Irrigation Scheduling FACTSHEET

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AGRICULTURE IRRIGATION SCHEDULING CALCULATOR

The Agriculture Irrigation Scheduling Calculator (AISC) is a water management tool to assist producers in making irrigation decisions. The AISC can be used for any region in British Columbia by selection the closest or most similar climate station on the Farmwest climate network.

Background

Irrigation systems are designed for the hottest time of the year. The system needs to be able to keep up the evapotranspiration requirement for a specific crop type and geographic location. Evapotranspiration (ET) is a combination of the evaporation of moisture from the soil and plant surfaces and water transpired through the plant. The amount of ET depends on temperature, solar radiation, relative humidity, and wind speed (Figure 1).

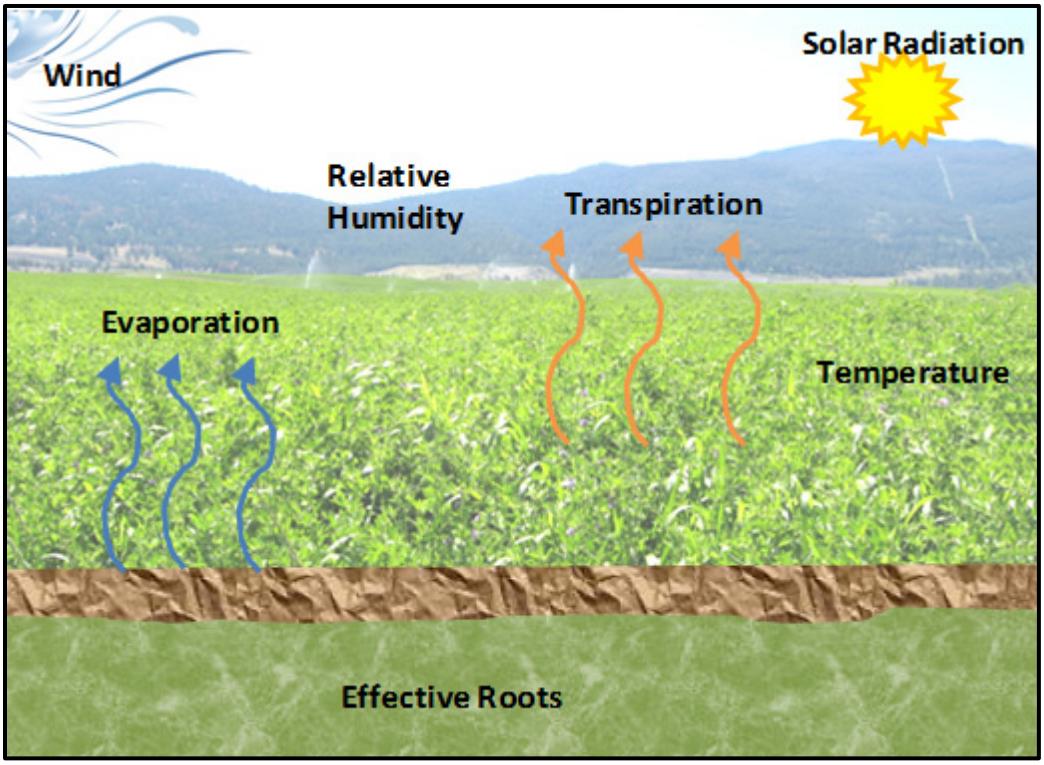

Figure 1 Evapotranspiration

Overview

During the cooler times of the year the producers will make irrigation decisions based on precipitation and temperature. This is essentially the basis for irrigation scheduling. The Agricultural Irrigation Scheduling Calculator was designed to assist producers in making scheduling decisions based on a more scientific approach.

The Irrigation Industry Association of British Columbia (IIABC) applied for funding though the National Water Supply Expansion Program to develop the calculator. The Province of British Columbia provided the expertise and support. The IIABC is the owner of the Agricultural Irrigation Scheduling Calculator.

The Agricultural Irrigation Scheduling Calculator (AISC) is designed to work with multiple types of crops and irrigation systems. To begin using the AISC an account is created with a password to protect personal data. Then the field and geographic location are entered. Now the crop, soil type, and irrigation system parameters are selected. After this is done the calculator can now determine and irrigation schedule for that field.

