Irrigation water management is an integral part of a conservation management system to support one or more of the following:

- **Manage soil moisture to promote desired crop response**
- **Optimize use of available water supplies**
- **Minimize irrigation induced soil erosion**
- **Decrease non-point source pollution of surface and groundwater resources**
- **Manage salts in the crop root zone**
- **Manage air, soil, or plant microclimate**

All irrigated cropland must have, at a minimum, the following essential practices as part of their conservation management system: Irrigation Water Management, Nutrient Management, Pest Management, and Conservation Crop Rotation. For nutrient management, in addition to a soil test to be taken, in order to evaluate risks due to nutrients, the phosphorus index (Section NM-9) and nitrogen index (this section), also located at http://www.nm.nrcs.usda.gov/technical/tech-notes/agro.html, need to be run. These help in evaluating the type of risk to surface and groundwater and choosing an alternative conservation practice or management practice to reduce the risk, such as leaching and runoff reduction practices. Nutrient management plans are developed to specify the source, amount, timing and method of application of nutrients on each field to achieve realistic yield goals, while minimizing movement of nutrients out of the root zone or off the field.

Nutrient applications associated with irrigation systems need to be applied according to Irrigation Water Management practice standard and Nutrient Management standards, http://www.nm.nrcs.usda.gov/technical/fotg/section-4/std-specs.html . The application rate (in/hr) for material applied through irrigation shall not exceed the water holding capacity of the soil root zone. Application amounts must be adjusted to match the soil intake rate.
When applying manure with irrigation equipment, modifying the equipment can reduce the potential for volatilization of nitrogen from the time the manure leaves the application equipment until it reaches the surface of the soil (e.g. reduced pressure, drop down tubes for center pivots). Nitrogen volatilization from manure in a surface irrigation system will be reduced when applied under a crop canopy. Schedule salt leaching events to coincide with lower residual soil nutrients and pesticides.

Nitrogen Index – Page 1 of 2

Index Items Transport Factors	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Surface Loss Rating (Col* factor weight)	Leaching Loss Rating (Col* factor weight)
Runoff Class	1.0	Negligible & Very Low (0)	Low (1)	Medium (2)	High (4)	Very High (8)		
Permeability Class	1.0	Impermeable to Very Slow (<0.0015 to 0.06 in/hr) (0)	Slow to Moderately Slow (0.06 to 0.6 in/hr) (1)	Moderate (0.6 to 2 in/hr) (2)	Moderately Rapid to Rapid (2-20 in/hr) (4)	Very Rapid (>20 in/hr) (8)		
Annual Precipitation	1.0	<8” (0)	8-15” (1)	16-22” (2)	23-30” (4)	>30” (8)		
Irrigation water Management	1.0	None (0)	Insignificant runoff and/or deep percolation – total amount applied = consumptive use; follows 449 standard (1)	Little runoff and/or deep percolation – total amount applied does not exceed 110% of consumptive use (2)	Some runoff and/or deep percolation – total amount applied does not exceed 125% of consumptive use (4)	Significant runoff and/or deep percolation – total amount applied exceeds 125% of consumptive use (8)		
Water runoff management	1.0	Grasses, perennial vegetation CRP (0)	No-till and/or strips/ Terraces plus buffers, filter strips or tailwater recovery (1)	Residue management (>30% at planting) and/or strips/terraces (2)	Conventional Tillage, some residue (4)	Fallow condition, no residue (8)		
Irrigation Erosion[1]	1.0	Not Irrigated or No Furrow Irrigation (0)	Tailwater recovery or QS>6 for very erodible soils or QS<10 for other soils (1)	QS>10 for erosion resistant soils (2)	QS>10 for erodible soils (4)	QS>6 for very erodible soils (8)		
Distance[2] to surface Waterbody	1.0	>1000’ (0)	500 to 1000’ (1)	200’ to 500’ (2)	30’ to 200’ (4)	<30’ (8)		
Distance[2] to aquifer	1.0	>150’ (0)	99’ to 150’ (1)	20’ to 99’ (2)	10’ to 19’ (4)	<10’ (8)		

[1] QS Note: Q = flow rate of water introduced into the furrow (in gallons per min). S = furrow slope (in ft/100 ft, percent). Q is multiplied by S. For example, 5 gpm x 2% = 10.
[2]Distance measured from edge of field to surface waterbody or bottom of root zone to an aquifer (usable water supply not to a seasonal high water table)

Nitrogen Index – Page 2 of 2

Index Items Source Factors	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Surface Loss Rating (Col* factor weight)	Leaching Loss Rating (Col*factor weight)
Application Rate	1.5	None applied (0)	Nitrogen applied at agronomic rates with soil test; follows 590 standard (1.5)	Nitrogen applied at rates greater than 100 to 150% of agronomic rates; with soil test (3)	Nitrogen applied at rates over 150% of agronomic rates; with soil test (6)	No soil test (12)		
Application Form	1.0	None applied (0)	Commercial fertilizer w/calibrated application equipment (1)	Commercial fertilizer but w/o calibration of application equipment Or Organic w/ manure test & calibrated application (2)	Organic w/manure Test but w/o calibrated application equipment (4)	Organic w/o manure test or calibration of application equipment (8)		
Commercial Fertilizer Timing (and/or)	1.0	None applied (0)	Grid or zone sampling; precision application (1)	Spring Applic. and/or top dressed during growing season (2)	Split applications on fall seeded crops (starter in fall/top dressed spring/summer) (4)	Application more than 1 month ahead of planting (8)		
Organic Fertilizer Timing	1.0	None applied (0)	Incremental application applied as crop uses N throughout year (1)	All manure applied less than 1 month before planting (2)	Application more than 1 month ahead of planting (4)	Application in winter months (December and January) (8)		
Application Method	1.0	None applied (0)	Banded/ injected or precision applied (1)	Broadcast/ surface applied, incorporated within 5 days (2)	Broadcast/surface applied, incorporated more than 5 days (4)	Surface applied, not incorporated (8)		

