Crop Nitrogen Requirement Tables
From Colorado State University

Use a soil analysis to determine the NO_3-N concentration of your soil.

Crops needing a weighted 2 ft. NO_3-N sample include (see Table 1):

* Corn
* Sorghum
* Sudan
* Sunflowers

Crops needing a summed nitrate content from the 0-1 ft. and the 1-2 ft samples (see Table 2):

**Winter Wheat
** Spring-seeded small grains (barley, oats, wheat, millet)

Crops needing 1 ft. samples include:

*** Alfalfa
*** DryBeans
*** Potatoes
*** Grasses
*** Proso and Pearl Millet (can also use 2 ft. samples)
*** Sunflowers (can also use 2 ft. samples)

Table 1 - Calculating a weighted NO_3-N soil content

Soil Layer	Thickness	NO3-N	Calculations
Inches		ppm	
0-8	8	20	8x 20 = 160
8-24	16	8	16 x 8 = 128
			Total = 288
			288/24 = 12 ppm

Table 2 - Calculating a summed NO_3-N soil content

	Soil Layer	NO_3-N		
	feet	ppm		
	0-1	10		
	1-2	4		
	10 + 4 = 14 ppm			

Table 3 - Irrigated Corn (175 bu/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	210	185	165
7-12	160	135	115
13-18	110	85	65
19-24	60	35	15
>24	10	0	0

* Average concentration (ppm) NO_3-N in 0-2 ft soil layer. See Table 1.

**For grain yields other than 175 bu/A, use:

N Rate = 35 + [1.2 x yield goal (bu/Ac)] - [8 x soil NO_3-N] - [0.14 x yield goal x % OM]

**For silage use:

N Rate = 35 + [7.5 x yield goal (tons/A)] - [8 x soil NO_3-N] -[0.85 x yield goal x %OM]

Table 4 - Dryland Corn (80 bu/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	100	90	80
6-12	50	40	30
>12	0	0	0

* Average concentration (ppm) NO_3-N in 0-2 ft soil layer. See Table 1.

**For grain yields other than 80 bu/A, use:

N Rate = 35 + [1.2 x yield goal (bu/Ac)] - [8 x soil NO_3-N] - [0.14 x yield goal x % OM]

**For silage use the equation:

N Rate = 35 + [7.5 x yield goal (tons/A)] - [8 x soil NO_3-N] - [0.85 x yield goal x % OM]

Table 5 - Dryland Winter Wheat (50 bu/A)

Soil NO_3-N (ppm)*		Soil Organic Matter (%)		
0-1 ft	0-2ft	0-1.0	1.1-2.0	>2.0
		Fertilizer Rate		
0-3	0-5	75	75	75
4-6	6-9	75	70	50
7-9	10-12	75	45	25
10-12	13-15	50	20	0
13-15	15-18	25	0	0
>15	>18	0	0	0

*Concentration of NO_3-N in the top foot of soil or sum of NO3-N concentrations in 1-foot sample depths to 2 feet. See Table 2.
**To adjust N rate for expected yields different from 50 bu/A add or subtract 25 lb N/A for each 10 bu/A difference (maximum N rate is 75 bu/A)

Table 6 - Irr. Winter Wheat (100 bu/A)

Soil NO_3-N	Soil Organic Matter (%)		
0-2 ft.	0-1.0	1.1-2.0	>2.0
(ppm)*	Fertilizer Rate (lb N/A)		
0-6	125	95	75
7-12	105	75	55
13-18	85	55	35
19-24	65	35	15
25-30	45	15	0
31-36	25	0	0
>36	0	0	0

*Sum of ppm NO_3-N in 1 ft. sample depths to 2 ft. See Table 2.
For sample depths of 1 ft. only, multiply the ppm value by 1.67 before using the table.
**To adjusts N rate for expected yields different from 100 bu/A, add or subtract 20 lb N/A for each 10 bu/A difference.

Table 7 - Irrigated Feed Barley, Oats and Wheat (100 bu/A)

Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	125	95	75
7-12	105	75	55
13-18	85	55	35
19-24	65	35	15
25-30	45	15	0
31-36	25	0	0
>36	0	0	0

*Sum of ppm NO_3-N in 1 ft. sample depths to 2 ft. See Table 2.

For sample depths of 1 ft only, multiply the ppm value by 1.67 before using the table.

**To adjust N rate for expected yields different from 100 bu/A, add or subtract 20 lb N/A for each 10 bu/A difference.

Table 8 - Irr. Malting Barley (100 bu/A)

Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	115	85	65
7-12	95	65	45
13-18	75	45	25
19-24	55	25	0
25-30	35	0	0
>31	0	0	0

*Sum of ppm NO3-N in 1 ft. sample depths to 2 ft. See Table 2.

For sample depths of 1 ft only, multiply the ppm value by 1.67 before using the table.

