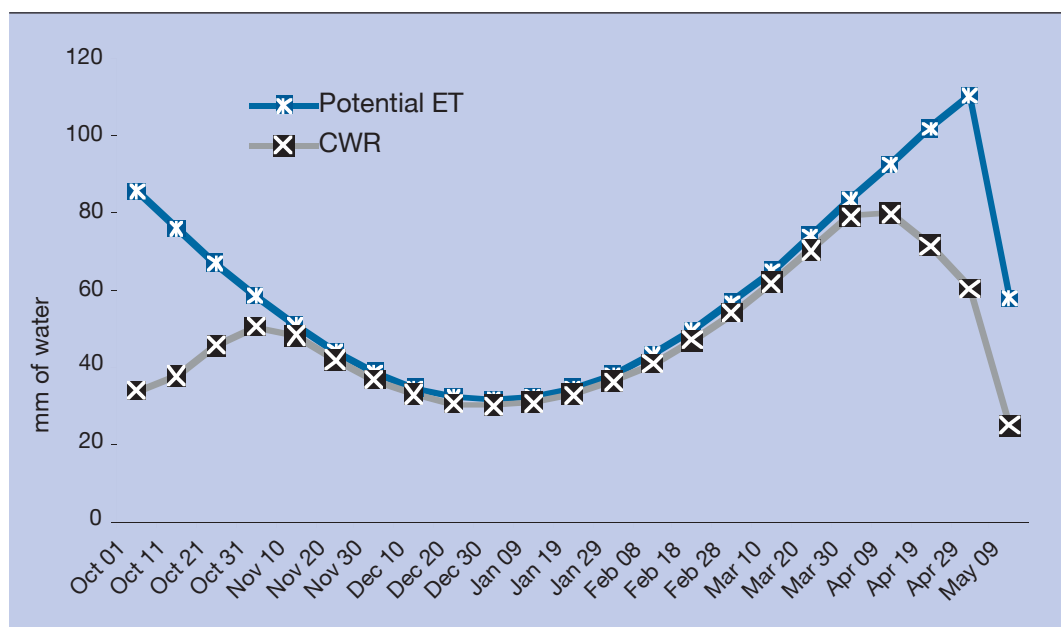
Turbat

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	93.07	0.40	37.23	0.00	0.00	37.23
11/10	86.14	0.50	43.04	0.00	0.00	43.04
21/10	79.89	0.68	54.57	0.00	0.00	54.57
31/10	74.52	0.87	64.58	0.00	0.00	64.58
10/11	70.21	0.95	66.70	0.00	0.00	66.70
20/11	67.08	0.95	63.72	0.00	0.00	63.72
30/11	65.18	0.95	61.92	0.00	0.00	61.92
10/12	64.53	0.95	61.30	0.00	0.00	61.30
20/12	65.04	0.95	61.78	0.00	0.00	61.78
30/12	66.26	0.95	62.95	0.00	0.00	62.95
9/1	68.77	0.95	65.34	0.00	0.00	65.34
19/1	72.58	0.95	68.95	0.00	0.00	68.95
29/1	77.50	0.95	73.63	0.00	0.00	73.63
8/2	83.39	0.95	79.22	0.00	0.00	79.22
18/2	90.06	0.95	85.56	1.59	1.59	83.97
28/2	97.30	0.95	92.43	6.72	6.72	85.71
10/3	104.87	0.95	99.62	7.65	7.39	92.24
20/3	112.53	0.95	106.90	5.10	4.17	102.74
30/3	120.04	0.95	114.04	1.23	0.85	113.19
9/4	127.19	0.86	109.75	0.00	0.00	109.75
19/4	133.74	0.71	94.40	0.00	0.00	94.40
29/4	139.52	0.55	76.57	0.00	0.00	76.57
9/5	71.63	0.43	30.90	0.00	0.00	30.90
Total	2,031.05	-	1,675.10	22.30	20.72	1,654.38



Nokundi

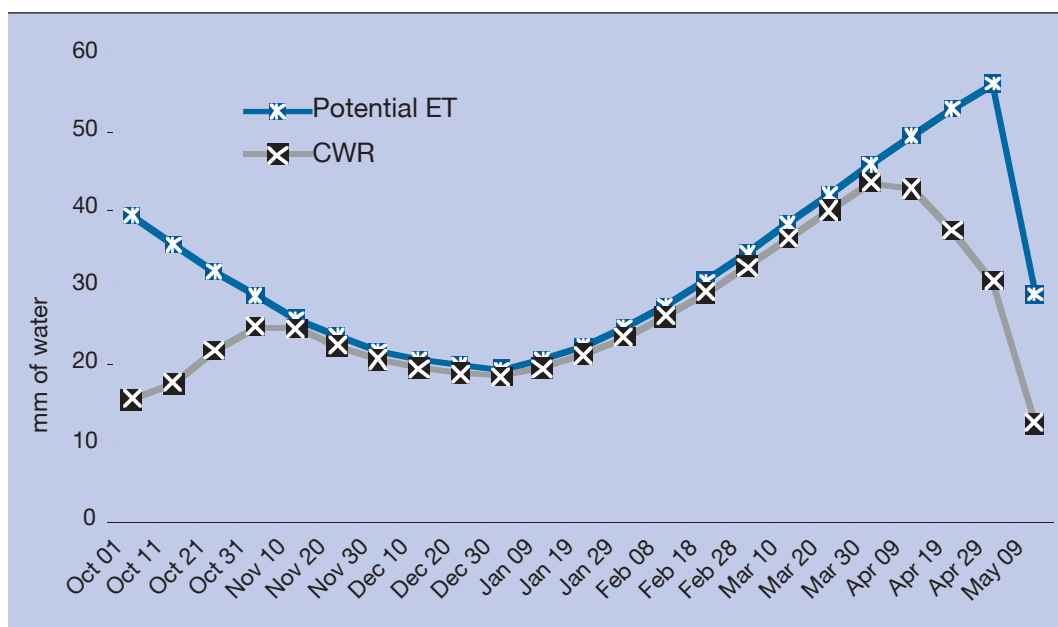
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	85.730	0.400	34.290	0.000	0.000	34.290
11/10	76.380	0.500	38.110	0.000	0.000	38.110
21/10	67.300	0.680	45.910	0.000	0.000	45.910
31/10	58.770	0.870	50.860	0.000	0.000	50.860
10/11	51.060	0.950	48.510	0.000	0.000	48.510
20/11	44.410	0.950	42.190	0.000	0.000	42.190
30/11	39.000	0.950	37.050	0.000	0.000	37.050
10/12	34.990	0.950	33.240	0.000	0.000	33.240
20/12	32.450	0.950	30.830	0.000	0.000	30.830
30/12	31.890	0.950	30.300	0.000	0.000	30.300
9/1	32.710	0.950	31.070	0.000	0.000	31.070
19/1	34.850	0.950	33.110	0.000	0.000	33.110
29/1	38.450	0.950	36.520	0.000	0.000	36.520
8/2	43.450	0.950	41.280	0.000	0.000	41.280
18/2	49.730	0.950	47.250	0.000	0.000	47.250
28/2	57.120	0.950	54.260	0.000	0.000	54.260
10/3	65.390	0.950	62.120	0.000	0.000	62.120
20/3	74.280	0.950	70.570	0.000	0.000	70.570
30/3	83.530	0.950	79.350	0.000	0.000	79.350
9/4	92.840	0.860	80.060	0.000	0.000	80.060
19/4	101.950	0.710	71.900	0.000	0.000	71.900
29/4	110.560	0.550	60.620	0.000	0.000	60.620
9/5	58.290	0.430	25.140	0.000	0.000	25.140
Total	1,365.13	-	1,084.54	0.00	0.00	1,084.54