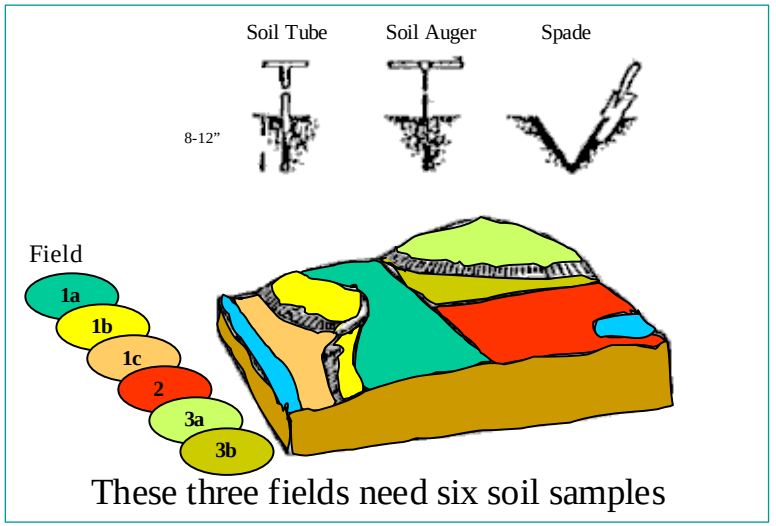
Total Weighted Rating (Sum of Columns)

Rating	Surface Water	Ground Water
Low Potential	<17	<14
Medium Potential	17 to 34	14 to 28
High Potential	34 to 68	28 to 58
Very High Potential	>68	>58

NM – 2 – How to Collect Soil Samples

Why Soil Tests are Important

Why Sample



These three fields need six soil samples

Soil testing is the key to nutrient management. Without a preplant soil test, fertilizing is a guess at best. Most soil testing is very cost effective. Many times growers put on fertilizer as "insurance" instead of testing the soil to see if fertilizer is needed. People could save as much as $100/ac by spending $20 on a soil test. NMSU has guidelines for soil sampling (Guide A-114), http://cahe.nmsu.edu/pubs/_a/a-114.html, and interpretations (Guide A-122), http://cahe.nmsu.edu/pubs/_a/a-122.html. NRCS Agronomy Technical Note 58, http://www.nm.nrcs.usda.gov/technical/tech-notes/agro/ag58.pdf , provides instructions for use of NMSU Fertilization Interpretation Software (NRCS 590 Job sheet), http://www.nm.nrcs.usda.gov/technical/tech-notes/agro.html, once the user has obtained a proper soil test. For routine analysis, request pH - saturated paste, electrical conductivity (EC): saturated paste, soil organic matter (OM): Walkley Black, nitrate nitrogen (N) (KCl or water soluble method), phosphorus (P) (Olsen-P test if pH>6.8), potassium (K) (water soluble (preferred) or ammonium acetate method), magnesium, calcium, and sodium (SAR). Many soils and crops in NM also show a need for sulfur, zinc, manganese, and other micronutrients (DTPA extractable Fe, Zn, Mn, and Cu). Those listed are part of the standard/micronutrient analysis done at the NMSU Soil, Water and Agricultural Testing Laboratory in Las Cruces; other soil testing laboratories can run the same tests, but the client needs to specify which procedures to use to enable proper nutrient recommendations for NM crops.

When and How to Take Soil Samples

1. The best time to sample is before spring fertilization or after harvest from uniform sampling areas with similar management.
2. Use any of the tools shown below to take sample. Sample to the plow depth (Usually 8-12").

Each sample should represent a uniform area. Size up the area and observe these variations:

Differences in texture (sand, silt, clay), color, slope, degree of erosion, drainage, past management (fertilization, manure application, rotation, irrigation type, etc.).

1. Take 15 to 20 subsamples from each uniform area. Mix thoroughly in a plastic container and fill a plastic bag with a pint of soil. This is the composite sample, which represents the field or area. Label each container with your name and address and the field or sample identification (ID) corresponding to the ID on the information sheet.
2. Avoid (or sample separately, if of interest) such areas as: Dead or back furrows, old straw piles, waterways, terraces, fencerows, and unusual or difficult spots.
3. Repeat the sampling procedure outlined on each uniform area you want tested.
4. Air-dry the samples before mailing. Do not use heat for drying. Wet samples will delay analyses up to one week.

Where to Send Soil Samples for Analysis:

Following NRCS 590 Nutrient Management Standard and NMSU Fertilization Interpretation software, soil test analyses shall be performed by laboratories that are accepted in the North American Proficiency Testing Program or those laboratories whose tests are accepted by the NMSU (partial list of labs below).

Partial Listing of Soil Testing Laboratories

Agricultural Testing and Research Lab
P.O. Drawer 1318
Farmington, NM 87499
505/326-2730

NMSU SWAT Testing Lab
MSC 3Q, Box 30003
Dept. of Agronomy and Horticulture
Las Cruces, NM 88003
505/646-4422

Servi-Tech Labs
P.O. Box 1397
1816 E. Wyatt Earp
Dodge City, KS 67801
308/234-2418
www.servi-techinc.com

Ward Laboratories
4007 Cherry Ave
Kearney, NE 68848-0788
402/476-2811
www.wardlab.com

Inter Ag Services, Inc.
IAS Laboratories
2515 E. University Dr.
Phoenix, AZ 85034
602/273-7248

MDS Harris
621 Rose St.
P.O. Box 80837
Lincoln, NE 68501
www.mdsharris.com

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(listing of North American Proficiency Testing participating laboratories available at http://www.naptprogram.org/pap/)

NMSU Land Grant University Soil Testing Information Sheet:
IMPORTANT

If your sample is to be tested for available zinc and iron, rusty tools will contaminate the sample with iron, and galvanized or brass containers will contaminate it with zinc. The resultant soil analysis could indicate a sufficiency of these elements when actually a deficiency exists. **Use plastic container when possible.**

ALL EQUIPMENT MUST BE ABSOLUTELY CLEAN
SOIL TESTS AVAILABLE

TEST	PURPOSE	COST PER SAMPLE
Standard: pH, total soluble salts, sodium adsorption ratio, organic matter, nitrate-nitrogen (water extractable), phosphorus (bicarb) method, and water soluble potassium.	Basic evaluation for characterizing the soil fertility status for growing crops. A fertilizer recommendation is given with sufficient information. Normally this test is sufficient unless a special problem is suspected.	$19.00
Subsoil Nitrate:	Evaluation of nitrate supply below the plow depth. Fertilizer nitrogen recommendation based on routine soil test of surface soil is adjusted if subsoil nitrate is high.	$5.00
Iron and Zinc:	Information on the micronutrients Iron and Zinc. Zinc is usually deficient in New Mexico soil. Carbonates interfere with iron and zinc uptake.	$6.00
Manganese and Copper:	Information on the micronutrients Manganese and Copper.	$6.00

Checks or Money Orders are made payable to New Mexico State University. Always verify prices by contacting the lab or visiting their website at http://swatlab.nmsu.edu/ . Click on soil for a price list. Water and plant samples can also be tested at this laboratory.

