

Irrigation and Nutrient Management Training

for Grower Nitrogen Management Plan Self-Certification





Agenda – Day 1

Day 1

| | | |
|------------------------|---|---|
| 1:00 – 4:00 | Welcome and Introduction ILRP Background Ag Order Requirements | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| | Module 1: Introduction Lesson 1: Nitrogen Cycle Lesson 2: Nitrogen Contamination Lesson 3: INMP Requirements and Deadlines Lesson 4: Statistical Outliers | Andre Biscaro <i>Irrigation and Water Resources Advisor</i> UC Cooperative Extension |
| | | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| | Module 2: Parcel Management Lesson 1: Management Units Lesson 2: Assessor's Parcel Number Lesson 3: Crop Name and Age | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| 15-Minute Break | | |
| | Module 3: Irrigation Management Lesson 1: Irrigation and Nitrogen Management Lesson 2: Irrigation Methods (INMP Worksheet Box 1) Lesson 3: Crop Evapotranspiration (INMP Worksheet Box 2) Lesson 4: Anticipated Crop Irrigation (INMP Worksheet Box 3) Lesson 5: Irrigation Set Times Lesson 6: Irrigation Water Nitrogen Concentration (INMP Worksheet Box 4) Lesson 7: Irrigation Efficiency Practices (INMP Worksheet Box 5) | Andre Biscaro <i>Irrigation and Water Resources Advisor</i> UC Cooperative Extension |



Agenda – Day 2

Day 2

| | | |
|--------------------------------------|--|---|
| 1:00 – 4:00 | Module 4: Harvest Information Lesson 1: Production Units (INMP Worksheet Box 6) Lesson 2: Expected Crop Yield (INMP Worksheet Box 7A) Lesson 3: Actual Crop Yield (INMP Worksheet Box 7B) | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| | Module 5: Nitrogen Management Lesson 1: Nitrogen Efficiency Practices (INMP Worksheet 8) Lesson 2: Soil Available Nitrogen (INMP Worksheet Box 9) Lesson 3: Nitrogen in Irrigation Water (INMP Worksheet Box 10) Lesson 4: Nitrogen in Organic Amendments (INMP Worksheet Box 11) Lesson 5: Dry/Liquid Nitrogen Fertilizer (INMP Worksheet Box 12) Lesson 6: Foliar Nitrogen Fertilizer (INMP Worksheet Box 13) | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| 15-Minute Break | | |
| | Lesson 7: Total Nitrogen (INMP Worksheet Box 14) Lesson 8: Nitrogen Applied Vs Nitrogen Removed | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| Module 6: Certification | | |
| | Lesson 1: Certification Options and Requirements | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| Module 7: INMP Summary Report | | |
| | Lesson 1: Reporting Data | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| Review and Test | | |

Irrigated Lands Regulatory Program

- Statewide program regulating discharges from irrigated agriculture
 - Irrigation tailwater, stormwater flow, infiltration to groundwater
 - Applies to all growers who irrigate commercial crops
- Local implementation through Regional Water Quality Control Boards
 - Conditional Waiver or Waste Discharge Requirements (aka WDRs or Ag Order)
- Goal: protect surface and groundwater quality and beneficial uses
- Landowner/grower options: Comply individually or join 3rd party coalition
 - Ventura County Agricultural Irrigated Lands Group (VCAILG)



September 2023 – A New Ag Order for Our Region

- Los Angeles Regional Board adopted new Ag Order (Sept 2023)
- Two main new program requirements:

Nitrogen tracking and reporting (INMP/INMR)

Applies to all growers in Ventura County.



Today's focus:
INMP/INMR requirements

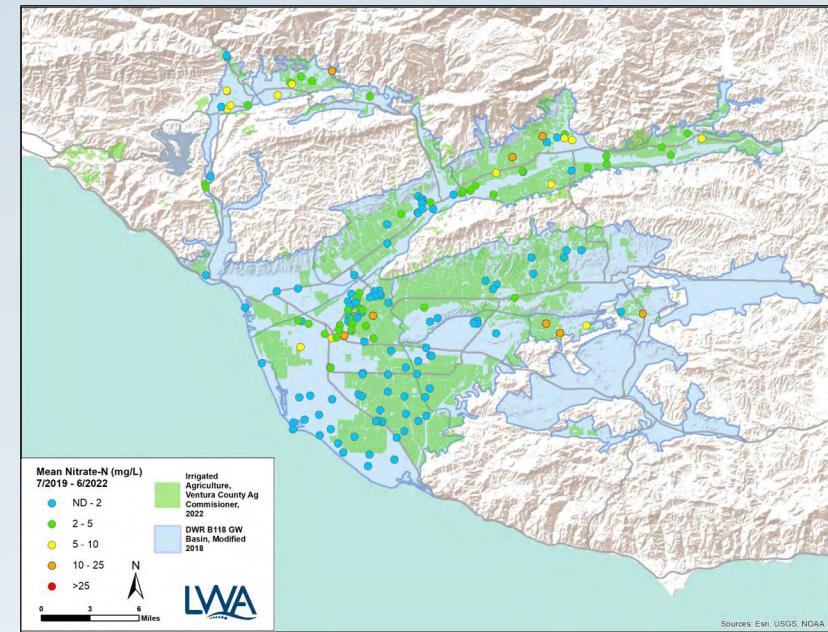
TMDL compliance requirements

Applies to growers in specific subwatersheds depending on representative water quality monitoring results.



What are the “Precedential Requirements”?

- East San Joaquin WDR adopted by State Water Resources Control Board (2018)
- Precedential for all Irrigated Lands programs in California
- Focus on addressing nitrogen in surface and groundwater through comprehensive irrigation and nutrient management program
 - Groundwater quality trend monitoring
 - Irrigation and Nutrient Management Plan (INMP) development
 - Irrigation and Nutrient Management Report (INMR) submittal
 - On-farm drinking well sampling
 - Groundwater protective formulas, values, and targets



INMP: The Plan

- INMP = Irrigation and Nutrient Management Plan
- Annual **on-farm** planning document – not submitted to VCAILG
- Developed per **Management Unit**
 - Pre-season - Anticipates crop irrigation and nutrient needs
 - Post-season – Records actual application and harvest yield
- Must be certified:
 1. Self certified by grower attending CDFA-approved  training workshop and passing exam
 2. Self-Certified by grower that adheres to site-specific recommendations from NRCS Technical Service Providers
 3. Certified by Crop Advisor (CCA) certified by the American Society of Agronomy
- Initial plans are due **March 1, 2025**, and annually thereafter
 - Crops planted before March 1, 2025 → exempt
 - Anything planted after March 1, 2025 → needs an INMP



INMP CERTIFICATION

The person signing this INMP certifies, under penalty of law, that the INMP was prepared under their direction and supervision, that the information and data reported is to the best of his/her knowledge and belief, true, accurate, and complete, and that they are aware that there are penalties for knowingly submitting false information. The qualified professional signing the INMP may rely on the information and data provided by the Discharger and is not required to independently verify the information and data.

The person signing the INMP below further certifies that they used sound irrigation and nutrient management planning practices to develop irrigation and nutrient application recommendations and that the recommendations are informed by applicable training for meeting the crop's agronomic needs while minimizing nitrogen loss to surface water and groundwater. Where the person signing the INMP is not the Grower, he/she is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by the Grower in a manner that is inconsistent with the INMP's recommendations for nitrogen application. **This certification does not create any liability for claims for environmental violations.**

Certification:

- Certified by Certified Crop Adviser or NRCS Technical Service Provider
- Self-Certified by Grower who has completed the CDFA training program
- Self-Certified by Grower who follows NRCS site-specific recommendations (documentation required)
- Certification not required (Grower operating on ≤10 acres)

I, _____, certify this INMP in accordance with the statement above.