Alfalfa

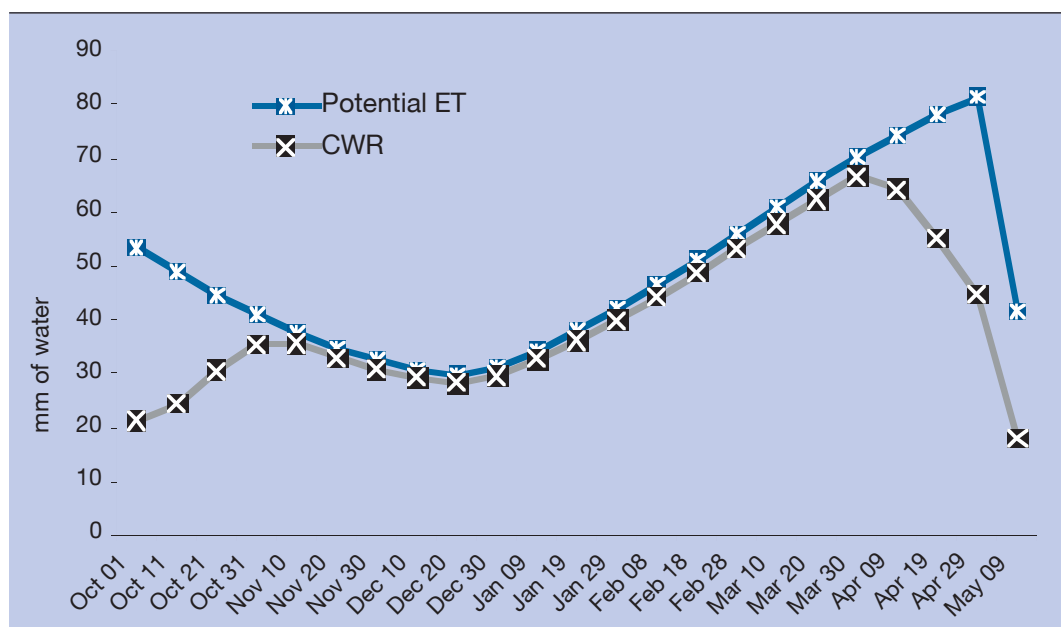
Kalat

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	39.25	0.40	15.70	0.00	0.00	15.70
11/10	35.56	0.50	17.75	0.00	0.00	17.75
21/10	32.06	0.68	21.88	0.00	0.00	21.88
31/10	28.86	0.87	24.99	0.00	0.00	24.99
10/11	26.04	0.95	24.74	0.00	0.00	24.74
20/11	23.69	0.95	22.51	1.41	1.39	21.12
30/11	21.87	0.95	20.78	6.68	6.44	14.34
10/12	20.61	0.95	19.58	10.75	10.18	9.40
20/12	19.93	0.95	18.93	13.65	12.77	6.16
30/12	19.54	0.95	18.56	14.33	13.31	5.25
9/1	20.67	0.95	19.63	15.31	14.17	5.46
19/1	22.50	0.95	21.37	16.34	15.08	6.30
29/1	24.85	0.95	23.61	16.97	15.64	7.97
8/2	27.68	0.95	26.29	17.12	15.76	10.53
18/2	30.90	0.95	29.35	16.74	15.44	13.91
28/2	34.42	0.95	32.70	15.89	14.69	18.00
10/3	38.14	0.95	36.24	14.63	13.59	22.64
20/3	41.97	0.95	39.87	13.05	12.20	27.67
30/3	45.78	0.95	43.49	11.19	10.56	32.94
9/4	49.48	0.86	42.68	9.02	8.60	34.08
19/4	52.95	0.71	37.36	6.35	6.13	31.24
29/4	56.11	0.55	30.78	2.39	2.34	28.44
9/5	29.12	0.43	12.56	0.00	0.00	12.56
Total	741.98	-	601.38	198.82	188.29	413.09