Information on additional tests (soil, water, and plant) is available from the Soil, Water, and Agricultural Testing Laboratory. Expected turn-around time is one week in lab. If a delay is expected, you will be notified by phone.

USPS Address:
New Mexico State University
SWAT LAB
Box 30003, Dept. 3Q
Agronomy and Hort Dept.
Las Cruces, New Mexico 88003

Physical Address:
New Mexico State University
SWAT LAB
2290 Knox Street, PGEL West
Las Cruces, NM 88003

Attachment 1

Sampling Date:

Name

Address

City **State** Zip

Phone Number ( )

Email address:

SOIL SAMPLE INFORMATION SHEET

NEW MEXICO STATE UNIVERSITY

SWAT LABORATORY

Received Date:

CHECK DESIRED ANALYSIS

Standard	$19.00 ☐
Subsoil Nitrate (subsoil sample)	$5.00 ☐
Iron & Zinc (w/standard test)	$6.00 ☐
Manganese & Copper (w/std)	$6.00 ☐

Verify Prices at: http://swatlab.nmsu.edu/soilist.html

Sample is for:	☐Farm ☐ Home ☐ Orchard	☐Farm ☐ Home ☐ Orchard	☐Farm ☐ Home ☐ Orchard	☐Farm ☐ Home ☐ Orchard
Lab ID Number				
Field ID				
Geographic Location (TRS, X, Y, Lat/Long)				
Acres or Square Feet				
Sampling Depth (circle one)	0-2 0-4 0-6 0-8 0-12 12-24	0-2 0-4 0-6 0-8 0-12 12-24	0-2 0-4 0-6 0-8 0-12 12-24	0-2 0-4 0-6 0-8 0-12 12-24
Last years crop				
This years crop				
Yield Goal				
Orchard or Vineyard?				
Establishment year & number per acre				
Organic Amendments	Enter Quantity of Each	Enter Quantity of Each	Enter Quantity of Each	Enter Quantity of Each
Solids				
Liquids				
Irrigation System	☐Drip ☐ Flood ☐ Sprinkler	☐Drip ☐ Flood ☐ Sprinkler	☐Drip ☐ Flood ☐ Sprinkler	☐Drip ☐ Flood ☐ Sprinkler
Depth to Groundwater	☐<6’ ☐ 6-12’ ☐ >12’	☐<6’ ☐ 6-12’ ☐ >12’	☐<6’ ☐ 6-12’ ☐ >12’	☐<6’ ☐ 6-12’ ☐ >12’
Water Nitrate-N Credit	mg/l (ppm)	mg/l (ppm)	mg/l (ppm)	mg/l (ppm)
Contact Info for Person taking sample:				
COMMENTS:				

Please remove any rocks from the sample. Submit a minimum of 2 cups of soil that has been air-dried. Avoid using rusty tools or containers.

(NM – 3) Soil Fertility Interpretation GUIDE/Form (ETc example is for Corn Silage)

Crop_____ Variety _____ Average Annual Yield_____ Depth of Soil Sample_____ Sample Date_____

Soil Nutrient Status	
Parameter	**Result (ppm)**
Nitrate-N	
Phosphorus	
Potassium	
Calcium	
Magnesium	
Sulfur	
Iron (Fe)	
Copper (Cu)	
Zinc (Zn)	
Manganese (Mn)	
Organic Matter	%
pH	
ECe (dS/m)	
SAR	
Sodium (Na)	ppm

Petiole/Leaf analysis is used as a monitoring tool for determining the adequacy of the fertilization practices.

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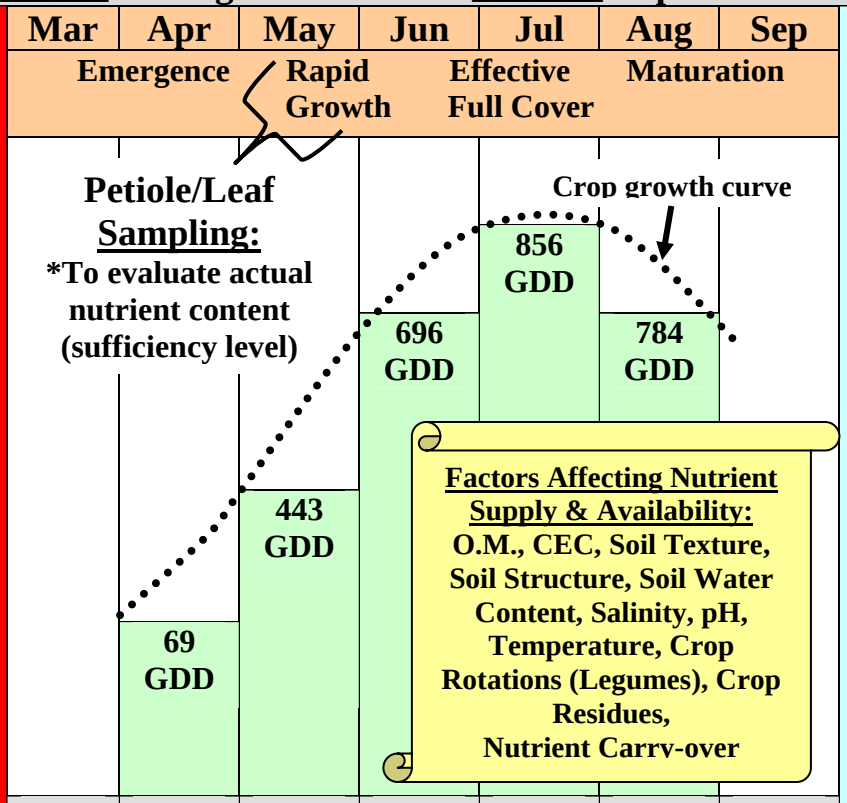

Enter Fertilizer Inputs

Type:

Rate:

Form:

Application method:

Date applied:

Soil Test Interpretations for N, P, K & Micronutrients:

* A **Very Low** or **Low** classification indicates a high probability for obtaining a fertilizer response.
* A **Moderate** classification indicates a fertilizer response may or may not occur.
* A **High** or **Very High** classification indicates a fertilizer response is not likely to occur.

