SECTION 686.4 SCHEDULING.

Section 686.41 Discussion of Scheduling.

Scheduling is the act of timing irrigation water applications in a way that will satisfy the water requirements of the crop without the waste of water, soil, or plant nutrient. It means applying water according to crop needs in amounts that can be held in the soil available to crops and at rates consistent with the intake characteristics of the soil and the erosion hazard of the site.

In order to schedule properly the irrigator needs to know the following:

1. The water holding capacity of the soil and the Management Allowable Depletion (MAD) of the crop that is being raised. These can be found in Section 681, Soils, and 682, Crops.
2. The net daily use requirements of the crop. This can be found in Figures 683-9 through 683-14.
3. An efficient application rate as determined in Section 684 (Irrigation Method Design).

   How long it takes to irrigate the field with various application rates. Determined by the design application rate and size of the field.
4. Some means of measuring the moisture of the soil profile in the crop root zone. Described in Section 686.1 (Measuring Soil Moisture Content).

The one skill that hasn't been addressed is the ability to determine what the water requirements of the last part of the irrigation will be from the time irrigation starts until the last segment is irrigated. This will determine when it is time to irrigate. The time in days it takes to irrigate a field should be multiplied by the consumptive use requirements of the crop in days. When the moisture contained in the soil profile exceeds the MAD moisture by an amount equal to irrigation time x daily use, irrigation should start on the first set. For instance, if it takes 5 days to irrigate a field and the MAD is 3" and the crop uses .30" per day, then 5 days x 0.30" = 1.50 inches allowable deficit in the profile (1/2 MAD) before the irrigations need to start.

The two most important items to keep track of once irrigation has begun are:

1. What is the present moisture content of the soil profile at the driest place in the field and,
2. What is the consumptive use of the crop during the upcoming irrigation period as determined by an estimate from Figures 683-9 through 683-14 or if possible consumptive use data from a weather station?

Scheduling requires an accounting system which uses the two previous items as parameters.

Figure 686-18 and 19 are examples of tools that could be used for scheduling. The following example Section 686.42 and Figure 686-20 are examples of scheduling tools for furrow irrigation.

A more extensive discussion of Scheduling can be found in Irrigation Scheduling published by the Cooperative Extension Service and the University of Nebraska.

Section 686.42 Example of a Furrow Irrigation Scheduling System.

The following is an example of an irrigation season where the farmer used irrigation scheduling as a tool. The plot on Figure 686-20 represents the first set in the field. This is the same field that is shown in Figure 684-1.

Known:

1. The well has the capacity to keep up with the peak consumptive use of the corn.
2. The owner wants to leave 1" of storage for rainfall.
3. The owner is going to deplete the moisture in the soil profile at the end of the irrigation.
4. The estimated consumptive use can be calculated by using Figure 683-10B.
5. An F_n of 3.0" can be applied in 9.0 days or less - Figure 684-1.

The irrigation season started with 2.5" of moisture (available water) above the MAD line at planting time (May 10). Irrigations and effective rainfall amounts were recorded as shown.

Point		Effective Rain		Irrigation
A		1.5 in.		
B				1.3 in.
C				3.1 in.
D				2.1 in.
E				2.1 in
F		0.30 in.		
G				3.0 in.
H				3.0 in.
I		2.5 in.		
J		1.0 in.		
K		1.0 in		
L				2.0 in.
	TOTALS	6.3 in		16.6 in.

Available water in the soil profile shows a difference between spring and fall of 2.7 inches.

The following are comments about the different times that water was added.

A. If it hadn't rained, it was time to irrigate: 9 days x .085 in/day = .8 in. would be further depleted in the last set before irrigation would have started.

B. Irrigation could have waited another 5 to 10 days before it was necessary, and the owner didn't need to fill the profile up at this time.

C. Again, it probably wasn't necessary to completely fill the soil profile.

D. Satisfy owner's wish to leave an inch of storage.

E. Satisfy owner's wish to leave an inch of storage.

F. None of the .30 in. of rain ran off so we could wait until the profile was at the MAD line before irrigation began.

G. Left half inch of storage

H. Left half inch of storage

I. Some of the rain ran off

J. If it hadn't rained, the irrigator waited too long to irrigate. Consumptive use = .25 in. x 7 days = 1.75 in. Further depletion on the last set (1.4" below the MAD line)

K. Same situation as J. Consumptive use = .19 in. x 6 days = 1.14 in. (0.6 below the MAD line)

L. Consumptive use until end was figured to be 12 days x .18 in/day = 2.2". Deplete the soil profile.

*It should be noted that generally the moisture requirements of all the sets can be satisfied if you wait until the moisture is depleted to the MAD level if:

1. There is no rain between irrigations
2. The well has the capacity to meet the peak demands of the crop and the acreage.

You can't wait until the MAD line is reached if water runs off of any sets due to rainfall before the irrigation or it is the first irrigation of the season. Irrigation should start on the first set in these situations by figuring the consumptive use of the crop and multiplying by the time it will take to get the last set irrigated.