Khuzdar

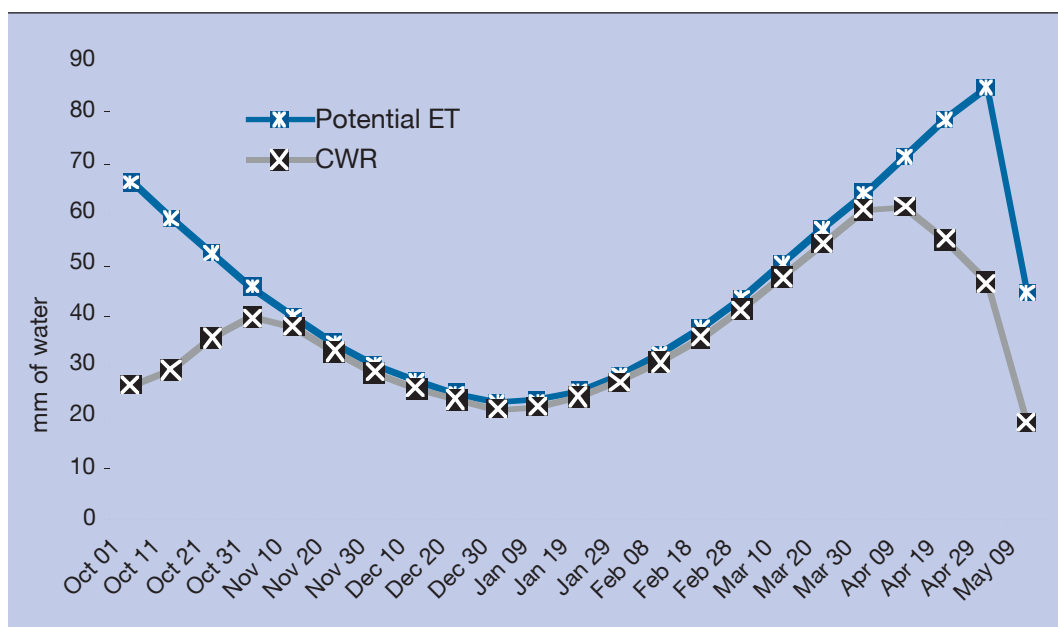
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	53.43	0.40	21.37	0.00	0.00	21.37
11/10	49.00	0.50	24.47	0.00	0.00	24.47
21/10	44.81	0.68	30.60	0.00	0.00	30.60
31/10	40.98	0.87	35.50	0.00	0.00	35.50
10/11	37.61	0.95	35.73	0.00	0.00	35.73
20/11	34.76	0.95	33.02	0.00	0.00	33.02
30/11	32.50	0.95	30.88	0.00	0.00	30.88
10/12	30.88	0.95	29.33	0.00	0.00	29.33
20/12	29.88	0.95	28.39	1.80	1.76	26.62
30/12	31.25	0.95	29.68	5.09	4.97	24.72
9/1	34.45	0.95	32.73	6.81	6.57	26.16
19/1	38.07	0.95	36.17	8.50	8.14	28.02
29/1	42.16	0.95	40.05	9.51	9.08	30.97
8/2	46.61	0.95	44.28	9.69	9.25	35.03
18/2	51.31	0.95	48.75	9.21	8.81	39.93
28/2	56.15	0.95	53.34	8.37	8.04	45.3
10/3	61.00	0.95	57.95	7.47	7.21	50.74
20/3	65.74	0.95	62.45	6.72	6.51	55.95
30/3	70.26	0.95	66.75	6.18	5.99	60.75
9/4	74.45	0.86	64.24	5.73	5.56	58.68
19/4	78.21	0.71	55.21	5.14	4.99	50.21
29/4	81.46	0.55	44.71	3.00	2.93	41.78
9/5	41.77	0.43	18.02	0.00	0.00	18.02
Total	1,126.74	-	923.60	93.19	89.82	833.78



Alfalfa

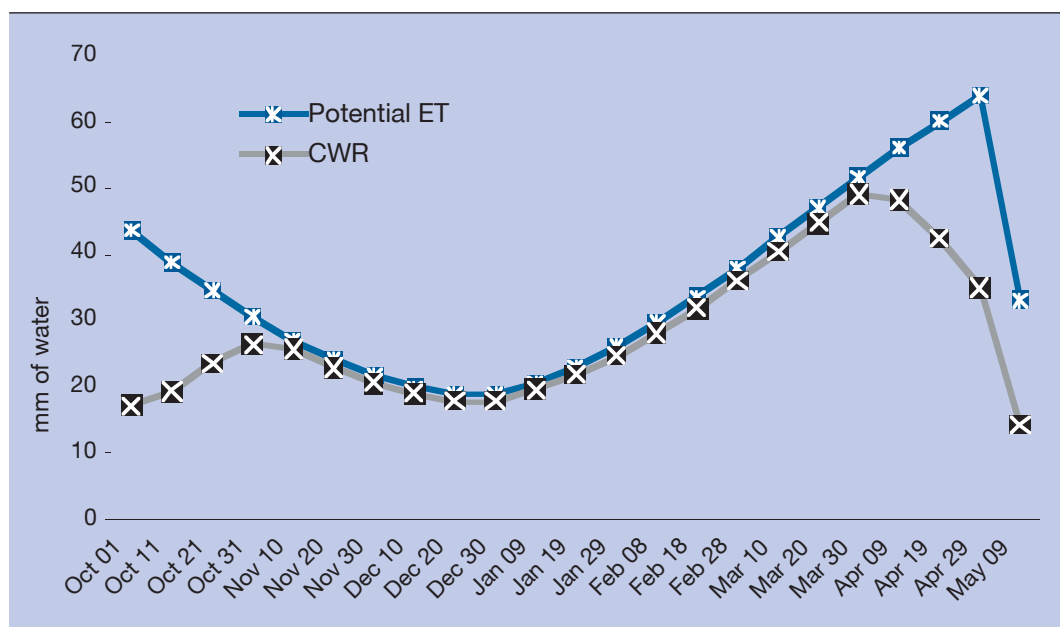
Quetta

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	66.38	0.40	26.55	0.00	0.00	26.55
11/10	59.34	0.50	29.62	0.00	0.00	29.62
21/10	52.49	0.68	35.81	0.00	0.00	35.81
31/10	46.02	0.87	39.83	0.00	0.00	39.83
10/11	40.12	0.95	38.11	0.00	0.00	38.11
20/11	34.96	0.95	33.21	1.41	1.39	31.82
30/11	30.67	0.95	29.14	6.68	6.44	22.71
10/12	27.37	0.95	26.00	10.75	10.18	15.82
20/12	25.09	0.95	23.83	13.65	12.77	11.07
30/12	23.07	0.95	21.92	14.33	13.31	8.61
9/1	23.62	0.95	22.44	15.31	14.17	8.27
19/1	25.57	0.95	24.29	16.34	15.08	9.22
29/1	28.64	0.95	27.21	16.97	15.64	11.57
8/2	32.77	0.95	31.13	17.12	15.76	15.37
18/2	37.85	0.95	35.96	16.74	15.44	20.52
28/2	43.73	0.95	41.54	15.89	14.69	26.85
10/3	50.23	0.95	47.72	14.63	13.59	34.13
20/3	57.16	0.95	54.31	13.05	12.2	42.1
30/3	64.32	0.95	61.1	11.19	10.56	50.55
9/4	71.48	0.86	61.64	9.02	8.60	53.04
19/4	78.44	0.71	55.32	6.35	6.13	49.2
29/4	85.00	0.55	46.61	2.39	2.34	44.27
9/5	44.78	0.43	19.31	0.00	0.00	19.31
Total	1,049.11	-	832.60	201.85	188.29	644.32