_____ (Signature) _____ (Date)

If the certifier is not the Grower, the Grower additionally agrees as follows:

I, _____, Grower, have provided information and data to the certifier above that is, to the best of my knowledge and belief, true, accurate, and complete; that I understand that the certifier may rely on the information and data provided by me and is not required to independently verify the information and data, and that I further understand that the certifier is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by me in a manner that is inconsistent with the INMP's recommendations for nitrogen application. I further understand that the certification does not create any liability for claims for environmental violations.

_____ (Signature) _____ (Date)

INMR – The Report

- INMR = Irrigation and Nutrient Management Report
- Carries over summary info from the INMP(s):
 - Total N applied per management unit (“A” value)
 - Harvest yield (to be used to calculate N removal, or “R” value)
 - Irrigation and nutrient management practice questions
- Due **March 1, 2026**, and annually thereafter
- Submitted to VCAILG, anonymized, then submitted to Regional Board
- Non-reporters will be noted in VCAILG Annual Monitoring Report
- Data to be used to information development of Groundwater Protection Formulas, Values, and Targets
- Identification of outliers



The image shows a Microsoft Excel spreadsheet titled "INMP Worksheet - Excel Version - Excel". The spreadsheet is for the "IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP)" and is version 7 (Nov 25, 2023). The logo for "VENTURA COUNTY Irrigated Land Group" is visible at the top. The form includes sections for "Ranch Management" (listing APN(s) and Irrigated Acres) and "Management Unit (MU) Information" (listing MU Name, Crop Type, MU Irrigated Acres, Reporting Year, Crop Age, Crop Establishment Date, Crop Harvest Completion Date, and a question about being a statistical outlier). A note at the bottom indicates that MU Name is a required field.

INMP Program Development – What's Next?

- Continued work with Regional Board staff to clarify requirements and develop guidance
- Ongoing INMP Self-Certification Trainings
 - December 9 and 10
 - CDFA FREP online self-certification training – now available!
- Build tools and resources to assist growers with INMP/INMR
- Development of Clearwater INMR module and training workshops and videos in Early 2026

