

SOUTH CENTRAL KANSAS IRRIGATION MANAGEMENT PROJECT

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The South Central Kansas Irrigation Management Project, SCKIMP, is a five year cooperative effort between K-State Research and Extension and irrigation farmers of south central Kansas. The primary goal of SCKIMP is to promote the adoption of irrigation scheduling and water management technology with particular emphasis on the use of evapotranspiration - (ET) based irrigation scheduling. In 1999, the third full year of the project, twelve field partners, area farmers or farm managers, worked with K-State Research and Extension personnel to utilize information on ET, soil and irrigation system in their individual irrigation management programs. The partners were provided spreadsheet based Water Budget program, dubbed KanSched, for their use in managing irrigation on their demonstration site. The partners are encouraged to utilize this or other public or commercially available scheduling programs. Not all partners have incorporated ET based scheduling into their management decision making. However, those who have, have had good success and are now advocates for the method.

KanSched is still in a developmental phase, with a preliminary draft of the users manual completed. KanSched users specify field and crop characteristics on the input sheet of the spreadsheet program and enter ET, rain or irrigation events on the water budget sheet of the program. The program also automatically update several graphs to aid the user in schedule decision-making.

Climatic based ET scheduling allows the irrigator to track the water use of the crop as it varies with temperature, humidity, wind and solar radiation. Figure 1 show the daily ET for corn in Pratt county for 1998. June was abnormally hot and dry so daily crop use rates were approaching and exceeding 0.40 inches per day without any rainfall to meet crop need. However, this abnormally high ET period was followed by July and August with low to moderate corn ET values. The cumulative daily ET, rainfall and irrigation amounts are shown in Figure 2. The cumulative rainfall line shows the long periods without rainfall. Rainfall at this site was well below normal in-season rainfall amounts.

The field soil water balance is shown in Figure 3 and is the most popular graph with the partners. The upper and lower straight lines represent soil field capacity and permanent wilting point respectively. The middle dotted line is the management allowed deficit (MAD) soil water value. The goal of the irrigation scheduling procedure is to maintain the field soil water content between field capacity and the MAD values. Rain amounts (dots) and irrigation applications (squares) are shown. During June, the field soil water content was depleted to the lower limit in spite of continuous irrigation. This means that the crop ET rate was greater than the irrigation capacity. However, earlier irrigation would not have been beneficial since the field soil water content was near field capacity at that time and the soil profile could not hold the extra water. Although the field did get very dry, much less than the MAD value, the crop yielded an average yield. This indicates the conservation nature of the schedule process and the need to refine field and crop inputs. Several factors may need to be examined. These may include deeper root penetration than predicated, better soil water holding capacity, and reduced ET under low soil water conditions.

SCKIMP also includes several other field based projects. Water application rate modifications were conducted on four partner fields. This project helps verify the scheduling process. Full scale center pivot evaluations have also been conducted on a number of partner systems. This information, combined with laboratory and experiment field based tests, is providing information on irrigation system efficiency and uniformity.

This project is being conducted in cooperation with Water PACK, the Water Protection Association of South Central Kansas and is partially sponsored by Kansas Water Office through State Water Plan funds and the Kansas Corn Commission.

Figure 1.

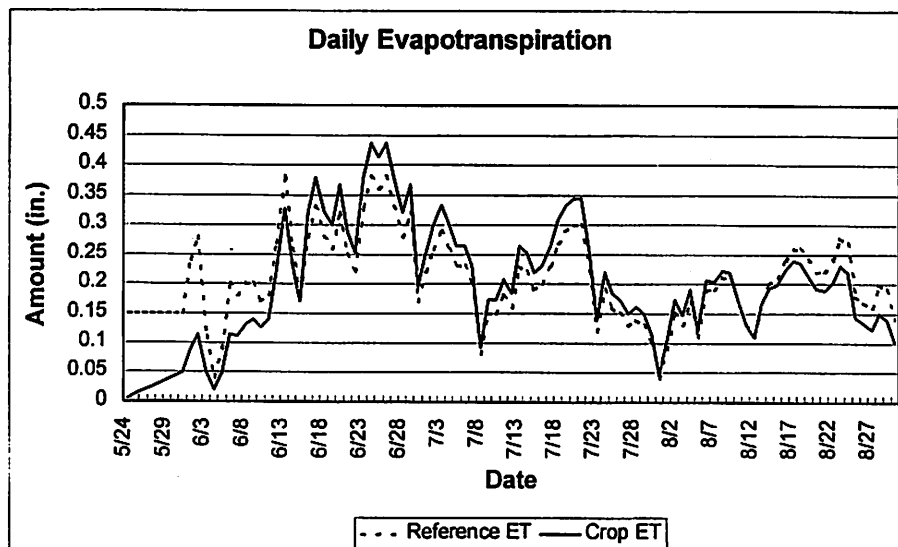


Figure 2.

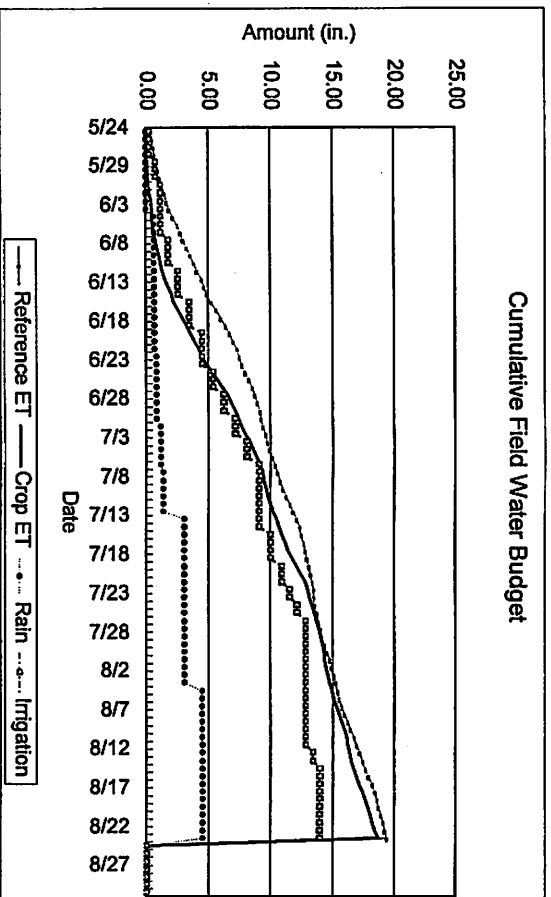


Figure 3.