Barkhan

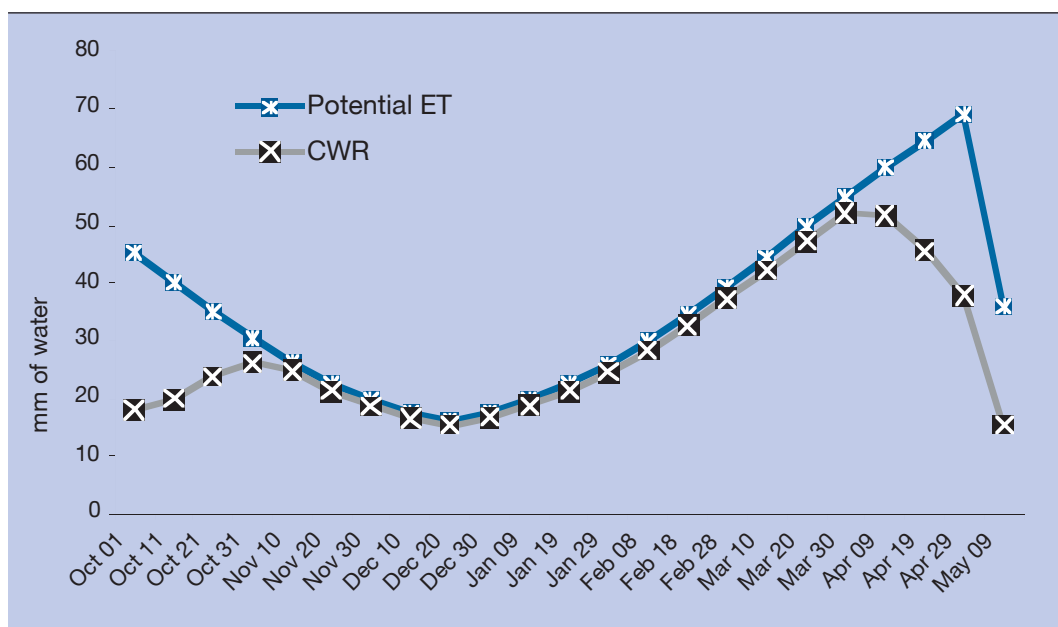
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	43.80	0.40	17.39	1.93	1.92	15.47
11/10	38.99	0.50	19.46	0.00	0.00	19.46
21/10	34.71	0.68	23.69	0.00	0.00	23.69
31/10	30.75	0.87	26.62	0.00	0.00	26.62
10/11	27.23	0.95	25.86	0.00	0.00	25.86
20/11	24.22	0.95	23.01	0.00	0.00	23.01
30/11	21.82	0.95	20.73	0.00	0.00	20.73
10/12	20.06	0.95	19.05	0.00	0.00	19.05
20/12	18.96	0.95	18.01	0.00	0.00	18.01
30/12	19.03	0.95	18.07	0.00	0.00	18.07
9/1	20.77	0.95	19.73	0.00	0.00	19.73
19/1	23.18	0.95	22.02	1.35	1.32	20.7
29/1	26.2	0.95	24.89	4.39	4.39	20.5
8/2	29.75	0.95	28.26	5.74	5.71	22.55
18/2	33.73	0.95	32.05	7.73	7.44	24.61
28/2	38.05	0.95	36.15	9.38	8.81	27.33
10/3	42.57	0.95	40.45	10.24	9.54	30.91
20/3	47.19	0.95	44.83	10.24	9.57	35.25
30/3	51.76	0.95	49.17	9.58	9.08	40.09
9/4	56.17	0.86	48.45	8.62	8.34	40.11
19/4	60.30	0.71	42.54	7.77	7.68	34.86
29/4	64.03	0.55	35.13	7.41	7.41	27.72
9/5	33.27	0.43	14.35	3.82	3.8	10.55
Total	806.21	-	649.91	88.20	85.02	564.89