VCAILG Latest E-Newsletter
<https://conta.cc/49XkBzP>

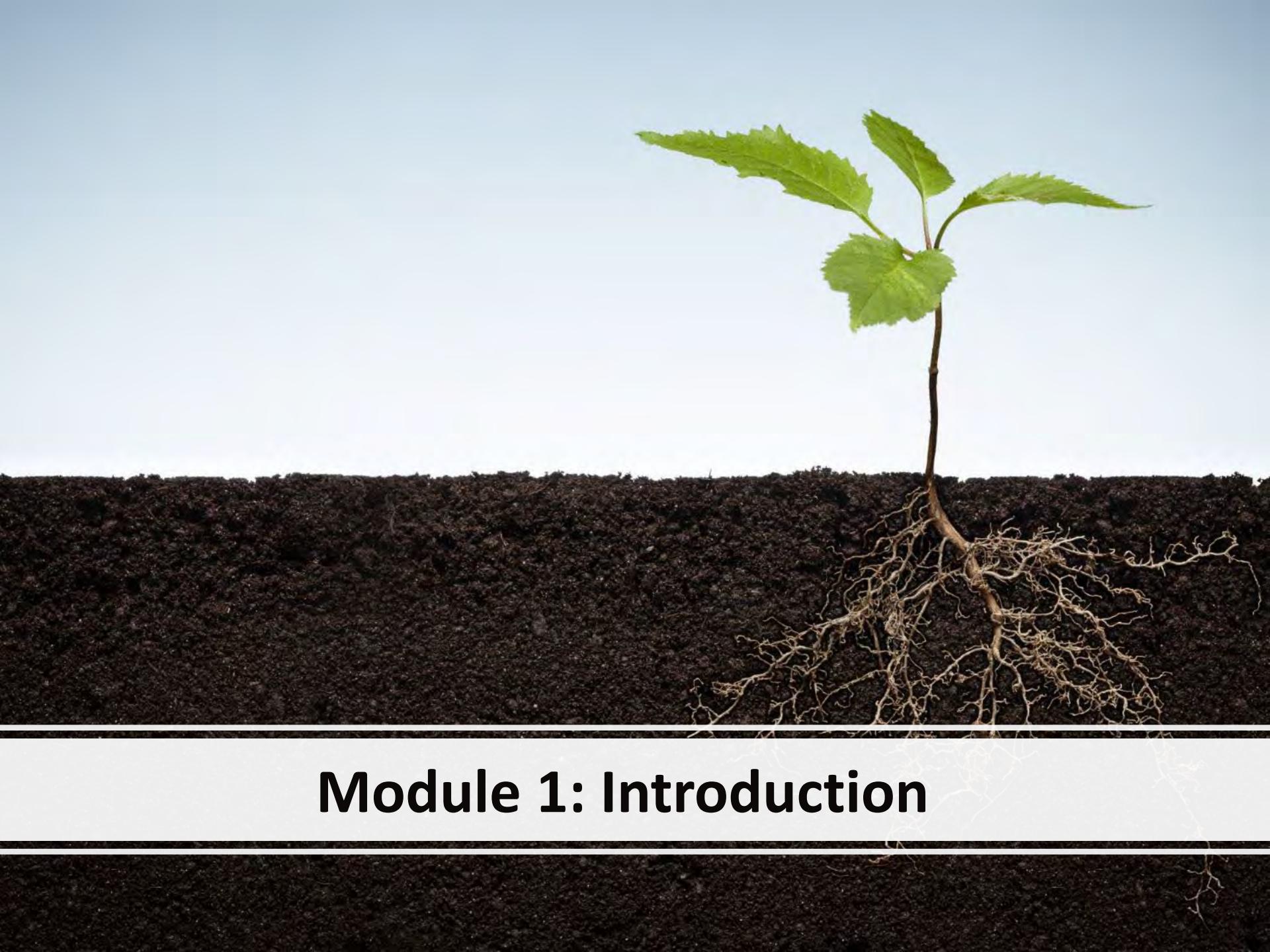




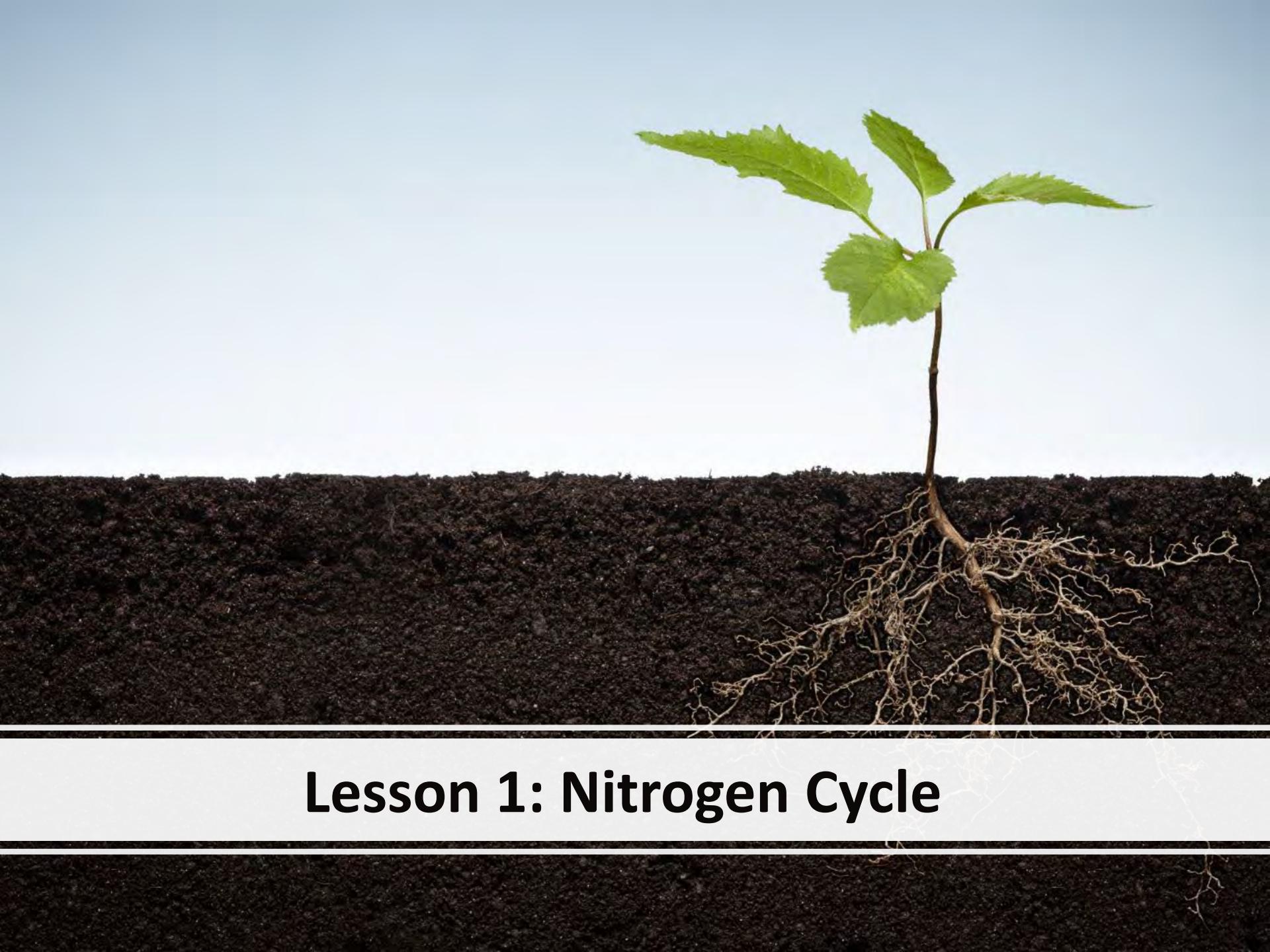
Questions before we begin?

Jodi@farmbureauvc.com
(805) 289-0155
www.farmbureauvc.com





Module 1: Introduction



Lesson 1: Nitrogen Cycle

1.1 Learning Objectives

Identify forms of nitrogen found in an agricultural system.

Identify nitrogen transformation processes relevant to an agricultural system.

Recognize major loss pathways of nitrogen in an agricultural system.

Nitrogen Forms



Organic Nitrogen

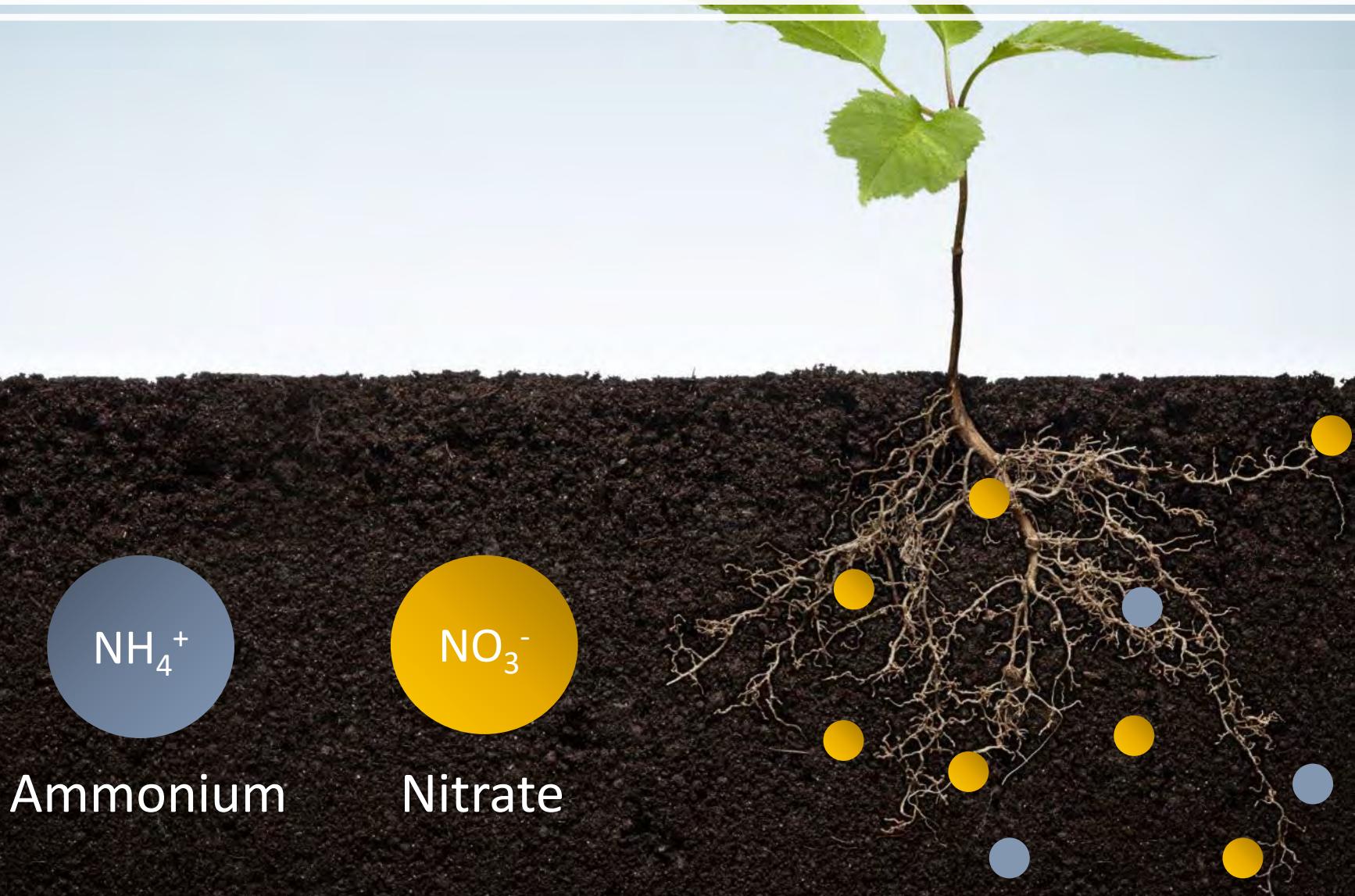
- Carbon and nitrogen molecules linked together
- Must be transformed