Required Tests:

* The Olsen Test is used to determine the Phosphorus content
* Potassium interpretations are based on a water extract
* A saturated paste extract is used for determining the ECe and pH (most crops will grow satisfactorily on soils with a pH between 6.2 to 8.3)

Other:

- When the ECe (soluble salts) is less than 2 dS/m, few salinity problems occur
- The SAR evaluates potential infiltration problems. ECe, SAR & pH are used to categorize soils as saline, saline-sodic, sodic or normal (i.e., no salinity, pH or Na problems)

It is IMPORTANT to correlate Soil Fertility Test, Fertilizer Inputs & Leaf Analysis with IWM. Note: Follow NMSU fertilizer recommendations

(NM – 4) Developing a basic Nitrogen Budget

Nitrogen Source	Units example	Units your result	conversion	lbs. N/acre e.g.	lbs. N/acre your result
Soil Nitrate-Nitrogen (NO_3^- -N): • The amount of residual soil nitrate-nitrogen can vary considerably depending on the soil type, irrigation efficiency, fertility program and plant uptake of previous crop. A conversion factor of 2.0 is used for a 0 – 6"soil sample depth to convert ppm N to lbs./ac.	7 ppm		Multiply by 2.0 to get lbs. N/ac.	14.0	
Estimated Nitrogen Release (ENR) from the mineralization of Soil Organic Matter (SOM): • About 15 – 25 lbs. of N/acre/yr. is mineralized from each % of SOM	1 % SOM		Assume 20 lbs. of N is mineralized/ac	20.0	
Irrigation Water Nitrate-Nitrogen (NO_3^- -N): • Typically low levels are found in most irrigation waters. For this example, 2.5 ac-ft of irrigation water is used.	2 ppm		Multiply by 2.72 to get lbs. N/ac-ft (2.5 ac-ft used)	13.6	
Manure N credits for the first year after application: • Moisture content can be 10 – 50% of the total weight and N content is about 1.5 – 2.0% on a dry weight basis. Approximately 30 – 70% of the N is made available to the crop during the first year.	5.0 tons/ac. @ 30% moisture & 1.5% N		Assume 45% of the total N is available during the first year	47.25	
Legume N credits from previous crop: • About 25 – 100 lbs. of N/ac. can be provided by the legume crop (i.e., pounds of legume crop residue/ac. and crop quality determines the amount of N made available)	≈ 30 lbs. of N/ac. (low crop residues)			30.0	
Total Available Nitrogen per acre =				124.85	

Crop: Corn Silage; **Yield:** 20 tons/acre; **N requirement:** 160 lbs./acre (Ref. Crop Nutrient Uptake Tool @ http://npk.nrcs.usda.gov/)
Crop N Requirement (160.0 lbs./ac.) – Total Available N (124.85 lbs./ac) = **35.15 lbs. of N/ac. needed as fertilizer**

Fertilizer used: Urea ($CO(NH_2)_2$; 45 – 46% N)

Cost/lb. of N:	Enter your Cost/lb. of N:	Note: All N sources should be split-applied in order to increase N uptake efficiency. It is recommended that the producer take soil & petiole/leaf samples in order to monitor the effectiveness of their nutrient management program and to modify it as needed.
➢ $500/ton of Urea ➢ 46% N = 920 lbs. of actual N/ton of Urea ➢ $500/920 = $0.54/lb. of N		

Remember to use realistic yield goals when developing crop N requirements.

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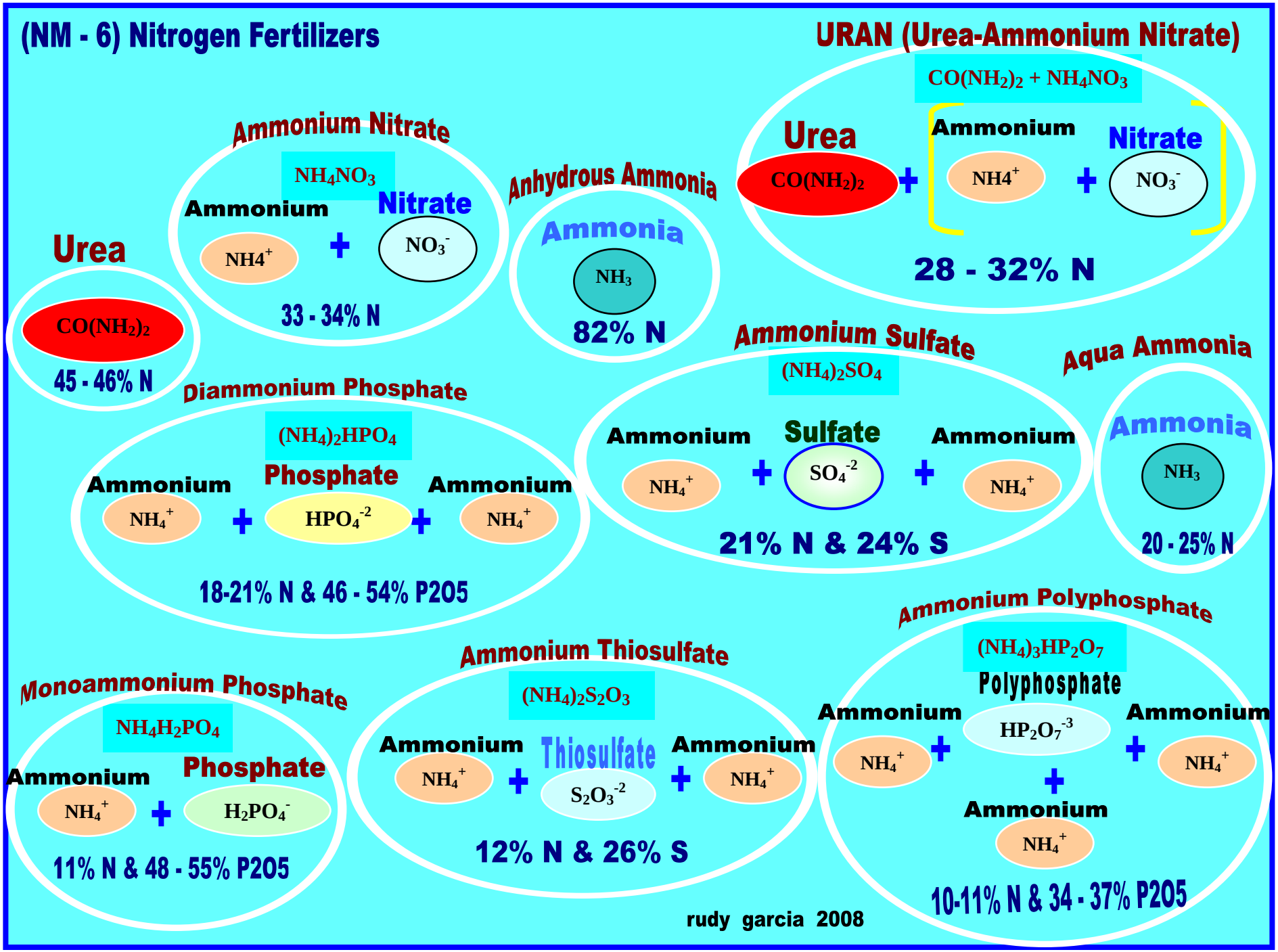
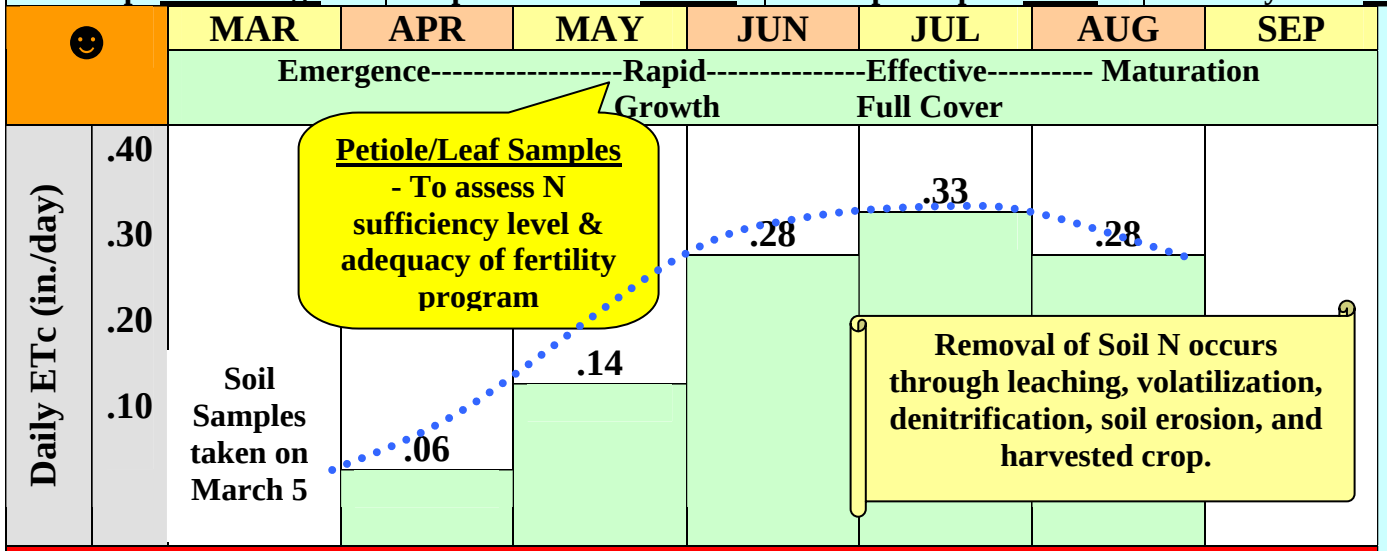
(NM - 6) Nitrogen Fertilizers