Alfalfa

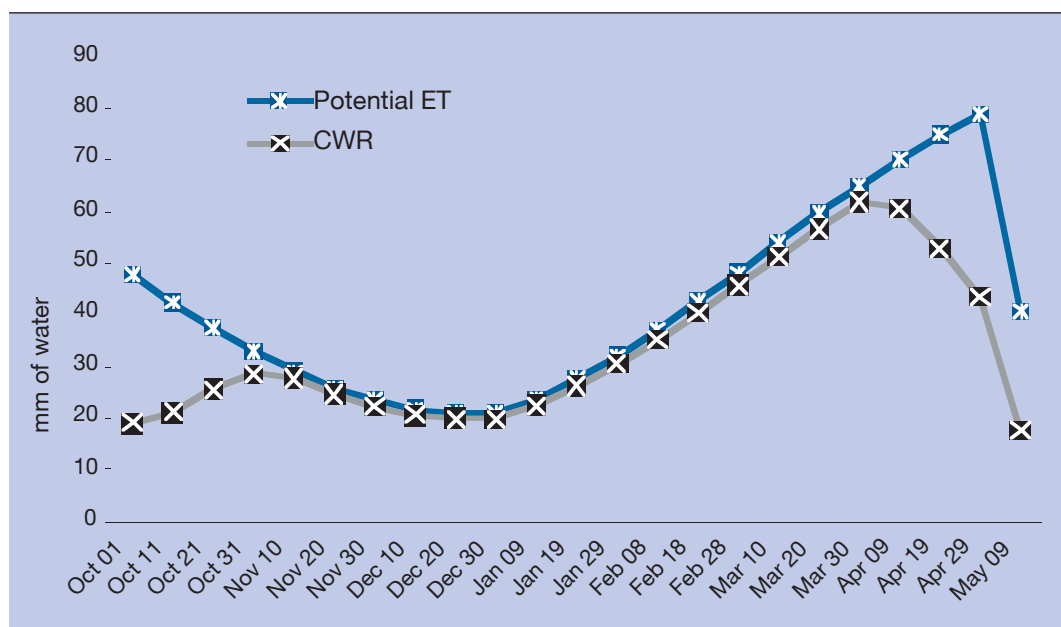
Zhob

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	45.28	0.40	18.11	0.00	0.00	18.11
11/10	40.02	0.50	19.97	0.00	0.00	19.97
21/10	34.98	0.68	23.86	0.00	0.00	23.86
31/10	30.31	0.87	26.22	0.00	0.00	26.22
10/11	26.13	0.95	24.82	0.00	0.00	24.82
20/11	22.56	0.95	21.43	0.00	0.00	21.43
30/11	19.70	0.95	18.71	0.00	0.00	18.71
10/12	17.59	0.95	16.71	0.00	0.00	16.71
20/12	16.28	0.95	15.47	1.56	1.51	13.96
30/12	17.65	0.95	16.77	4.86	4.65	12.12
9/1	19.91	0.95	18.91	5.43	5.26	13.65
19/1	22.58	0.95	21.45	5.94	5.82	15.63
29/1	25.94	0.95	24.64	6.94	6.78	17.86
8/2	29.91	0.95	28.41	8.49	8.18	20.23
18/2	34.38	0.95	32.66	10.35	9.82	22.84
28/2	39.25	0.95	37.29	12.14	11.40	25.89
10/3	44.38	0.95	42.16	13.47	12.57	29.59
20/3	49.63	0.95	47.15	14.01	13.07	34.08
30/3	54.85	0.95	52.11	13.54	12.67	39.44
9/4	59.90	0.86	51.66	11.95	11.26	40.41
19/4	64.65	0.71	45.61	9.25	8.80	36.81
29/4	68.96	0.55	37.82	4.28	4.13	33.69
9/5	35.93	0.43	15.49	0.00	0.00	15.49
Total	820.76	-	657.45	122.21	115.92	541.54



Sibi

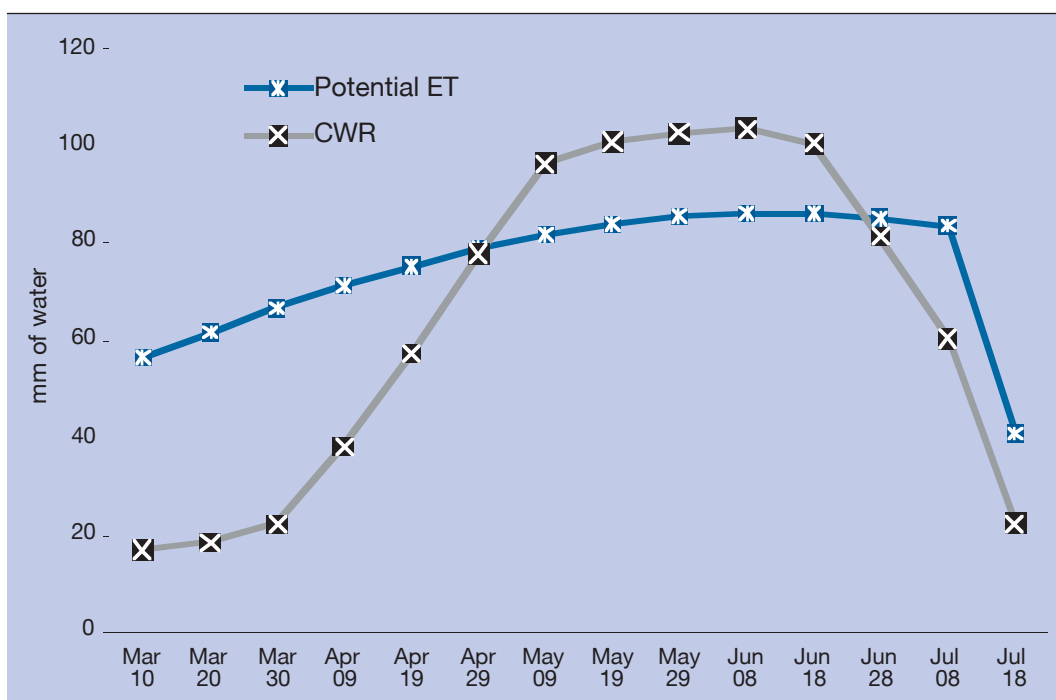
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
1/10	47.72	0.40	19.09	0.00	0.00	19.09
11/10	42.45	0.50	21.18	0.00	0.00	21.18
21/10	37.50	0.68	25.59	0.00	0.00	25.59
31/10	33.02	0.87	28.58	0.00	0.00	28.58
10/11	29.11	0.95	27.66	0.00	0.00	27.66
20/11	25.89	0.95	24.60	0.00	0.00	24.60
30/11	23.43	0.95	22.26	0.00	0.00	22.26
10/12	21.77	0.95	20.68	0.00	0.00	20.68
20/12	20.91	0.95	19.86	0.00	0.00	19.86
30/12	20.85	0.95	19.81	0.00	0.00	19.81
9/1	23.75	0.95	22.56	0.00	0.00	22.56
19/1	27.61	0.95	26.23	0.00	0.00	26.23
29/1	32.10	0.95	30.49	0.00	0.00	30.49
8/2	37.10	0.95	35.24	0.00	0.00	35.24
18/2	42.49	0.95	40.36	2.27	2.20	38.16
28/2	48.12	0.95	45.72	5.31	5.05	40.67
10/3	53.86	0.95	51.16	5.77	5.60	45.56
20/3	59.54	0.95	56.57	5.44	5.43	51.14
30/3	65.04	0.95	61.79	3.14	3.13	58.66
9/4	70.20	0.86	60.56	0.00	0.00	60.56
19/4	74.90	0.71	52.85	0.00	0.00	52.85
29/4	79.02	0.55	43.36	0.00	0.00	43.36
9/5	40.85	0.43	17.62	0.00	0.00	17.62
Total	957.20	-	773.79	21.93	21.41	752.37