Inorganic Nitrogen

- Directly available: ammonium and nitrate
- Must be transformed: nitrogen gas

Crop Available Nitrogen

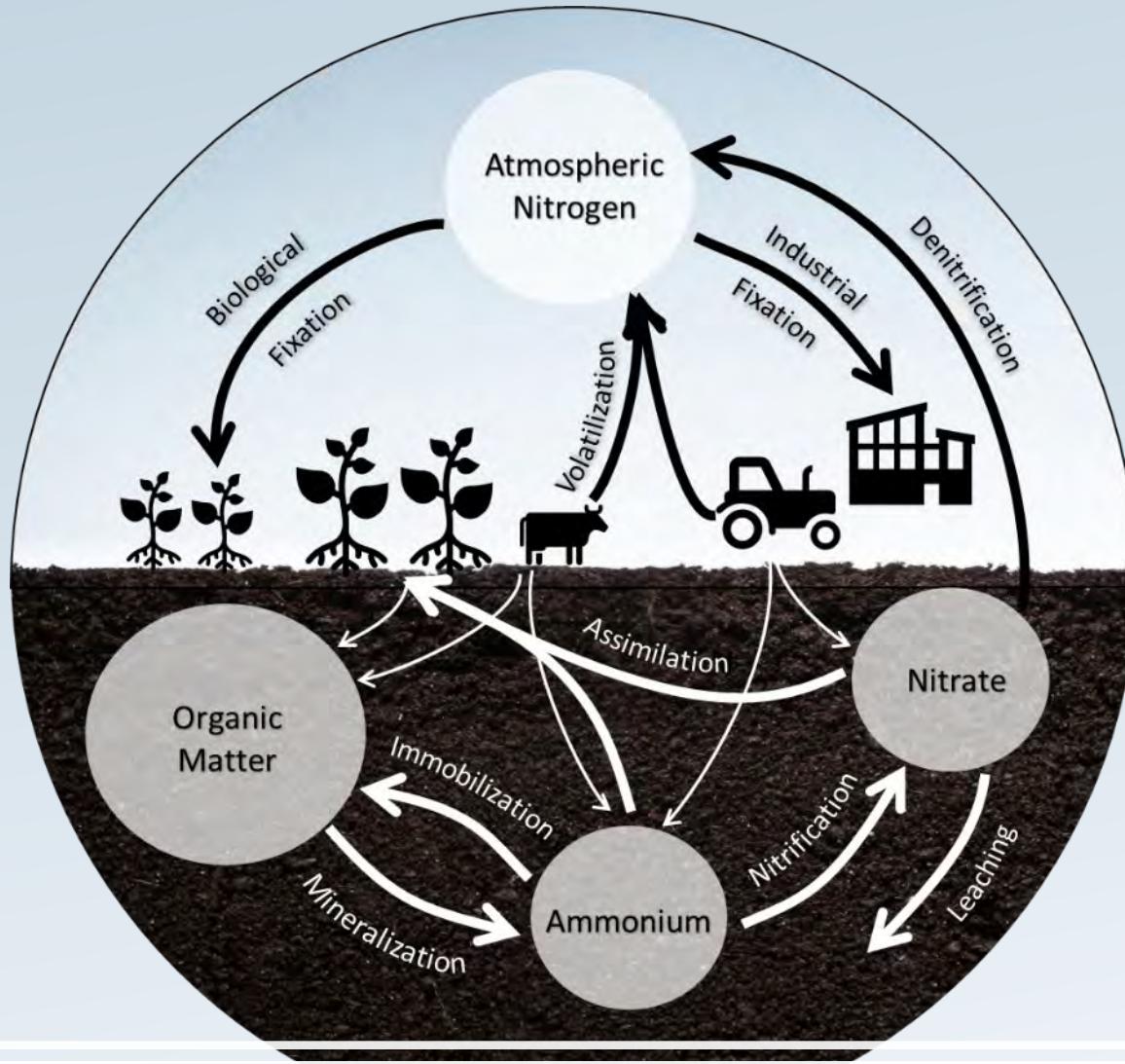


 Quiz

Activity 1.1.1

Determine whether each source is considered inorganic or mostly organic

| Nitrogen Source | Inorganic or Organic? |
|-------------------------------------|-----------------------|
| Urea ($\text{CO}(\text{NH}_2)_2$) | Organic |
| Calcium nitrate | Inorganic |
| Crop residues | Organic |
| Compost | Organic |
| Ammonium sulfate | Inorganic |
| Urea ammonium nitrate | Organic |