(NM – 7) IWM to increase Nitrogen Use Efficiency - Evaluation Guide (Corn Silage example)

Crop: Corn Silage	Expected Yield: 20 tons	Sample Depth: 0-12”	Irr. System: Hi-Flow	Leveled Field: Yes



It is important that the plant response (yield & quality) be correlated to the IWM and Fertility program (which is based on soil & tissue analysis and NMSU recommendations[1/]).

MAR	APR	MAY	JUN	JUL	AUG	SEP
Soil Analysis: Enter sampling date(s) and test results for Nitrate-N (ppm) & ENR[2/] (lbs)						
24 ppm 20 lbs						
Nitrogen Inputs [3/] (N fertilizer, manure, other): Enter application date(s) and pounds of N applied per acre						
	4/10 50 lbs N		6/5 50 lbs N	7/5 50 lbs N		
Petiole/Leaf Analysis[4/]: Enter sampling date(s) and test results for % N (sufficiency level is 2.7-3.5%)						
		5/15 2.9%				
Irrigations[5/] (irrigated on a two-week fixed schedule): Enter irrigation dates and amount applied per irrigation (3” applied/irrigation)						
3/15	4/1 4/15	5/1 5/15	6/1 6/15	7/1 7/15	8/1	

1/ Agronomy Tech. Note 58 (NMSU jobsheet – soil test interpretations)

2/ ENR = Expected Nitrogen Release (N from mineralized O.M.)

3/ Nitrogen Inputs: Nitrogen (urea) applied in three applications

4/ NMSU Guide A-143: Using Plant Tissue Analyses for Efficient Water Use by Plants

5/ Refer to the following Sections of this Guide for further IWM Assessments:
Section 30: Field Irrigation Evaluation Guide
Section 32: Graded Border Irrigation Analyses Guide
Section 35: Soil Moisture Monitoring Record Keeping Form & Irrigation Scheduling Guide