Maize

Lasbela

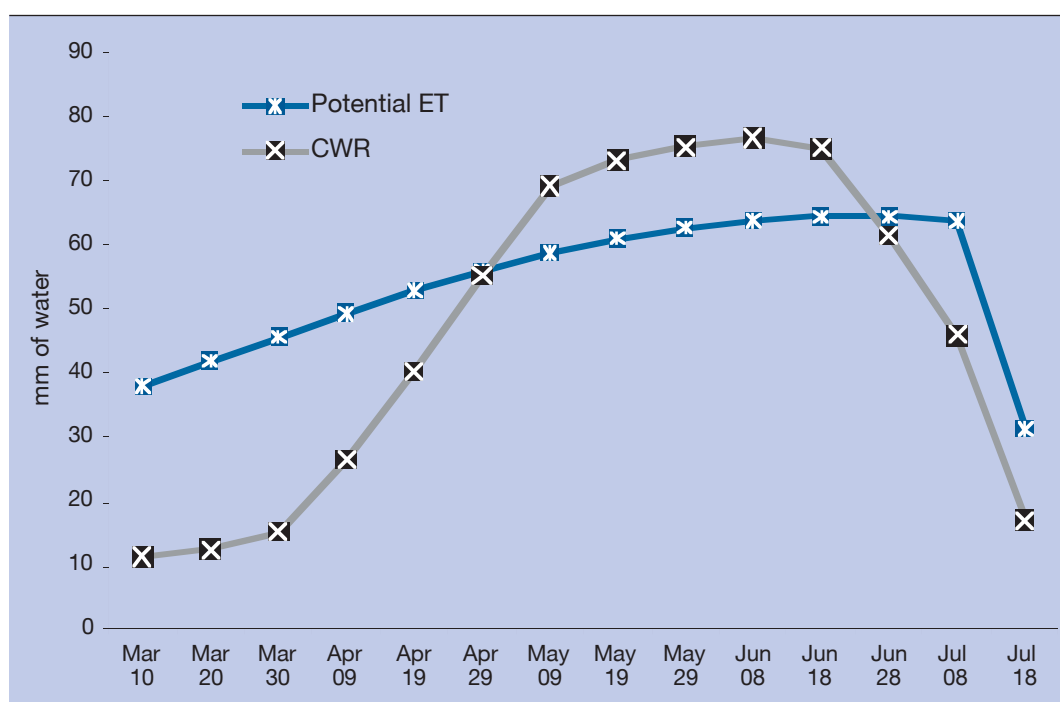
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	56.76	0.30	17.03	10.24	9.54	7.49
20/3	61.84	0.30	18.55	10.24	9.57	8.98
30/3	66.72	0.33	22.32	9.58	9.08	13.24
9/4	71.28	0.54	38.30	8.62	8.34	29.96
19/4	75.39	0.76	57.47	7.77	7.68	49.78
29/4	78.97	0.99	77.94	7.41	7.41	70.53
9/5	81.91	1.18	96.47	7.86	7.78	88.69
19/5	84.16	1.20	100.99	9.30	8.93	92.06
29/5	85.65	1.20	102.78	11.74	10.88	91.90
8/6	86.35	1.20	103.62	15.06	13.53	90.09
18/6	86.25	1.16	100.49	18.96	16.65	83.84
28/6	85.35	0.96	81.54	23.00	19.90	61.64
8/7	83.68	0.72	60.43	26.64	22.86	37.57
18/7	40.98	0.55	22.41	14.41	12.33	10.08
Total	1,045.30	-	900.35	180.84	164.48	735.86



Maize

Kalat

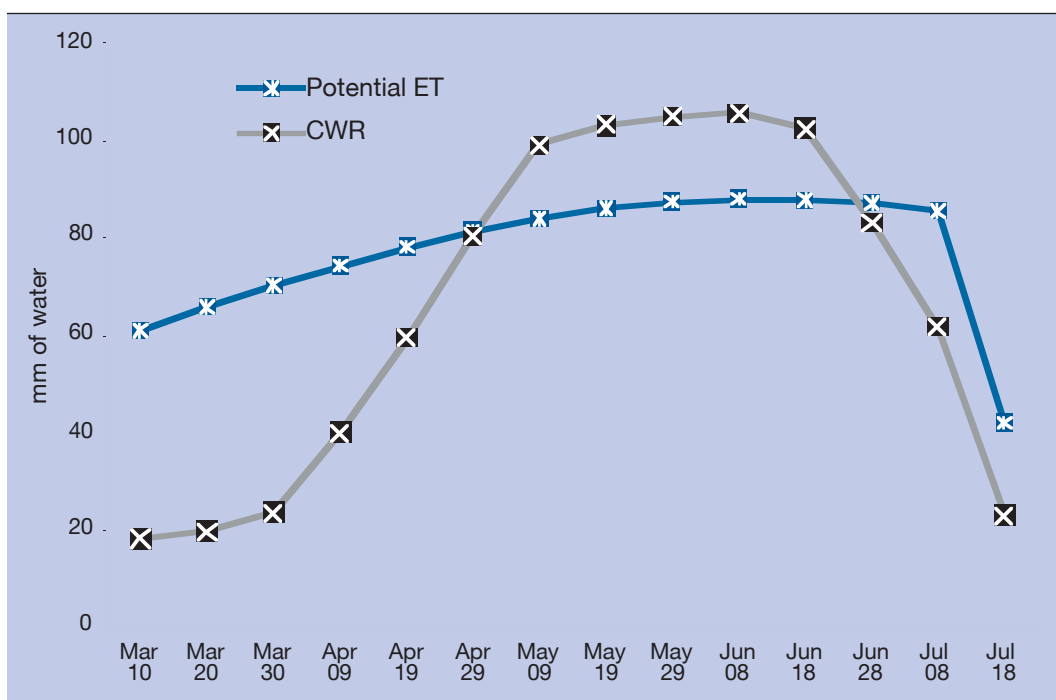
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	38.14	0.3	11.44	8.44	8.08	3.36
20/3	41.97	0.3	12.59	6.35	6.09	6.5
30/3	45.78	0.33	15.32	2.65	2.57	12.75
9/4	49.48	0.54	26.6	0.00	0.00	26.6
19/4	52.95	0.76	40.37	0.00	0.00	40.37
29/4	56.11	0.99	55.39	0.00	0.00	55.39
9/5	58.87	1.18	69.34	0.00	0.00	69.34
19/5	61.15	1.2	73.38	0.00	0.00	73.38
29/5	62.89	1.2	75.47	0.00	0.00	75.47
8/6	64.05	1.2	76.86	0.00	0.00	76.86
18/6	64.59	1.16	75.25	0.69	0.68	74.57
28/6	64.51	0.96	61.61	3.97	3.87	57.74
8/7	63.8	0.72	46.06	5.57	5.41	40.65
18/7	31.44	0.55	17.19	2.91	2.83	14.36
Total	755.71	-	656.86	30.57	29.53	627.33