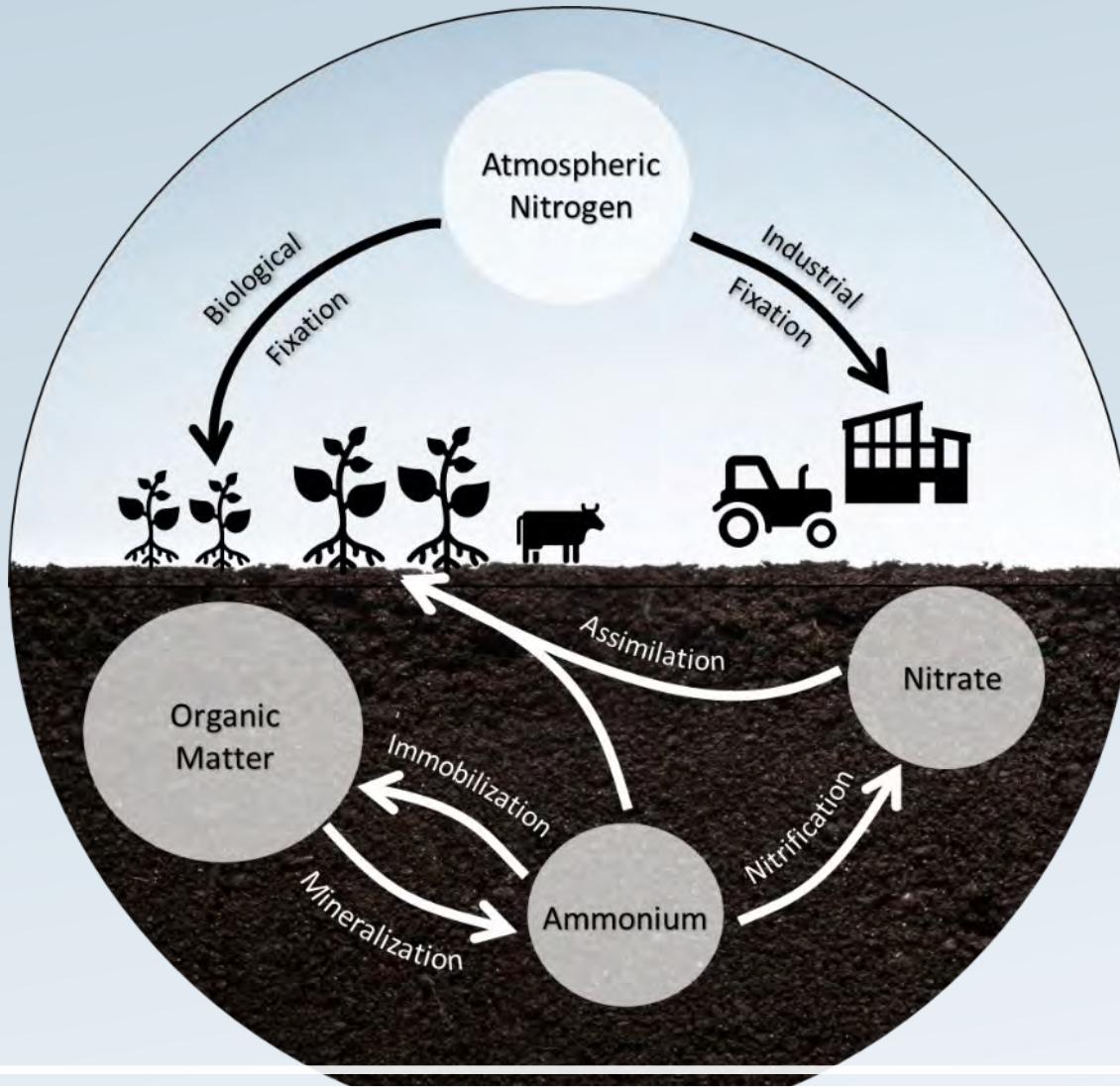
Nitrogen Cycle

 Quiz

Activity 1.1.2

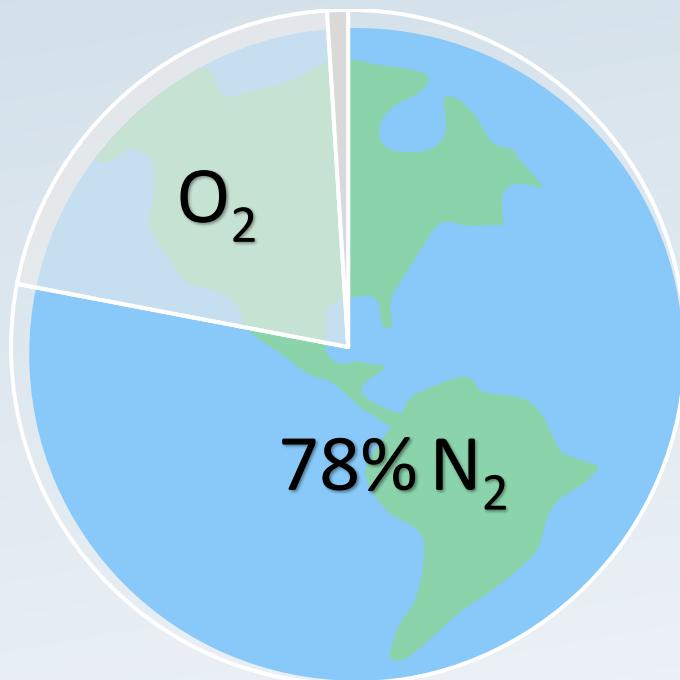
Match the environmental sphere with its description

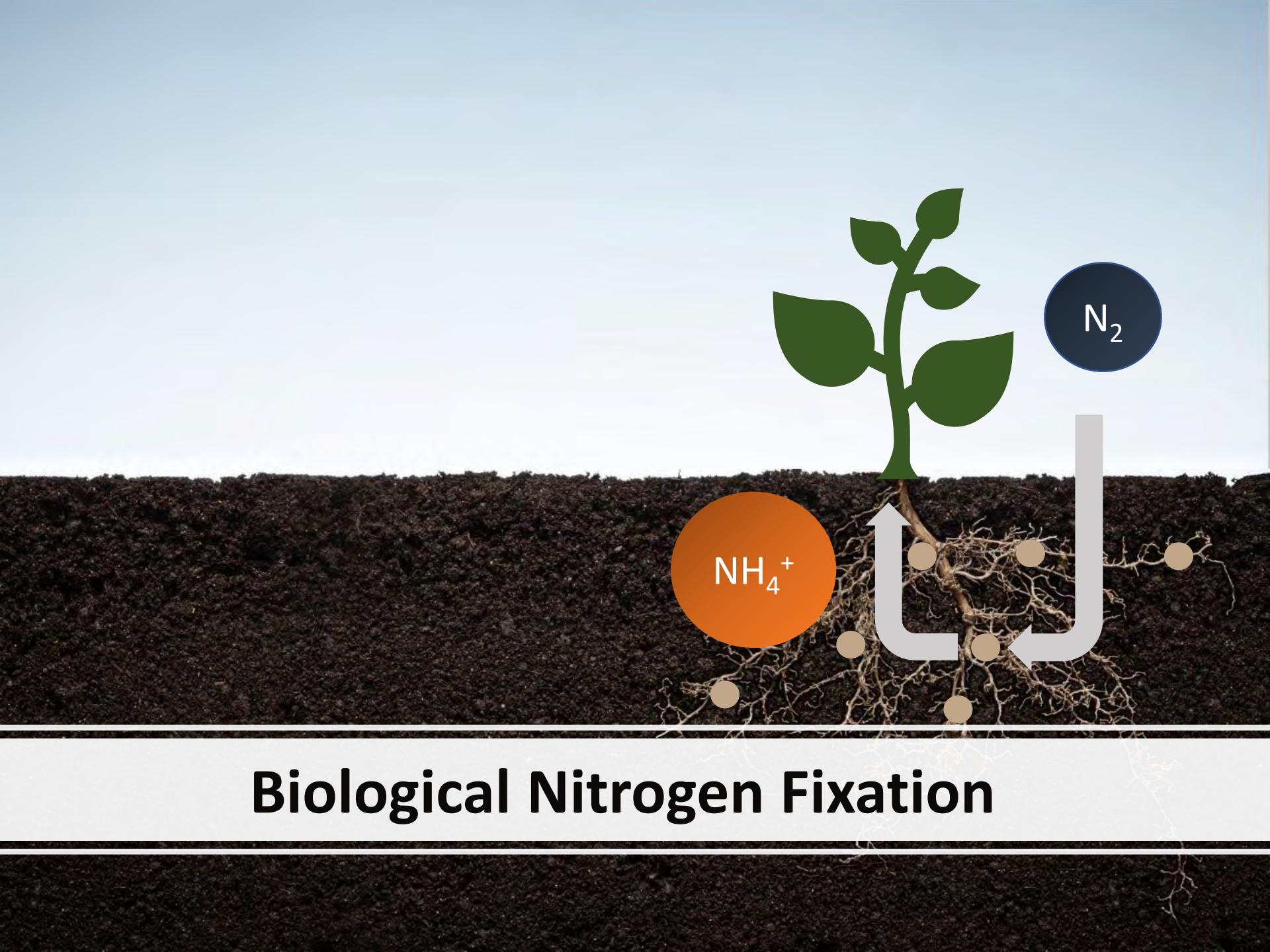
| Environmental Sphere | Description |
|----------------------|--|
| Lithosphere | All the soil and rocks contained in Earth's crust |
| Hydrosphere | All water including surface and groundwater |
| Biosphere | All living organisms including plants and microbes |
| Atmosphere | All the gases in the air surrounding Earth |