Using the Calculator

The calculator is found on the IIABC website. To use the AISC click on the Agriculture icon (Figure 2). New Users will be required to create an account. When this is done the producer can then start entering field data. Multiple fields and system can be store for quick retrieval in the calculator. The calculator does have both metric and imperial measurements. Help icons, indicated by a question mark, are found in the calculator where data input is required. The calculator has a four step process for entering data.

Figure 2 Agricultural Icon

Step 1 Crop Type

The first item entered into a new system is the crop type. Each crop type has an effective rooting depth, availability coefficient and climate coefficients associated with it. Effective rooting depth, which is the top 50 percent of the rooting depth, vary from shallow (1.5ft) to deep (4ft). The availability coefficient (AC) represents the percentage of water the crop can draw from the soil and continue to have productive growth. The AC varies from 35 to 55 percent (Figure 3). The crop climate coefficients represent the plants different consumptive rate for water through the growing season.

Table 1 Rooting Depth (RD) and Availability Coefficient (AC)

Crop	RD [ft]	RD [m]	AC	Crop	RD [ft]	RD [m]	AC
Alfalfa	4	1.2	0.55	Hops	4	1.2	0.50
Almonds	4	1.2	0.40	Kiwifruit	3	0.9	0.35
Asparagus	4	1.2	0.45	Lettuce	1 1/2	0.45	0.30
Beans, green	2	0.6	0.45	Loganberries	4	1.2	0.50
Beets	2	0.6	0.50	Onions, green	1 1/2	0.45	0.30
Blackberries	4	1.2	0.50	Pasture species	1 1/2	0.45	0.50
Blueberries	2	0.6	0.50	Peas	2	0.6	0.35
Broccoli	2	0.6	0.45	Peppers, sweet	3	0.9	0.30
Brussel Sprouts	3	0.9	0.45	Potato	2	0.6	0.35
Cabbage	1 1/2	0.45	0.45	Pumpkin	4	1.2	0.35
Cantaloupe	4	1.2	0.45	Radishes	1 1/2	0.45	0.30
Carrots	2	0.6	0.35	Raspberries	4	1.2	0.50
Cauliflower	1 1/2	0.45	0.45	Spinach	2	0.6	0.20
Celery	2	0.6	0.20	Squash	3	0.9	0.50
Cereals	3	0.9	0.50	Strawberries	2	0.6	0.20
Clover (ladino)	1 1/2	0.45	0.50	Sugar Beets	4	1.2	0.55
Clover (red)	3	0.9	0.50	Tomato	2	0.6	0.40
Corn, field	4	1.2	0.50	Tree fruits (12 ft x 18 ft)	4	1.2	0.40
Corn, sweet	3	0.9	0.50	Tree fruits (3 ft x 10 ft)	2	0.6	0.40
Cucumber	1 1/2	0.45	0.50	Tree fruits (6 ft x 12 ft)	3	0.9	0.40
Eggplant	3	0.9	0.45	Turf	1/2	0.15	0.50
Garlic	1 1/2	0.45	0.30	Turnip	1 1/2	0.45	0.50
Grapes	4	1.2	0.40				

Figure 3 Rooting Depth and Availability Coefficient

Step 2 Soil Cross Section

The second set of information entered is the soil type and depth (Figure 4). Each soil type has a different water storage capacity. Multiple layers of soil can be entered. It is recommended to have the soil professional tested for classification.

