

Northwest Nebraska

Irrigation Tips

Water Use at Crop Stages

In./Day	Corn	Root Depth In Feet
0.04	emergence	0.5
0.14	leaf	1.0
0.24	12 leaf	2.0
0.28	early tassel	2.5
0.30	silking	3.0
0.26	blister	3.5
0.24	milk	3.5
0.20	begin dent	4.0

In./Day	Dry beans	Root Depth In Feet
0.04	emergence	0.5
0.14	vegetative	1.0
0.22	full bloom	1.5
0.26	begin pod fill	2.0
0.30	full pod	2.5
0.24	bean fill	3.0
0.18	begin maturity	3.0

Useful Information

Upper Niobrara White Natural Resources District
 430 East Second Street Chadron * (308) 432-6190 * (308) 432-6187 fax
 > Check out the weekly Crop Water Use Report at:
<http://www.unwnrd.org>

USDA Natural Resources Conservation Service
 Alliance (308) 762-4690 Chadron (308) 432-4616
 Rushville (308) 327-2141 <http://www.ne.nrcs.usda.gov>

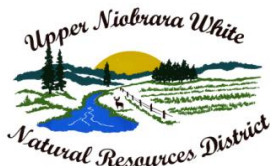
UNL Cooperative Extension
 Box Butte (308) 762-5616 Sheridan (308) 327-2312
 Dawes (308) 432-3373 Sioux (308) 668-2428
 Panhandle Research and Extension Center (308) 632-1230
<http://www.panhandle.unl.edu>

Department of Natural Resources
 (402) 471-2366 Visit the well registration database at:
<http://dnrdata.dnr.state.ne.us/wellssql/>

Nebraska Department of Environmental Quality
 (402) 471-2186 State Office <http://www.ndeq.state.ne.us>

Digger's Hotline
 800 642-8434

Nebraska State Patrol
 800 525-5555



Available Water Capacity

Soil Texture	Available Water Inches/Foot
Fine Sand or Loamy Sand	1.0 to 1.1
Sandy Loam	1.4
Loam or Silt Loam	2.0 to 2.5
Silty Clay Loam or Clay Loam	1.2 to 2.6
<u>Scheduling Example</u>	
Silt loam soil AWC = 2.5 in./ft.	
At silking, corn root depth = 3.0 ft.	
Minimum Balance (MB) = 60%	
ET estimate = 0.32 in./day	
Est. soil moisture at 60% for 3.0 ft. rooting depth by hand-feel method or moisture block readings.	
AWC x root depth x soil moisture = available water	
2.5" x 3.0' x 60% = 4.5" available water	
2.5" x 3.0' x 50% = <u>3.75"</u> MB	
.75" water left	
.75"/0.30"ET = 2.5 days moisture left	

Irrigation Definitions

Evapotranspiration (ET) - Crop water use, plus evaporation.

Available Water Capacity (AWC) – Water available to plants in the root zone.

Field Capacity – Soil profile is full and will not hold more water. Soil is allowed to drain 24 to 36 hrs.

Minimum Balance (MB) – Minimum soil moisture content managed for to avoid crop stress.

Permanent Wilting Point (PWP) – Soil's water content so low the plant cannot recover.

Deep Percolation (DP) – Excess water the soil can't hold. Gravity pulls excess water below plant rooting depth.

Irrigator's Formula

How many inches of water is a field receiving from irrigation? To find out, use this formula:

$$\frac{\text{GPM} \times \text{TIME}}{\text{ACRES} \times 452} = \text{INCHES APPLIED}$$

GPM is flow rate in gallon per minute.



TIME is length of irrigation in hours.

ACRES is number of acres irrigated per field or set.

1 acre inch = 27,154 gallons

452 gpm/hour = 1 acre inch

1 acre foot = 325,848 gallons

**Example: 800 gpm well
130 acre field
72 hours**

$$\frac{800 \times 72}{130 \times 452} = 0.98 \text{ inches or 1 inch}$$

Last Irrigation

Normal water requirement for corn and dry beans between various stages of growth and maturity in Western Nebraska.

Average Expected Crop Water Use / ET Western Nebraska (Crop Use Values in Inches/Week)

Growth Stage	Days to Maturity	Water Use in Inches
Corn		
B blister	45	10.5
Dough	34	7.5
Beginning Dent		
Dent	24	5.0
Full Dent		
Full Dent	13	2.5
Beginning Maturity		
Beginning Maturity	0	0.0
Dry beans		
Full Pod Development		
Full Pod Development	30	5.5
Beginning Maturity		
Beginning Maturity	20	3.0
50% Buckskin Pod color		
50% Buckskin Pod color	8	1.0

Week	Date	Alfalfa	Corn	Beans	Spring Grains	Sugar Beets	Winter Grains	Pasture	Potatoes
1	4/15-21	.50	----	----	.25	.20	.60	.50	----
2	4/22-28	.80	----	----	.30	.30	.85	.75	----
3	4/29-5/5	1.10	.25	----	.35	.35	1.05	1.00	----
4	5/6-12	1.45	.35	----	.55	.40	1.25	1.30	----
5	5/13-19	1.80	.40	----	.80	.50	1.50	1.55	.30
6	5/20-26	1.85	.50	----	1.10	.60	1.95	1.60	.40
7	5/27-6/2	1.90	.65	.20	1.30	.75	2.00	1.70	.45
8	6/3-9	2.00	.85	.20	1.45	.90	1.95	1.70	.55
9	6/10-16	2.00	1.05	.30	1.70	1.05	1.75	1.75	.70
10	6/17-23	2.05	1.30	.50	2.15	1.20	1.50	1.80	.85
11	6/24-30	2.10	1.50	.80	2.10	1.35	1.15	1.80	1.05
12	7/1-7	2.10	1.70	1.25	1.95	1.50	.75	1.85	1.30
13	7/8-14	2.10	1.85	1.70	1.70	1.65	.50	1.85	1.50
14	7/15-21	2.10	2.00	1.90	1.40	1.75	.10	1.85	1.65
15	7/22-28	2.10	2.00	2.05	.95	1.85	----	1.85	1.80
16	7/29-8/4	2.05	2.05	1.90	.55	1.90	----	1.80	1.85
17	8/5-11	2.00	2.00	1.65	.10	1.85	----	1.75	1.80
18	8/12-18	1.90	1.85	1.35	----	1.75	----	1.65	1.75
19	8/19-25	1.80	1.65	.95	----	1.70	----	1.60	1.65
20	8/26-9/1	1.70	1.45	.55	----	1.60	----	1.50	1.55
21	9/2-8	1.60	1.20	.20	----	1.50	----	1.40	1.45
22	9/9-15	1.45	.95	.10	----	1.35	----	1.30	1.35
23	9/16-22	1.35	.75	----	----	1.20	----	1.15	1.25
24	9/23-29	1.20	.55	----	----	1.0	.30	1.05	----
25	9/30-10/6	1.05	.40	----	----	.85	.40	.95	----
26	10/7-13	1.00	----	----	----	.65	.50	.85	----

TOTAL FOR SEASON =
43.05
27.25
15.60
18.70
29.70
17.90
37.85
23.20