Nitrogen Transformations

Nitrogen in the Air

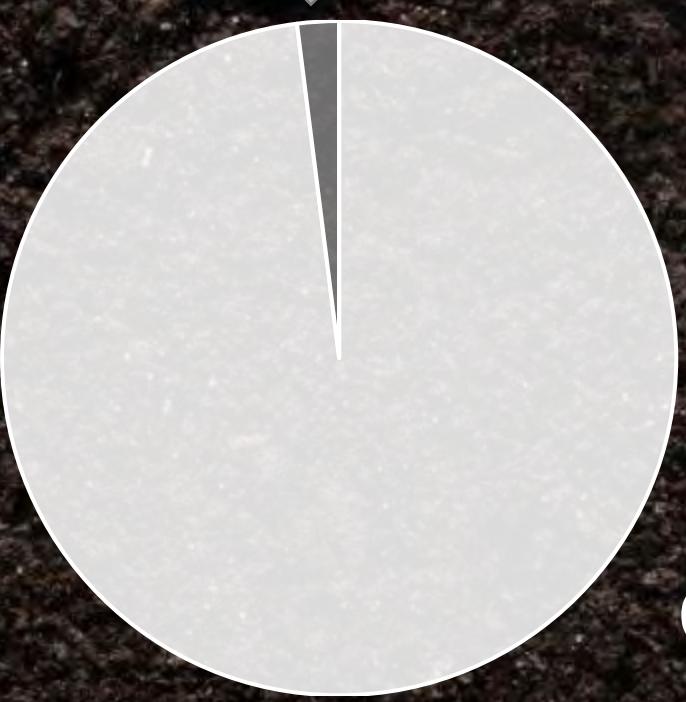




Biological Nitrogen Fixation



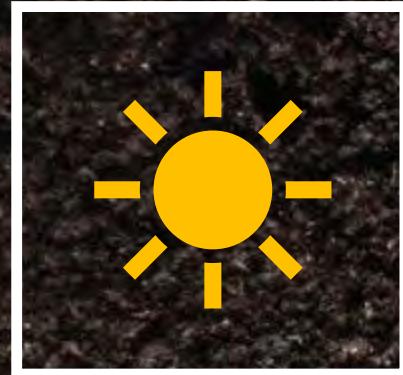
Industrial Nitrogen Fixation



Inorganic N

Organic N

Nitrogen in the Soil



Soil Microbes



C:N Ratio

Soil Organic Matter

C:N < 20:1



Nitrogen Mineralization

C:N > 35:1



Nitrogen Immobilization



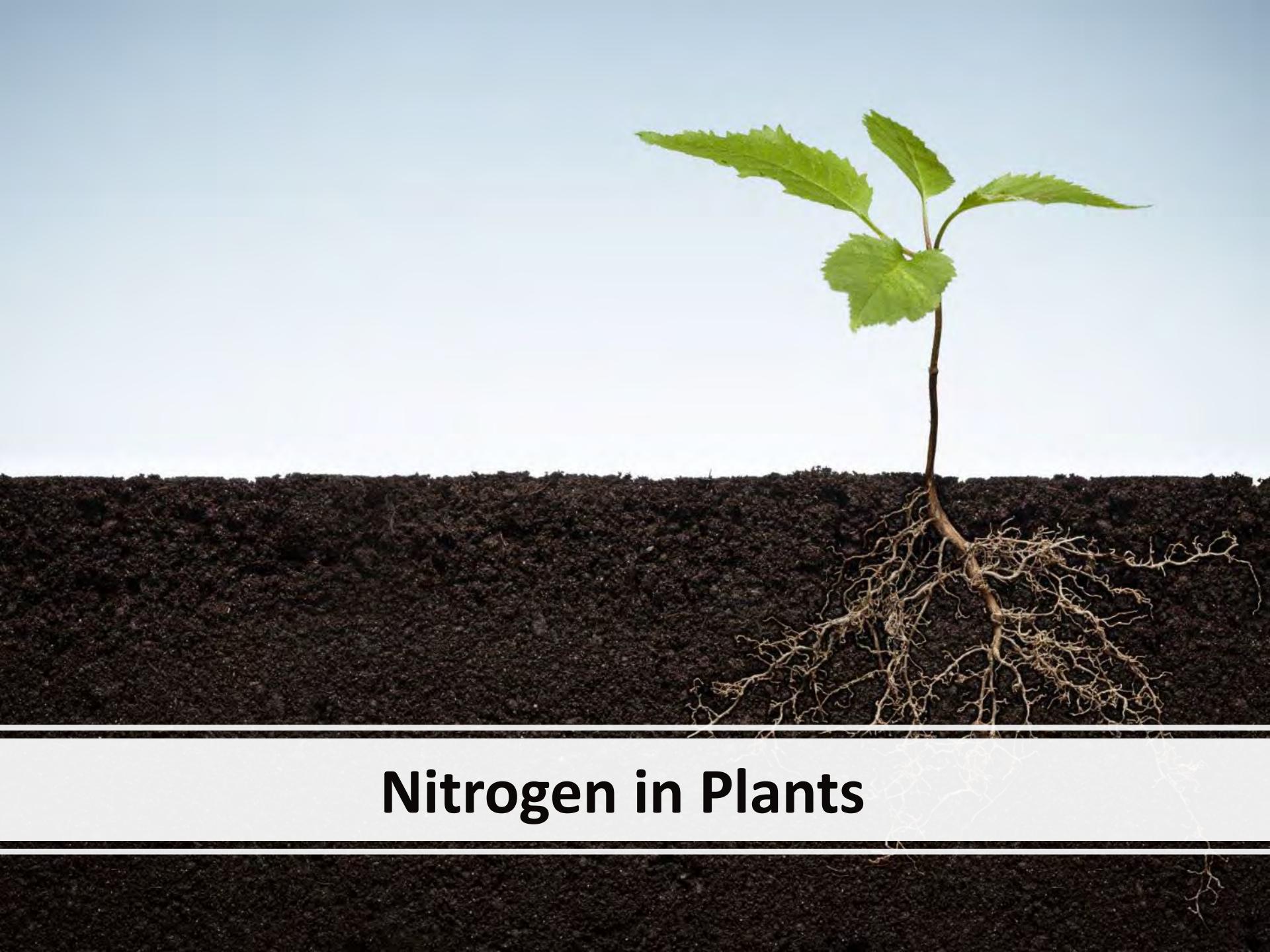
Nitrification

 Quiz

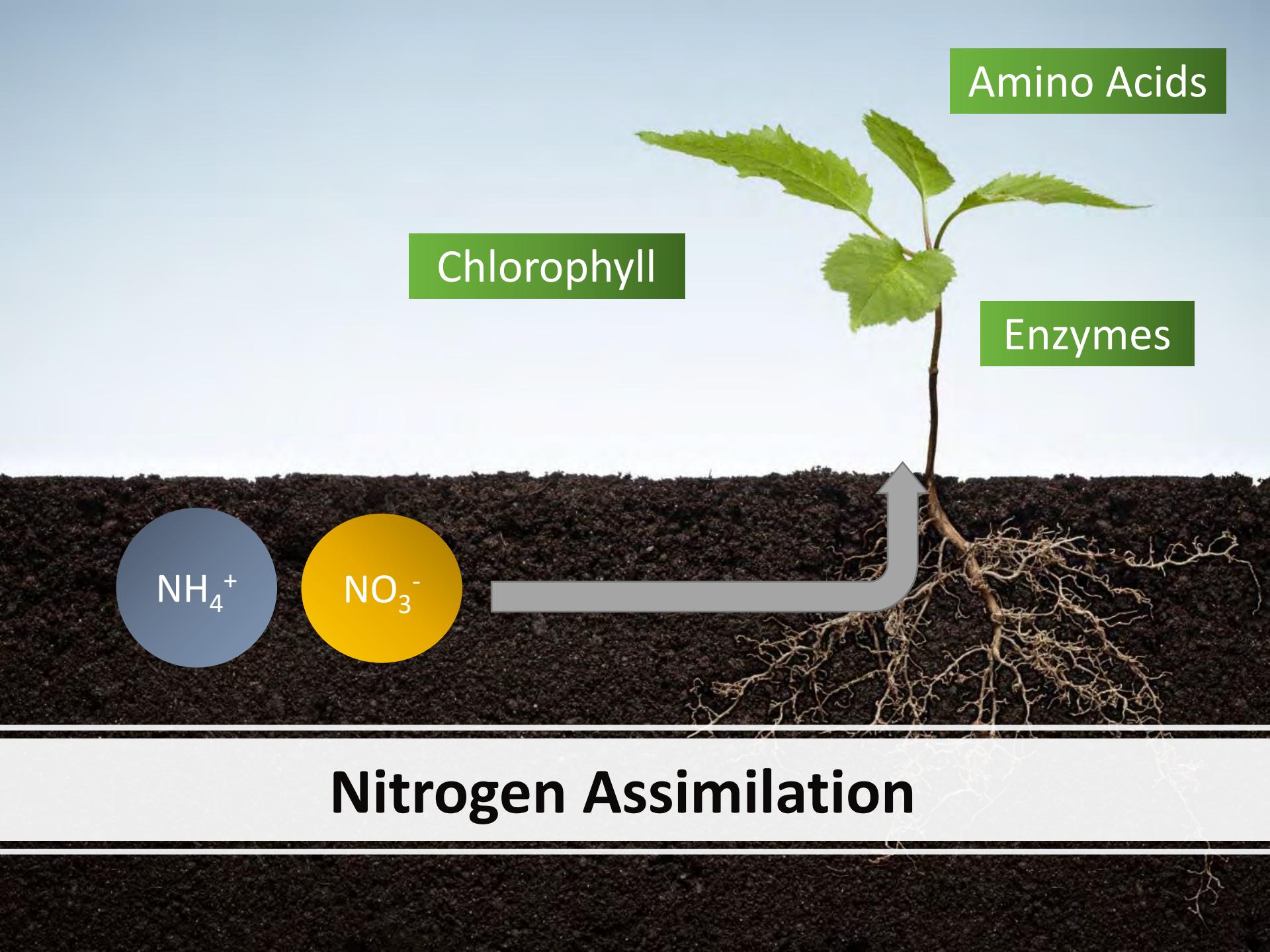
Activity 1.1.3

Determine whether nitrogen will likely be mineralized or immobilized

| Organic Material | C:N Ratio | Nitrogen Mineralized or Immobilized? |
|-------------------------|-----------|--------------------------------------|
| Poultry Manure | 6:1 – 8:1 | Mineralized |
| Wheat Straw | 80:1 | Immobilized |
| Hairy Vetch Cover Crop | 11:1 | Mineralized |
| Corn Stover | 57:1 | Immobilized |
| Blood & Feather Meal | 3:1 – 4:1 | Mineralized |
| Vegetable Crop Residues | <15:1 | Mineralized |