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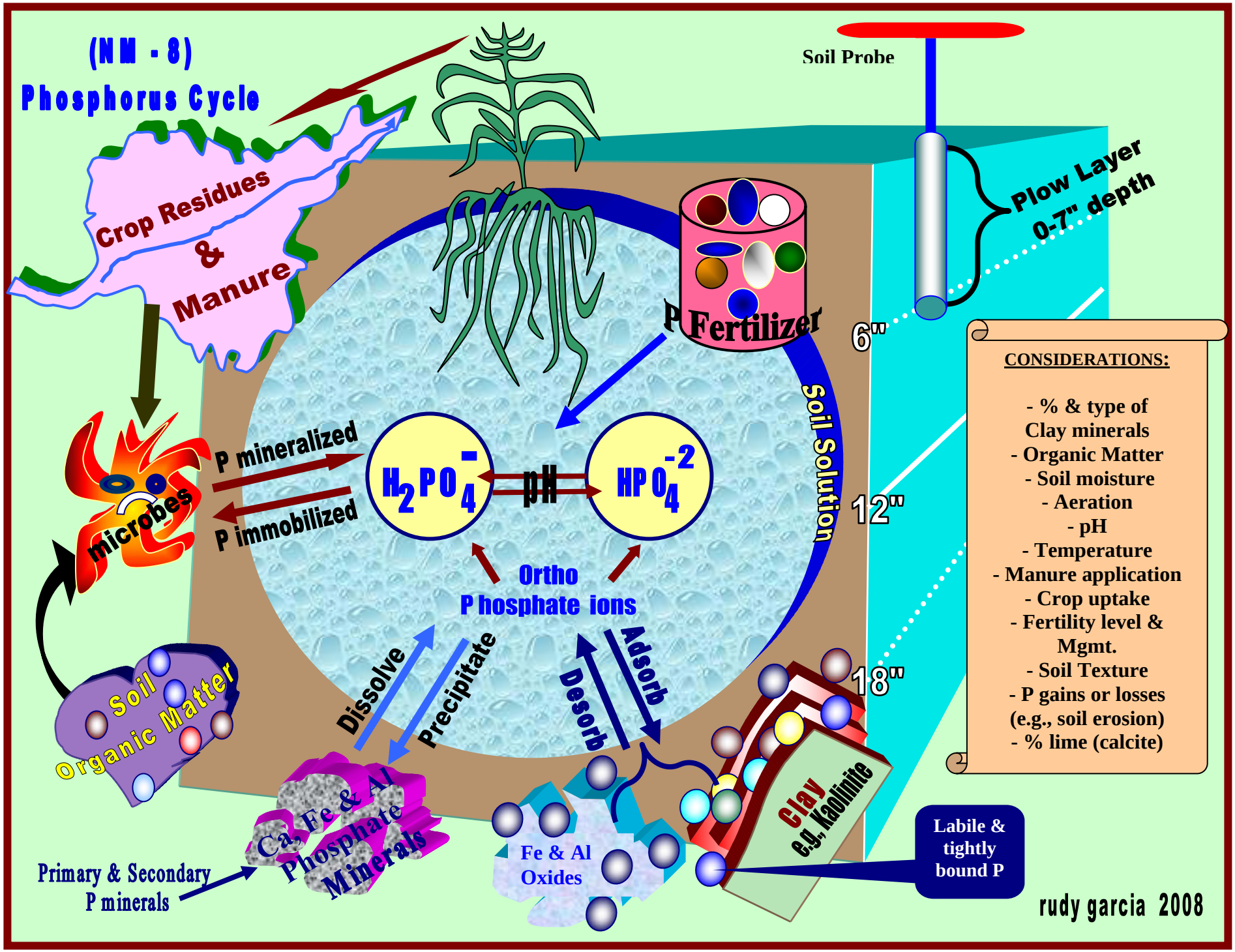
NOTE: Factors involved in IWM planning: Soil Texture, Soil Structure, Intake Family, Water Quality (salinity and SAR), Irrigation Application Efficiency evaluations, irrigation monitoring and scheduling, Irrigation System selection, consumptive use requirements, root zone depth.


(NM - 8)
Phosphorus Cycle
Crop Residues
&
Manure
Soil Probe
Plow Layer
0-7" depth
P Fertilizer
6"
12"
18"
Soil Solution
microbes
P mineralized
P immobilized
$H_2PO_4^-$
pH
HPO_4^{-2}
Ortho
P hosphate ions
Dissolve
Precipitate
Desorb
Adsorb
Soil
Organic Matter
Ca, Fe & Al
Phosphate
Minerals
Fe & Al
Oxides
Clay
e.g., Kaolinite
Labile &
tightly
bound P
Primary & Secondary
P minerals
CONSIDERATIONS:
- % & type of
Clay minerals
- Organic Matter
- Soil moisture
- Aeration
- pH
- Temperature
- Manure application
- Crop uptake
- Fertility level &
Mgmt.
- Soil Texture
- P gains or losses
(e.g., soil erosion)
- % lime (calcite)
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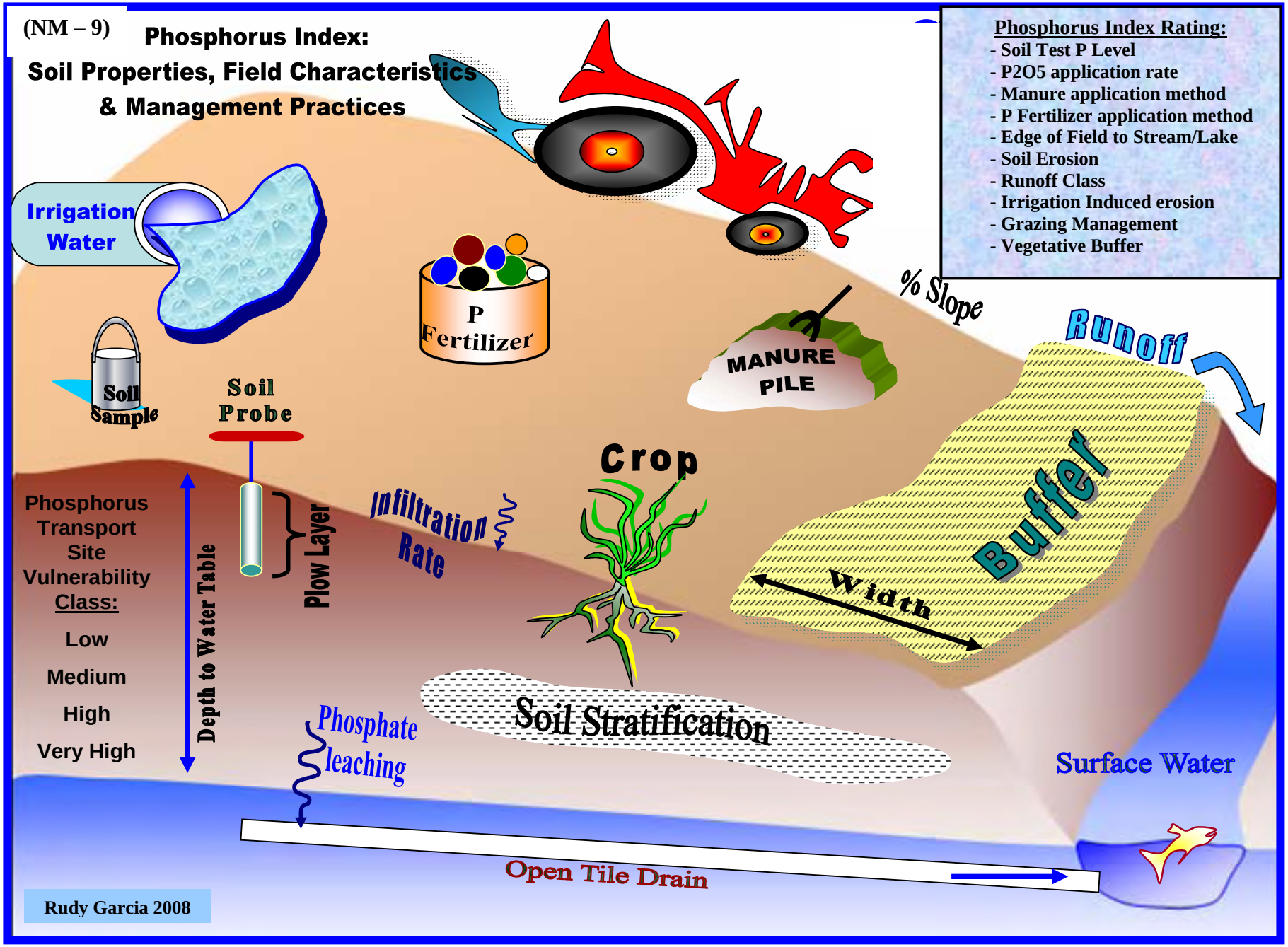
(NM – 9)
Phosphorus Index:
Soil Properties, Field Characteristics
& Management Practices
Phosphorus Index Rating:
- Soil Test P Level
- P2O5 application rate
- Manure application method
- P Fertilizer application method
- Edge of Field to Stream/Lake
- Soil Erosion
- Runoff Class
- Irrigation Induced erosion
- Grazing Management
- Vegetative Buffer
Irrigation Water
P Fertilizer
% Slope
Runoff
MANURE PILE
Soil Sample
Soil Probe
Crop
Buffer
Width
Infiltration Rate
Plow Layer
Depth to Water Table
Phosphorus Transport Site Vulnerability Class:
Low
Medium
High
Very High
Phosphate leaching
Soil Stratification
Surface Water
Open Tile Drain
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(NM – 10) Phosphorus Management (Using the P Index Rating)

