

where IRR = irrigation requirement in mm,
 ET = evapotranspiration in mm, and
 ER = effective rainfall in mm.

For the EAA, predicted monthly irrigated requirements were calculated and compared with actual irrigation schedules reported by Mierau (1974) (Table 11). No irrigation was required during the period June through October, the wet season. This result cannot be extrapolated to other parts of the state having different soil characteristics and rainfall patterns. Many of the sandy soils in Florida have low water holding capacities compared with the 9 cm for muck soil. Thus, short periods of water stress may develop in the wet season and result in a need for crop irrigation.

Extreme caution should be exercised in the use of Equation 26 to compute irrigation requirements for any given year, because actual irrigation requirements depend upon the frequency of occurrence and magnitude of each rainfall event rather than long-term averages. The fallacy of using long-term average monthly rainfall amounts for estimating irrigation requirements is demonstrated in Table 11. In only four months (February, March, April, and November) does long-term average ET_p exceed average rainfall. During these four months, predicted ET_p exceeded average rainfall by only 60 mm compared with 210 mm of irrigation required during the year. This fallacy is more severe when applied on an annual basis. Average annual rainfall exceeded average annual ET_p by 459 mm. However, its seasonal distribution results in the observed irrigation needs. These data emphasize the need for continuous daily evaluations of water balances to adequately determine the crop irrigation requirements for a specific application.

4.4 EXAMPLE OF IRRIGATION MANAGEMENT CONCEPTS FOR HUMID REGIONS

Many humid regions like Florida have variable rainfall distribution and soils with low water-holding capacity. This combination does not sustain optimal plant growth throughout the growing seasons of all crops. Therefore, irrigation is needed, but normally in amounts less than 50% of the total water needed to produce a crop. By contrast, in arid regions, nearly all of the seasonal water needs of crops may be supplied by irrigation. Moreover, water in excess of ET must be applied to leach excess salts to avoid salt buildup in the plant root zone. Most of the arid region soils that are used for crop production are medium to fine-textured and hence have a relatively high water storage capacity.

Irrigation management systems for arid region conditions have been developed over a long period of time. Currently, progress is being made