Nitrogen in Plants



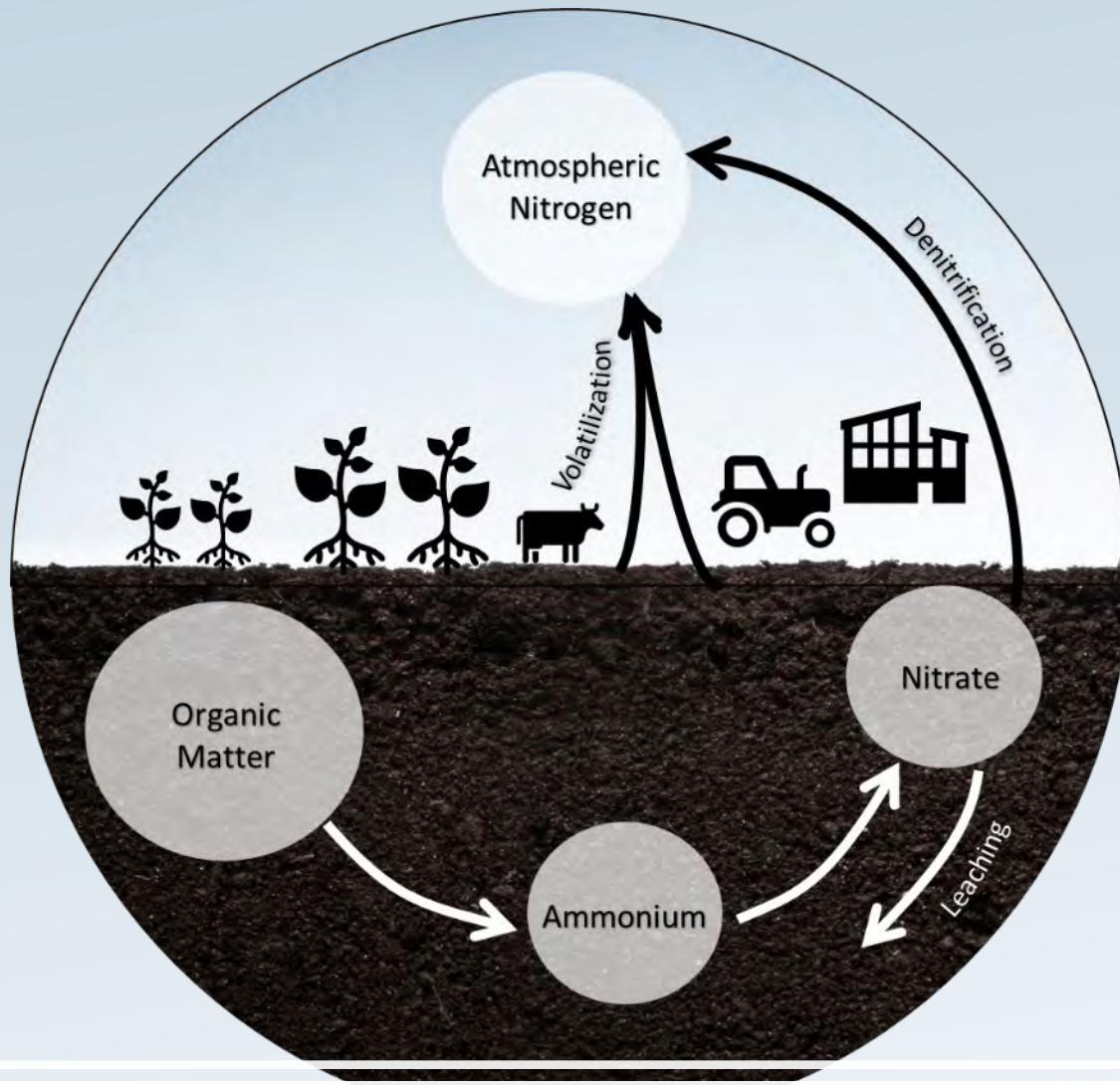
Amino Acids

Chlorophyll

Enzymes



Nitrogen Assimilation

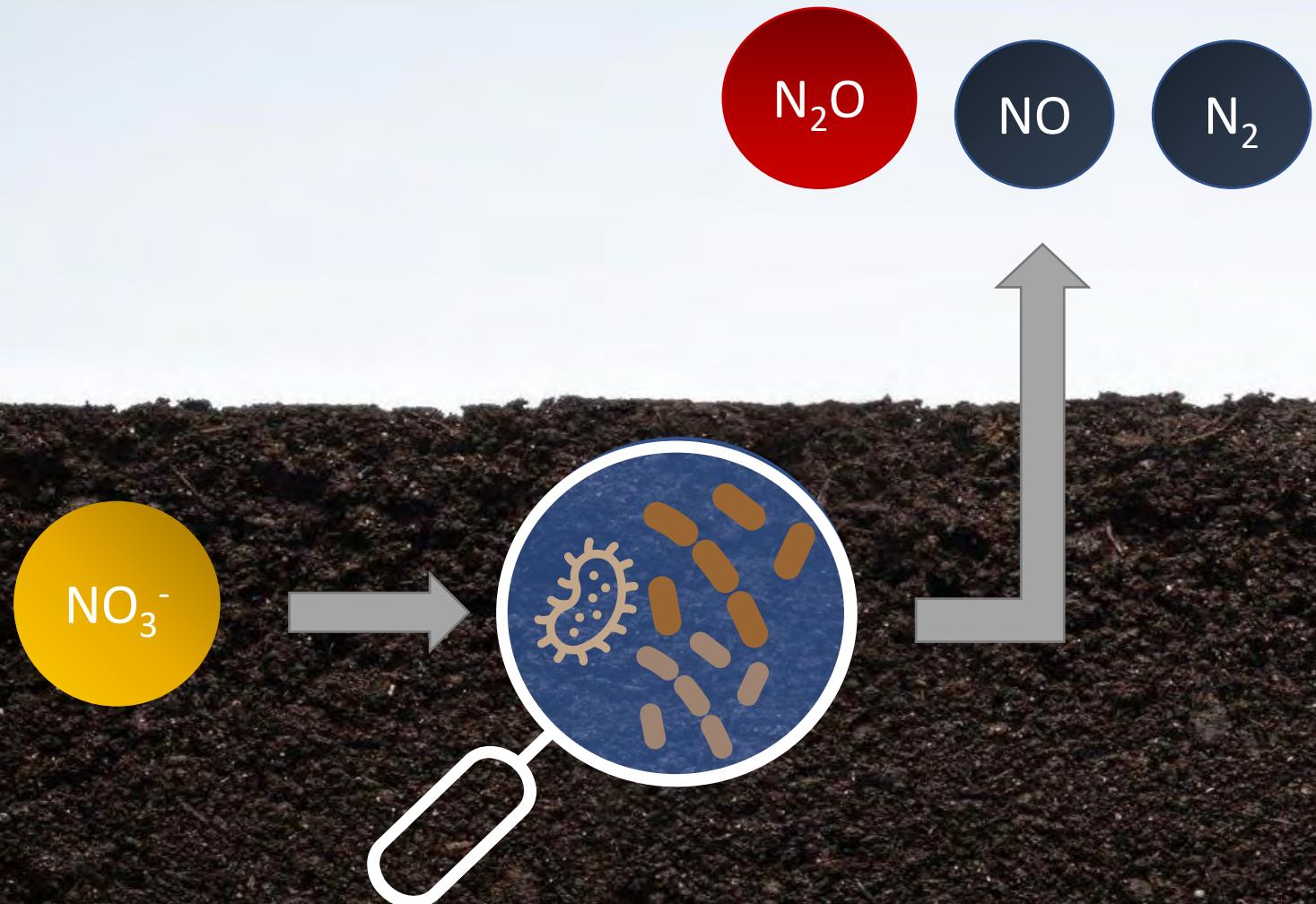


Nitrogen Losses

Nitrate Leaching



Denitrification





Volatilization

1.1 Key Points for Growers

The soil contains inorganic and organic N. However, crops mainly take up inorganic N as nitrate and ammonium.

Nitrogen goes through transformations including fixation, mineralization, immobilization, nitrification, and assimilation.

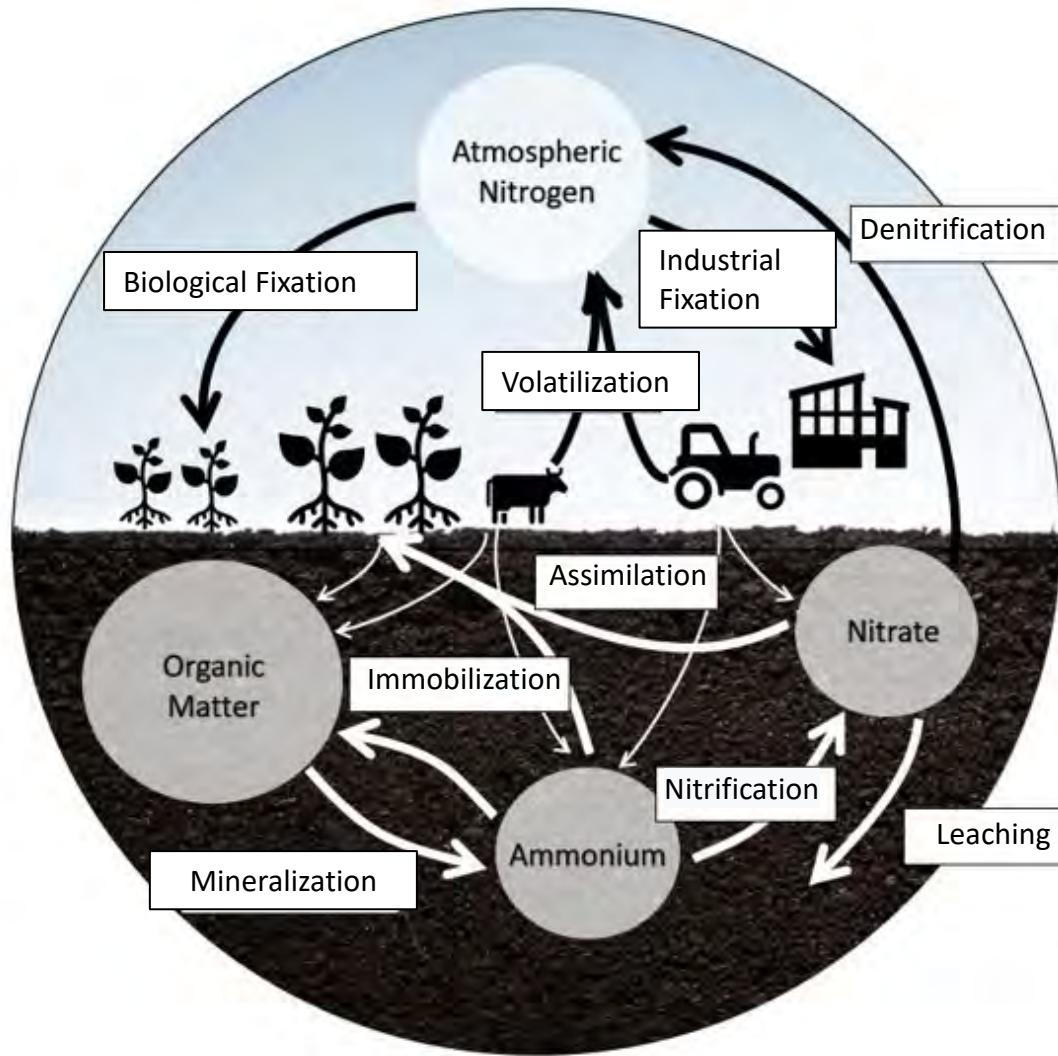