Maize

Khuzdar

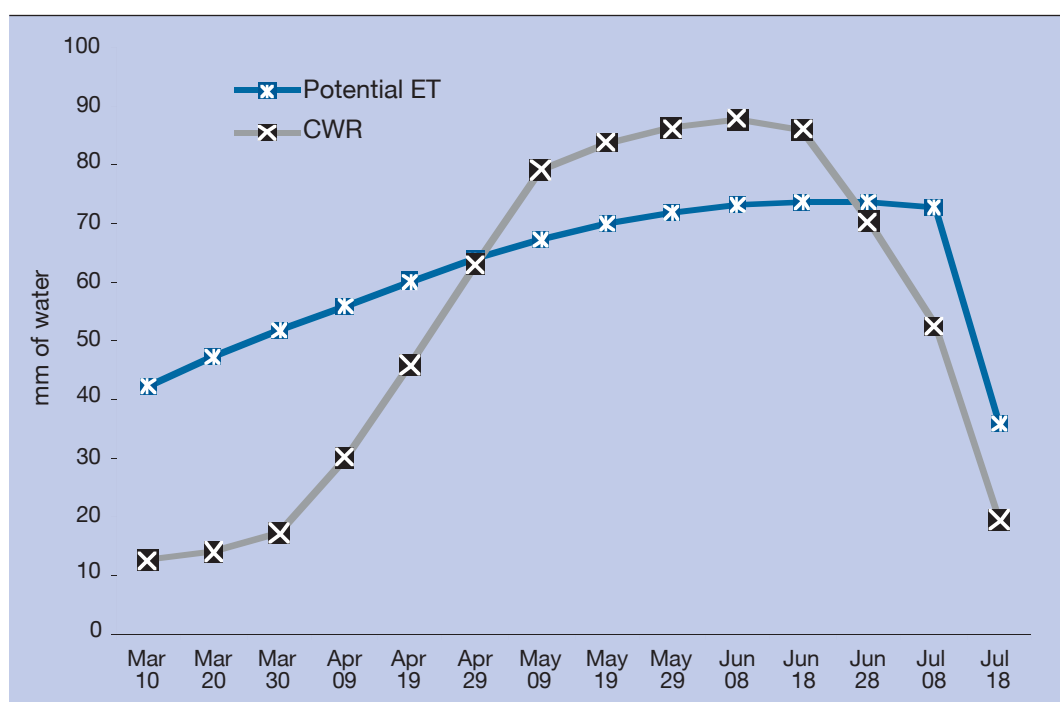
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	61.00	0.30	18.30	7.47	7.21	11.09
20/3	65.74	0.30	19.72	6.72	6.51	13.22
30/3	70.26	0.33	23.50	6.18	5.99	17.50
9/4	74.45	0.54	40.00	5.73	5.56	34.43
19/4	78.21	0.76	59.60	5.14	4.99	54.61
29/4	81.46	0.99	80.40	3.00	2.93	77.47
9/5	84.13	1.18	99.08	0.00	0.00	99.08
19/5	86.15	1.20	103.37	0.00	0.00	103.37
29/5	87.47	1.20	104.97	0.00	0.00	104.97
8/6	88.08	1.20	105.70	0.00	0.00	105.70
18/6	87.97	1.16	102.49	1.53	1.47	101.02
28/6	87.13	0.96	83.23	11.21	10.28	72.95
8/7	85.59	0.72	61.80	17.81	16.13	45.67
18/7	42.01	0.55	22.97	10.24	9.27	13.71
Total	1,079.65	-	925.14	75.01	70.34	854.80



Maize

Barkhan

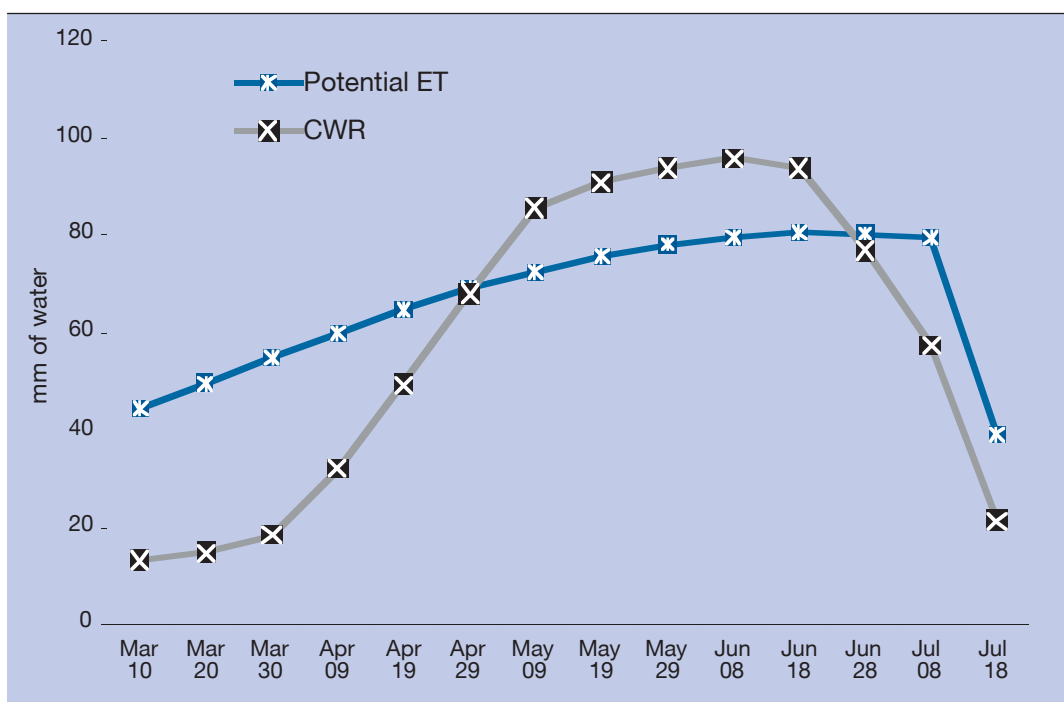
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	42.57	0.30	12.77	10.24	9.54	3.23
20/3	47.19	0.30	14.16	10.24	9.57	4.58
30/3	51.76	0.33	17.32	9.58	9.08	8.24
9/4	56.17	0.00	30.20	8.62	8.34	21.86
19/4	60.30	0.76	45.97	7.77	7.68	38.29
29/4	64.03	0.99	63.22	7.41	7.41	55.81
9/5	67.28	1.18	79.25	7.86	7.78	71.47
19/5	69.96	1.20	83.95	9.30	8.93	75.02
29/5	71.99	1.20	86.39	11.74	10.88	75.51
8/6	73.33	1.20	88.00	15.06	13.53	74.47
18/6	73.94	1.16	86.14	18.96	16.65	69.49
28/6	73.81	0.96	70.50	23.00	19.90	50.60
8/7	72.94	0.72	52.67	26.64	22.86	29.80
18/7	35.92	0.55	19.64	14.41	12.33	7.32
Total	861.21	-	750.18	180.84	164.48	585.70