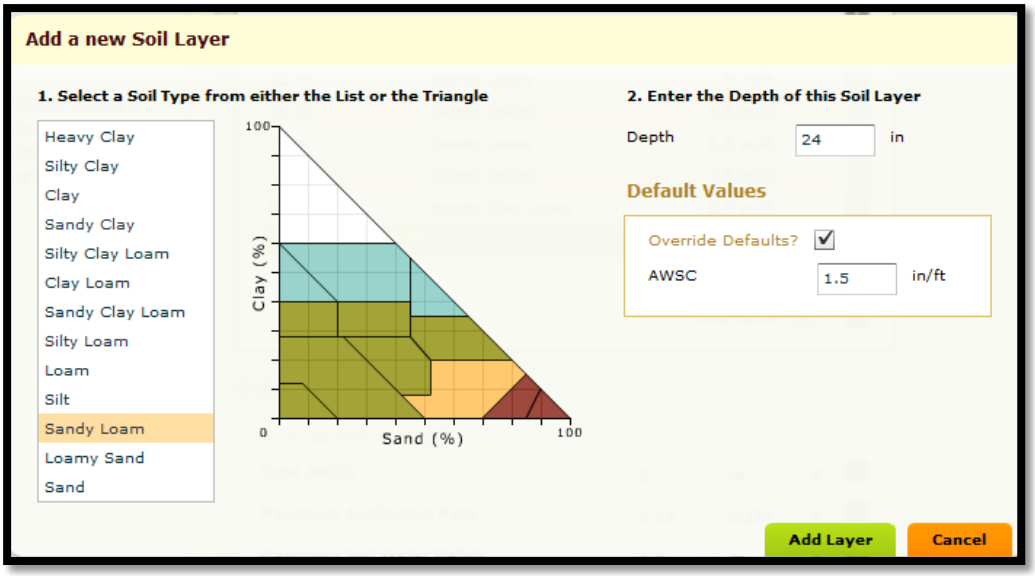

Figure 4 Soil Type

Step3 Irrigation System Design

The third set of data to enter is the irrigation system information (Figure 5). Multiple types are available and all agricultural systems other than flood are covered. It is very important to enter correct information on each system type. Incorrect spacing, nozzle size or pressure can make a large difference in the output of the calculator. The required information may be available on the original design if available, but often changes have been made in the system. Warning notices may appear if incorrect information is entered.

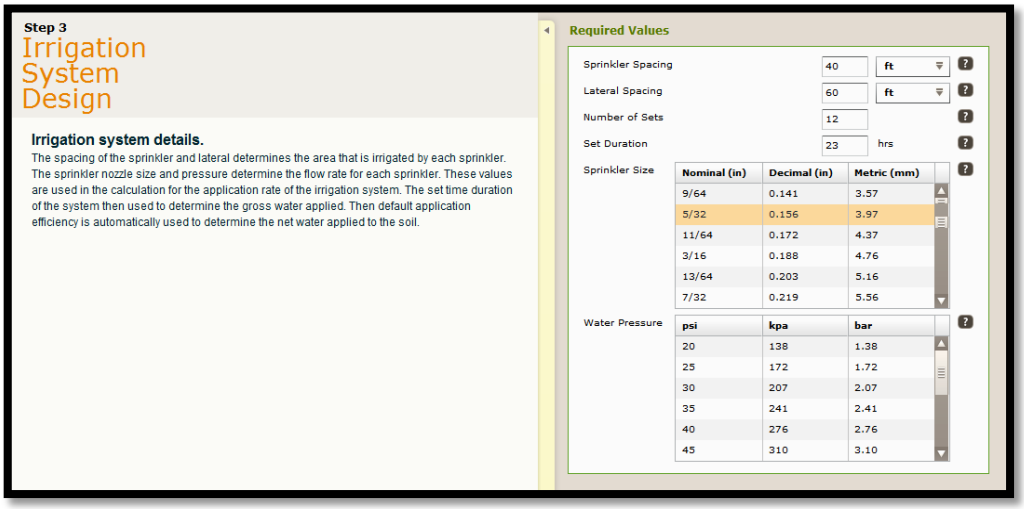

Figure 5 Irrigation System Details

Step 4 Irrigation Scheduling

The calculator is now ready to output an irrigation schedule. To begin the process the weather station which is entered earlier can be changed if desired. The weather stations are on the Farmwest network which has about 100 locations. It will be expanding to other provinces in the future. Now the date that the irrigation cycle was started on can be selected from a drop down calendar. The calculator also allows the producer to go back in time to look at previous years if the climate data is available (Figure 6).