**To adjust N rate for expected yields different from 100 bu/A, add or subtract 10 bu/A for each difference on sand, loamy sand, and sandy soils, and 15 lb N/A for each 10 bu/A on all other soils.

Table 9 - Dryland Proso and Pearl Millet (40 bu/A).			
Soil NO_3-N (ppm)*		Relative	Fertilizer Rate
0-1 ft.	0-2 ft.	Value	(lb N/A)
0-3	0-6	very low	40
4-6	7-11	low	20
7-10	12-17	medium	10
>10	>17	high	0

*Concentration of NO_3-N in the top foot of soil or the sum of NO_3-N concentrations in 1 ft. sample depths to 2 ft.

**The 10 lb N/A rate is suggested only when P and or K is being applied.

Table 10 - Dryland Grain Sorghum (40 bu/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-3	25	0	0
4-6	0	0	0
7-9	0	0	0
>9	0	0	0

*Average concentration (ppm) NO_3-N in 0 to 2 ft. layer. See Table 1.

**To adjust the N rate for other yield goals, add or subtract 12.5 lb N/A for each 10 bu/A difference.

Table 11 - Irr. Grain Sorghum (80 bu/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-3	75	45	25
4-6	50	15	0
7-9	25	0	0
>9	0	0	0

*Average concentration (ppm) NO_3-N in 0 to 2 ft. layer.

**To adjust the N rate for other yield goals, add or subtract 12.5 lb N/A for each 10 bu/A difference.

Table 12 - Dryland Forage Crops for Silage (15 tons/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-3	90	60	40
4-6	65	35	15
7-9	40	10	0
10-12	15	0	0
>12	0	0	0

*Average concentration (ppm) NO3-N in 0 to 2 ft. layer. See Table 1.
**To adjust the N rate for other yield goals, add or subtract 8 lb N/A for each ton/A difference.

Table 13 - Irr. Forage Crops for Silage (30 tons/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	230	200	180
7-12	190	160	140
13-18	150	128	100
19-24	110	80	60
25-30	70	40	20
31-36	30	0	0
>36	0	0	0

*Average concentration (ppm) NO_3-N in 0 to 2 ft. layer. See Table 1.
**To adjust the N rate for other yield goals, add or subtract 9 lb N/A for each ton/A difference.

Table 14 - Irr. Sunflowers (2,400 lbs/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	130	110	100
7-12	110	95	85
13-18	95	80	70
19-24	80	60	50
>24	60	45	35

*Average concentration (ppm) NO_3-N in 0 to 1 ft. layer.
**To adjust the N rate for other yield goals, add or subtract 6 lb N/A for each cwt/A difference.

Table 15 - Dry Sunflowers (1,500 lbs/A)			
Soil NO_3-N	Soil Organic Matter (%)		
(ppm)*	0-1.0	1.1-2.0	>2.0
	Fertilizer Rate (lb N/A)		
0-6	75	55	35
7-12	55	35	15
13-18	35	15	0
19-24	15	0	0
25-30	0	0	0

*Average concentration (ppm) NO_3-N in 0 to 1 ft. layer.

**To adjust the N rate for other yield goals, add or subtract 6 lb N/A for each cwt/A difference.

Table 16 - Irrigated Grasses	
Soil NO_3-N	Fertilizer Rate
(ppm)*	(lb N/A)
0-6	185
7-12	160
13-18	135
19-24	110
25-30	85
>30	0

*Average concentration (ppm) NO_3-N in 0 to 1 ft. layer.

**Use the same N rates for grass-legume mixtures containing less than 25% legume.

Table 17 - Irrigated Dry Beans (2,000 lbA)	
Soil NO_3-N	Fertilizer Rate
(ppm)*	(lb N/A)
0-10	50
11-20	30
21-30	10
>30	9

*Average concentration (ppm) NO_3-N in 0 to 1 ft. layer.

Use the following values to calculate crop nutrient needs for phosphorous and potassium.

Crop - Irrigated Barley
Yield = bu./acre
P_2O_5 = .70 lbs./bu. x yield = 0 lbs./acre
K_20 = 1.6 lbs./bu. x yield = 0 lbs./acre

Crop - Pasture Grass
Yield = tons/acre
P_2O_5 = 15 lbs./ton x yield = 0 lbs./acre
K_20 = 35 lbs./ton x yield = 0 lbs./acre

Crop - Corn Silage
Yield = tons/acre
P_2O_5 = 3.0 lbs./ton x yield = 0 lbs./acre
K_20 = 8.0 lbs./ton x yield = 0 lbs./acre

Crop - Corn For Grain
Yield = bu./acre
P_2O_5 = 0.6 lbs./bu. x yield = 0 lbs./acre
K_20 = 1.2 lbs./ton x yield = 0 lbs./acre