Maize

Zhob

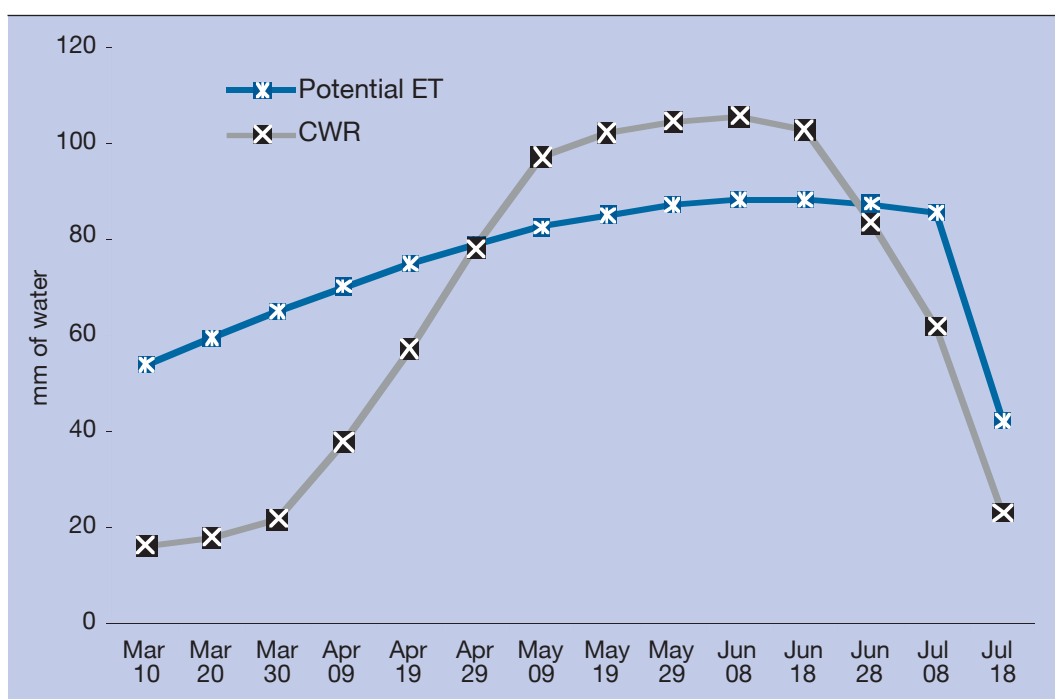
Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	44.38	0.30	13.31	13.47	12.57	0.74
20/3	49.63	0.30	14.89	14.01	13.07	1.82
30/3	54.85	0.33	18.36	13.54	12.67	5.70
9/4	59.90	0.54	32.21	11.95	11.26	20.95
19/4	64.65	0.76	49.30	9.25	8.80	40.49
29/4	68.96	0.99	68.08	4.28	4.13	63.95
9/5	72.72	1.18	85.66	0.00	0.00	85.66
19/5	75.84	1.20	91.00	1.33	1.31	89.69
29/5	78.22	1.20	93.86	3.27	3.27	90.59
8/6	79.80	1.20	95.77	4.62	4.55	91.22
18/6	80.55	1.16	93.84	8.46	7.96	85.88
28/6	80.44	0.96	76.84	13.04	12.01	64.82
8/7	79.48	0.72	57.38	16.93	15.47	41.92
18/7	39.12	0.55	21.39	9.41	8.58	12.81
Total	928.53	-	811.89	123.55	115.64	696.25



Maize

Sibi

Date	ETo (mm/ period)	Crop Kc	CWR (mm)	Total rain (mm)	Effective rain (mm)	Irr. Req. (mm)
10/3	53.86	0.30	16.16	5.77	5.60	10.55
20/3	59.54	0.30	17.86	5.44	5.43	12.43
30/3	65.04	0.33	21.76	3.14	3.13	18.63
9/4	70.20	0.54	37.74	0.00	0.00	37.74
19/4	74.90	0.76	57.10	0.00	0.00	57.10
29/4	79.02	0.99	78.00	0.00	0.00	78.00
9/5	82.46	1.18	97.13	0.00	0.00	97.13
19/5	85.15	1.20	102.18	0.00	0.00	102.18
29/5	87.01	1.20	104.41	0.00	0.00	104.41
8/6	88.00	1.20	105.60	0.00	0.00	105.60
18/6	88.10	1.16	102.64	1.02	0.99	101.65
28/6	87.32	0.96	83.41	7.50	7.10	76.31
8/7	85.66	0.72	61.86	11.80	11.08	50.78
18/7	41.95	0.55	22.94	6.72	6.31	16.63
Total	1,048.20	-	908.78	41.39	39.65	869.14



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Water requirements
of major crops for different
agro-climatic zones of Balochistan

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