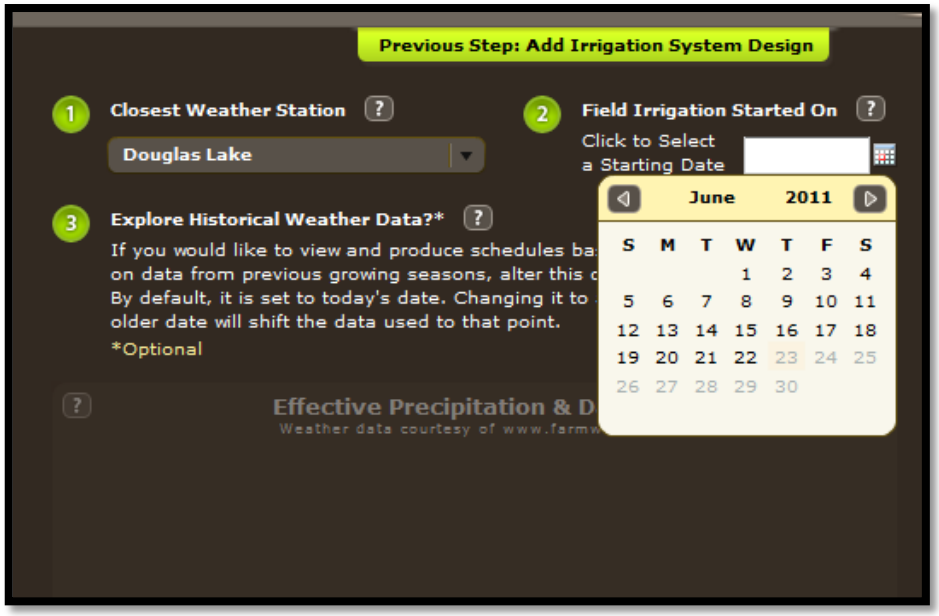

Figure 6 Irrigation Cycle Date

After the start date has been selected the calculator will determine the irrigation schedule. The result will show the daily ET and a forecast for the next five days. The calculator outputs two types of results. For most systems it is the time before the next irrigation should occur (Figure8). For drip systems it is the operating time for the zone (Figure 9).

User Guides

For more detail on using the Agricultural Irrigation Scheduling Calculator, User Guides are available on the IIABC web site (Figure 7).

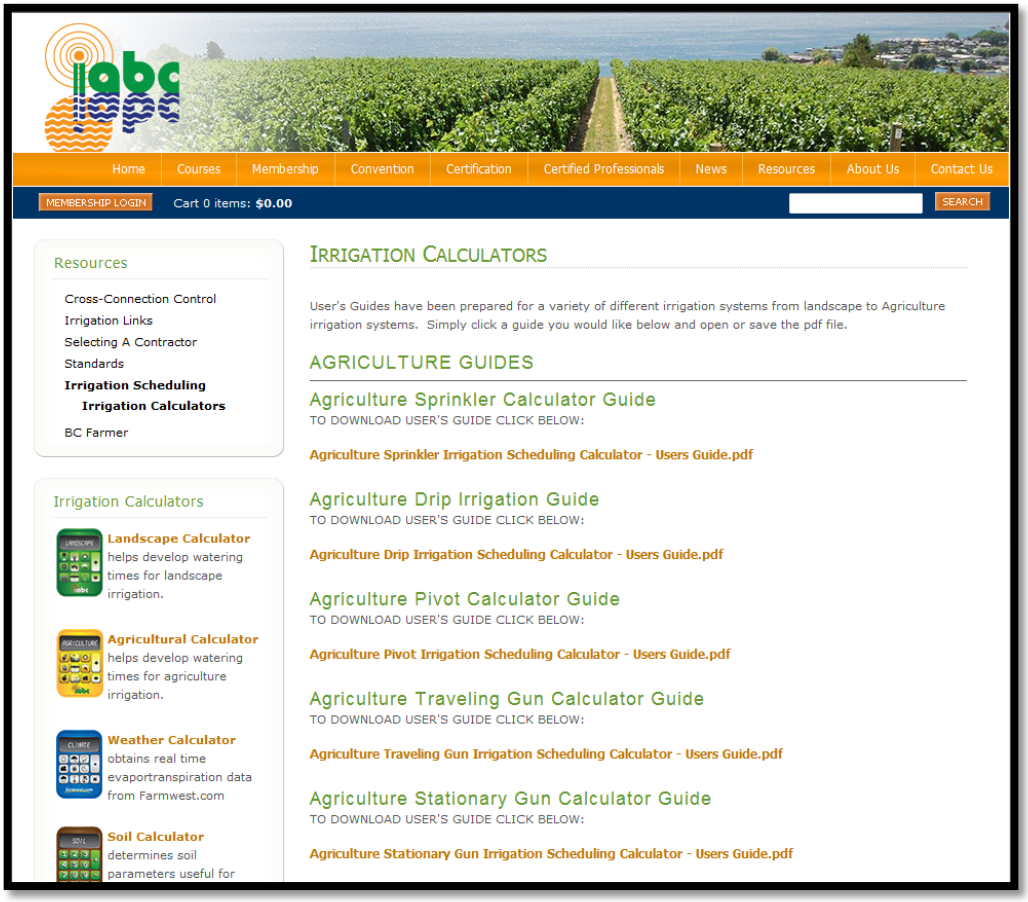

Figure 7 User Guides

Figure 8 Irrigation Schedule for Sprinkler System

Figure 9 Irrigation Schedule for Drip System

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