Site Characteristic	Wt. F.	Weighting Factor (Wt. F.) x Column Factor (0, 1, 2, 4 & 8) = P Index Points					P Index Pts.
		None or Very Low	Low	Medium	High	Very High	
		0	1	2	4	8	
Soil Test P Level	1	V. Low < 8 ppm	Low 8 - 15 ppm	Moderate > 15 - 23 ppm	High > 23-30 ppm	V. High > 30 ppm	2.0
P (P2O5) Appl. Rate	1	None Applied	< 30 lbs/ac	30 - 90 lbs/ac	> 90-150 lbs/ac	> 150 lbs/ac	1.0
Organic P Appl. Method	1	None Applied	Injected 3 - 6" below surface	Incorp. Immediately before planting	Incorporated > 3[6] mo. before planting	Surface Applied	8.0
P Fertilizer Appl. Method	1	None Applied	Placed w/ Planter Deeper than 2"	Incorp. Immediately before planting	Incorporated > 3[7] mo. before planting	Surface Applied	1.0
Edge of Field to Stream/lake[1]	1.5	V. Low > 1000 ft.	Low > 500 - 1000 ft.	Medium > 200 - 500 ft.	High 30-200 ft.	V. High < 30 ft.	0
Soil Erosion[2]	1.5	V. Low < 1 t/ac	Low 1 - 3 t/ac	Medium > 3 - 5 t/ac	High > 5-15 t/ac	V. High > 15 t/ac	1.5
Runoff Class[3]	1.5	Negligible & V. Low	Low	Medium	High	V. High	1.5
Irr. Erosion (see QS note)	1.5	Not[4] Irrigated	Tail water Recovery or[5]	QS > 10 for erosion resistant soils	QS > 10 for erodible soils	QS > 6 for very erodible soils	3.0
Grazing Management	0.5	Not Grazed	Only graze crop residue	Pasture < 30% Dry Matter as supp. feed	Pasture 30-80% Dry Matter as supp. feed	Pasture 80-100% D.M. as supp. feed	0
Vegetative Buffer	1.5	> 100 ft.	> 65 - 100 ft.	20 - 65 ft.	< 20 ft.	No Buffer	0

