- the measures to prevent sediment deposition in front of the intake and in the flood channel will significantly reduce annual maintenance.

In view of these advantages, and the fact that Option 2 offers a substantially higher rate of return it is recommended that the diversion Option 2 be adopted.

9.6 Crop Water Requirements

The conventional method of estimating the project irrigation water requirement is not applicable to flood schemes where in most years, irrigation water is applied only once. The availability of irrigation water is normally less than optimum and the main factors affecting the amount of water available for plant growth are the depth of water applied during the initial irrigation and the depth and moisture holding characteristics of the soil. In order to give an indication of the deficit and hence the likely crop yields, the optimum crop water requirements have been compared with the actual soil moisture available.

The mean daily reference crop ETo, has been calculated using the mean monthly climatic data for Sibi, which is 13 miles west and at a similar altitude to the scheme. The mean annual ETo is 91.26 inches (2318mm), with peak daily values ranging from 0.11 inches (2.8mm) in December to 0.46 inches (11.7mm) in June. The mean monthly climatic data for Sibi, together with the mean monthly ETo and for comparison peak daily reference crop evapotranspiration, defined as the maximum value that is likely to occur in 3 years out of 4 are given in Table 22.

For the purposes of assessing the crop water requirement, the contribution from rainfall is so low and erratic that it has been ignored. The crop water requirements, for the various crops included in the proposed cropping programme, have been derived by applying the crop factor Kc for the different growth stages, to the mean daily reference crop evapotranspiration ETo. The crop factors are based on the values given in FAO Publication 24[15] for optimum plant populations, but with modifications to take account of mid-month planting. However, in practice, the planting density is likely to be less than the optimum and since the ground is kept reasonably weed free, the moisture available to individual plants will be greater than predicted. The net crop water requirements in terms of depth of application and volume per acre (acre ft) are given in Table 23.

[15]Guidelines for Predicating Crop Water Requirements; FAO Irrigation and Drainage Paper 24 1984.

BMIADP - PHASE II PREPARATION STUDIES
CHANDIA FLOOD IRRIGATION SCHEME
MEAN MONTHLY CLIMATE DATA AND MONTHLY REFERENCE CROP EVAPOTRANSPIRATION (ETo) FOR SIBI
(File Ref: CLIMCHA)

Latitude: 29.55 deg North
Altitude: 436ft

	Mean Daily Temperatures Maximum (deg C)	Minimum (deg C)	Mean Relative Humidity (%)	Mean Daily Sunshine (hrs)	Mean Wind Speed (m/s)	Mean Monthly ETo (mm)	Peak Monthly ETo (mm)
Note	1	1	1	1	1	2	3
January	21.5	6.1	46	7.4	.77	80	88
February	24.7	9.6	40.5	7.9	1.03	105	116
March	30.6	15.4	43.5	8.4	1.24	163	179
April	37.5	21.6	27	9.1	1.37	223	245
May	43.3	27.4	25	9.6	1.71	295	325
June	45.3	30.8	31	11.8	2.01	319	351
July	42.3	30.8	45.5	10.1	2.18	295	325
August	40.8	29.6	50	10.2	1.88	263	289
September	40.1	26.5	42	10.9	1.33	221	243
October	36.8	18.8	30.5	10.3	.94	169	186
November	30.5	12.1	35	8.9	.68	106	117
December	24.3	7.2	41.5	7.7	.6	79	87

Notes:
1. Mean monthly climatic normals (Ref: Meteorological Department - Karachi)
2. Mean monthly ETo determined using CROPWAT 5.2 program based on Penman Method (Ref: FAO 24)
3. Corrected peak daily ETo defined as the maximum ETo that is likely to occur in 3 years out of 4 (Ref: FAO 24, fig 10)