

## Irrigation water credit

Nitrate-nitrogen in irrigation water is available to a growing crop and is another credit to include in the fertilizer need equation. Each ppm will add 2.72 lb N/ac to the soil with each 12-inches of irrigation water applied (or 0.23 lb N/acre with each inch of irrigation water applied).

When irrigation water contains 10 or more ppm of nitrate-nitrogen, the amount of N fertilizer added to a crop should be reduced to credit the nitrogen coming from irrigation water. *Table F-3* shows how much nitrogen is added for different amounts of irrigation water. (Note: Some water analyses give nitrate-nitrogen concentrations in parts per million [ppm] and others give values in milligrams per liter [mg/l]. They are the same.)

**Table F-3. Crop available nitrogen in irrigation water.**

Water Applied (inches)	Nitrate-Nitrogen concentration (ppm or mg/l)								
	5	10	15	20	25	30	35	40	45
(lb of nitrogen added per acre)									
6	7	14	20	27	34	41	48	54	61
9	10	20	30	41	51	61	72	82	92
12	14	27	41	54	68	81	95	109	122
15	17	34	51	68	85	102	119	136	153
20	23	45	68	91	114	136	159	182	204
25	28	57	85	114	142	170	199	227	255

The timing of irrigation application in relation to the period of rapid nitrogen uptake by the crop affects the value of the nitrogen in the water to that year's crop. Rapid N uptake extends from about V6 to after pollination, but N is taken up all season. Nitrogen in irrigation water applied during the rapid uptake period is just as useful to the crop as the same amount of nitrogen fertilizer. Nitrogen in water applied late in the growing season, after the crop has already taken up most of its nitrogen needs, is of limited value. Care must be taken to reduce drainage below the root zone since nitrogen will leach with the water. Irrigation scheduling are critical to reduce these losses.

Due of the uncertainty of precipitation during the growing season, we suggest that the nitrogen contained in 80% of the 5-year average irrigation depth be used when calculating the N contribution by irrigation water. If your field site is within an NRD with an annual water allocation, use the annual allocation in place of the 5-year average. An example will show how to calculate the N provided by irrigation water containing N.

### Example: Calculating the irrigation water N credit

Irrigation water contains 15 ppm nitrate-nitrogen. The 5-year average irrigation water application depth is 10 inches per year. Using 80% of the 5-year average, how much crop available N is in the irrigation water?

$$\begin{aligned}
 (\text{ppm}) \times (0.2267) \times (\text{in. of water}) &= \text{lb of nitrogen/acre in the water} \\
 0.8 \times 15 \text{ ppm} \times 0.227 \times 10 \text{ in.} &= 34 \text{ lb of nitrogen/acre}
 \end{aligned}$$