

MANAGING IRRIGATED FORAGE CROPS DURING DROUGHT - AN INTRODUCTION

Why plan for drought if you irrigate? Unfortunately, drought can affect irrigated crop production, although with less frequency and impact than dryland production. Drought is a normal part of every climate and is the most complex of all natural hazards. The drought impacts can be greater than those of other natural hazards, impacting agriculture, forestry, transportation, recreation and tourism and energy sectors.

This Factsheet introduces a series of Drought Management Factsheets that have information to assist irrigated forage crop producers to effectively plan and manage during drought conditions.

Drought Impacts



Drought is especially important to industries based on biological systems, such as agriculture and forestry, as plants consist of 80 to 95% water. In agricultural production systems water is the largest input, whether supplied by natural precipitation or irrigation.

As drought severity increases, the effects move from dryland production to irrigated production. Stream flows are reduced, reservoirs dry up and ground water levels drop. Other stream users such as fish may take priority when flows are reduced, thus restricting irrigation removals. Unusually high temperatures and low precipitation may push irrigation systems to their limits or beyond, so that drought stress occurs even when the system is operating at full capacity (especially those that are poorly designed). When water supplies are restricted, the impacts become more severe.

Defining Drought

Drought is defined by its duration, and is separated into three stages:

- firstly, meteorological drought – reduced precipitation from long term averages
- then, agricultural drought – reduced soil moisture stresses plants and reduces biomass
- finally, hydrologic drought – reduced water levels in streams, lakes, wells

Drought Indexes

In BC, as in most of North America, drought severity is assessed by an index. The most widely used is the **Standard Precipitation Index (SPI)**. The SPI is a probability index that considers precipitation that has occurred in past months and uses that data to quantify the current state. An index of zero indicates the median precipitation amount (half of the historical precipitation amounts are below the median and half are above the median).

The index is negative for drought and positive for wet conditions. As the dry or wet conditions become more severe, the index becomes more positive or negative. In BC, the Ministry of Environment provides maps indicating the SPI for periods ranging from 1 month to 12 months. Using this information will assist in determining the actual extent of past conditions so water management decisions may be made accordingly. For more information go to: http://wlapwww.gov.bc.ca/rfc/river_forecast/BC_SPI.htm

Plan Ahead



Effective drought planning for irrigators begins at least a year ahead. Knowledge of water status from the previous season is important when planning next year's production. Soil water levels, reservoir levels, stream flows, snowpack and ground water levels are all important sources of information. Some sources of information include farm records on reservoir levels, historic stream flows and well depths.

Other sources include web sites:

http://wlapwww.gov.bc.ca/rfc/river_forecast/drought_monitor.htm has up to date information on stream flows and snowpack

<http://www.farmwest.com> has details on accumulated heat units and evapotranspiration readings for many areas of BC (necessary for planning irrigation scheduling during the growing season)

In addition, a review of your crop production system can also provide useful information when developing your drought plan:

- do you have a mix of annual and perennial crops?
- what are the ages of perennial stands? will you require re-seeding?
- if drought occurs, should you re-seed to different, more drought tolerant crops?
- what is the status of your weed control? will this impact what crops you can grow?
- do you have a good understanding of your soil types, effective rooting zones of your crops and the available soil water storage capacity?
- do any of your fields have a hardpan that restricts rooting depth?

Late Season Droughts

A seasonal drought may occur as a result of unusually hot and dry conditions during the growing season, so that irrigation may be restricted later in the summer after cropping decisions have been made for the year. Under these conditions, fewer options exist to manage limited irrigation water and decisions about where to use this water need to be made. What are the options?

- should reduced irrigation be applied to all acreage, or concentrated on a portion?
- what are the impacts of stopping irrigation on different crops?
- can irrigation be applied only at 'critical' times to salvage a crop?

Drought Factsheet Series

The following Factsheets cover aspects of managing during drought, such as how to assess your soil water storage capacity, fertilizer management under drought conditions, irrigation management when water supplies are short, crop selection and management:

- No. 1 ***Managing Irrigated Forage Crops During Drought***
- No. 2 ***Key Drought Management Tips***
- No. 3 ***Forage Crops and Irrigation Management Under Drought Conditions***
- No. 4 ***Irrigation Decisions With Limited Water***
- No. 5 ***Irrigated Alfalfa Management Under Drought Conditions***
- No. 6 ***Alternate Forage Crops When Irrigation Water is Limited***
- No. 7 ***Drought Impacts on Soil Fertility***
- No. 8 ***Tillage, Residue Management and Their Effect on Soil Moisture***

Other Related Information

Factsheet #619.000-1 ***Soil Water Storage Capacity and Available Soil Moisture***
<http://www.al.gov.bc.ca/resmgmt/publist/600series/619000-1.pdf>

Nebraska Factsheet ***Estimating Soil Moisture by Appearance and Feel***
<http://ianpubs.unl.edu/irrigation/g690.htm>

Various irrigation and water conservation Factsheets are available at:
<http://www.al.gov.bc.ca/resmgmt/publist/Water.htm>