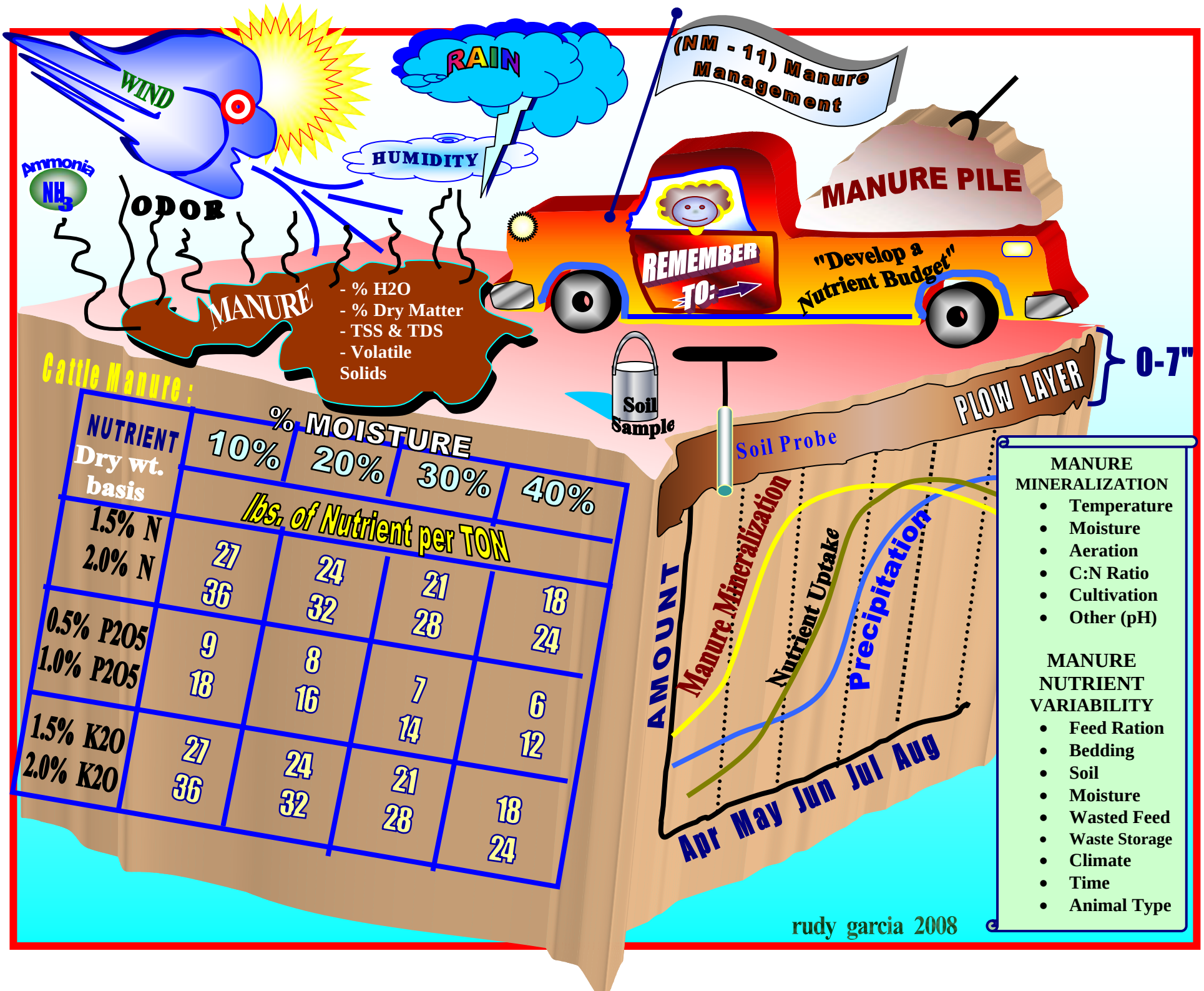
Enter Total P Index Points: e.g., 18

P Index Classification	Index Pts.	P Hazard Class	P Application Classification
	0 – 10	V. Low	N Based
	10 – 17	Low	N Based
	17 – 27	Med.	N Based
	27 – 37	High	P Based (1.5x crop removal)
	37 - 47	V. High	P Based (at crop removal)
	> 47	Excessive	No P application allowed

QS Note: Q = flow rate of water introduced into the furrow (in gpm). S = furrow slope (ft/100 ft, %). Q is multiplied by S: (e.g.: 5 gpm x 2% = 10).

(1) Proximity of Nearest Field Edge to Named Stream or Lake
(2) WEPS & RUSLE
(3) refer to Runoff Class Table (which is based on % field slope & soil permeability class (in/hr))
(4) or No Furrow Irrigation
(5) QS < 6 for Very erodible soils or QS < 10 for other soils
(6) or Surface Application < 3 Mo. before planting
(7) or Surface Applied < 3 months before planting

Phosphorus Index Rating (Reference: NRCS Agronomy Technical Note 57) rudy garcia 2008


WIND
RAIN
HUMIDITY
Ammonia
NH_3
ODOR
(NM - 11) Manure Management
MANURE PILE
REMEMBER TO:
"Develop a Nutrient Budget"
MANURE
- % H2O
- % Dry Matter
- TSS & TDS
- Volatile Solids
Soil Sample
Soil Probe
PLOW LAYER
0-7"
Cattle Manure :
% MOISTURE
lbs. of Nutrient per TON
NUTRIENT Dry wt. basis
10%
20%
30%
40%
1.5% N
2.0% N
27
36
24
32
21
28
18
24
0.5% P2O5
1.0% P2O5
9
18
8
16
7
14
6
12
1.5% K2O
2.0% K2O
27
36
24
32
21
28
18
24
AMOUNT
Manure Mineralization
Nutrient Uptake
Precipitation
Apr May Jun Jul Aug
MANURE MINERALIZATION
Temperature
Moisture
Aeration
C:N Ratio
Cultivation
Other (pH)
MANURE NUTRIENT VARIABILITY
Feed Ration
Bedding
Soil
Moisture
Wasted Feed
Waste Storage
Climate
Time
Animal Type
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(NM – 12) Effluent Irrigation GUIDE

* Total pounds of N to apply/acre/yr.	Range of Effluent N concentrations in storage ponds (mg/l or ppm)				
	200	300	400	500	600
	Acre-Inches of Effluent needed to apply given pounds of Nitrogen				
50	1.10	0.73	0.55	0.44	0.37
100	2.22	1.47	1.10	0.88	0.73
150	3.30	2.20	1.65	1.32	1.10
200	4.40	2.94	2.20	1.76	1.47
250	5.51	3.67	2.75	2.20	1.84

NOTE: Lab analysis is needed to determine actual ppm of N in effluent.

CONVERSIONS:
2.72 x ppm = lbs/ac-ft
or
0.227 x ppm = lbs/ac-in

Ac-in = 27,157 gallons

*** Actual Nitrogen applied should be based on Effluent and Soil lab tests, average annual crop yield and NMSU recommendations.**

Example: Corn Silage & Cool Season Grass (Pasture) Net Irrigation Requirements (NIR) in inches/yr

Corn Silage (Las Cruces, NM)	Corn Silage (Roswell, NM)	Corn Silage (Portales, NM)	Corn Silage (Clovis, NM)	Pasture, Cool Season Grass (Roswell, NM)	Pasture, Cool Season Grass (Portales, NM)
28.0	24.0	24.0	20.0	35.0	31.4

Example Calculation:

- **Crop:** Corn Silage (Las Cruces, NM)
- **NIR:** 28.0”
- **N requirement:** 150 lbs. per acre (based on soil test/recommendations)
- **Effluent Concentration:** 400 mg/l of N (lab test)
- **Effluent needed:** 1.65 ac-in (to get 150 lbs. N)
- **NIR – Effluent needed:** 28.0” – 1.65” = 26.35” of irrigation water needed (plus the 1.65” of water in the effluent)
- **% Irrigation Water contributed by the Effluent:** 1.65” ÷ 28.0” ≈ 6.0%
- **EC of Effluent:** 5.0 dS/m (5.0 dS/m x 0.06 = 0.3 dS/m - salts in effluent)
- **EC of Irrigation Water:** 2.0 dS/m (2.0 dS/m x 0.94 = 1.88 dS/m - salts in irrigation water)
- **Total Salt content in the irrigation and effluent mixture:** 1.88 + 0.3 = 2.18 dS/m (EC)

Enter Your Information:

- **Crop:**
- **NIR:**
- **N requirement:**
- **Effluent Concentration:**
- **Effluent needed:**
- **NIR – Effluent needed:**
- **% Irrigation Water contributed by the Effluent:**
- **EC of Effluent:**
- **EC of Irrigation Water:**
- **Total Salt content in the irrigation and effluent mixture:**

NOTE: Total Salinity is based on a weighted calculation of irrigation & effluent (based on % mixture); EC = Electrical Conductivity in dS/m

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