Excess nitrogen in the soil is susceptible to loss through leaching, denitrification, and/or volatilization.



Quiz

Label the missing components in the nitrogen cycle diagram

Activity 1.1.4





Lesson 2: Nitrogen Contamination

1.2 Learning Objectives

Identify impacts of nitrogen loss on the environment and human health.

Distinguish between nitrate measurements in drinking water reported as nitrate-N and nitrate.

Excess Nitrogen Impacts

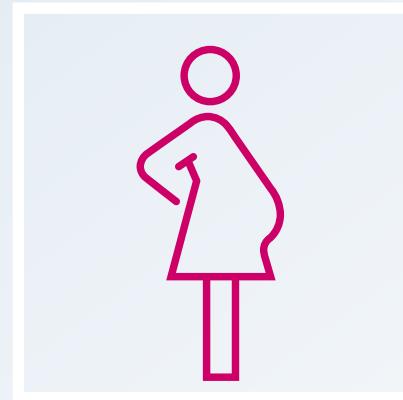
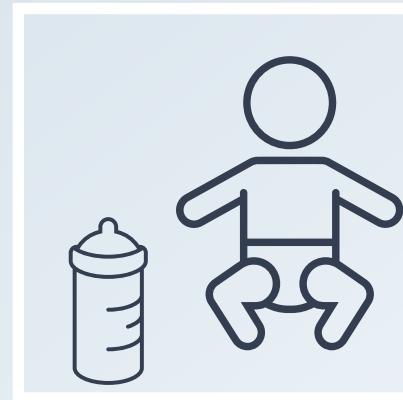


Atmosphere

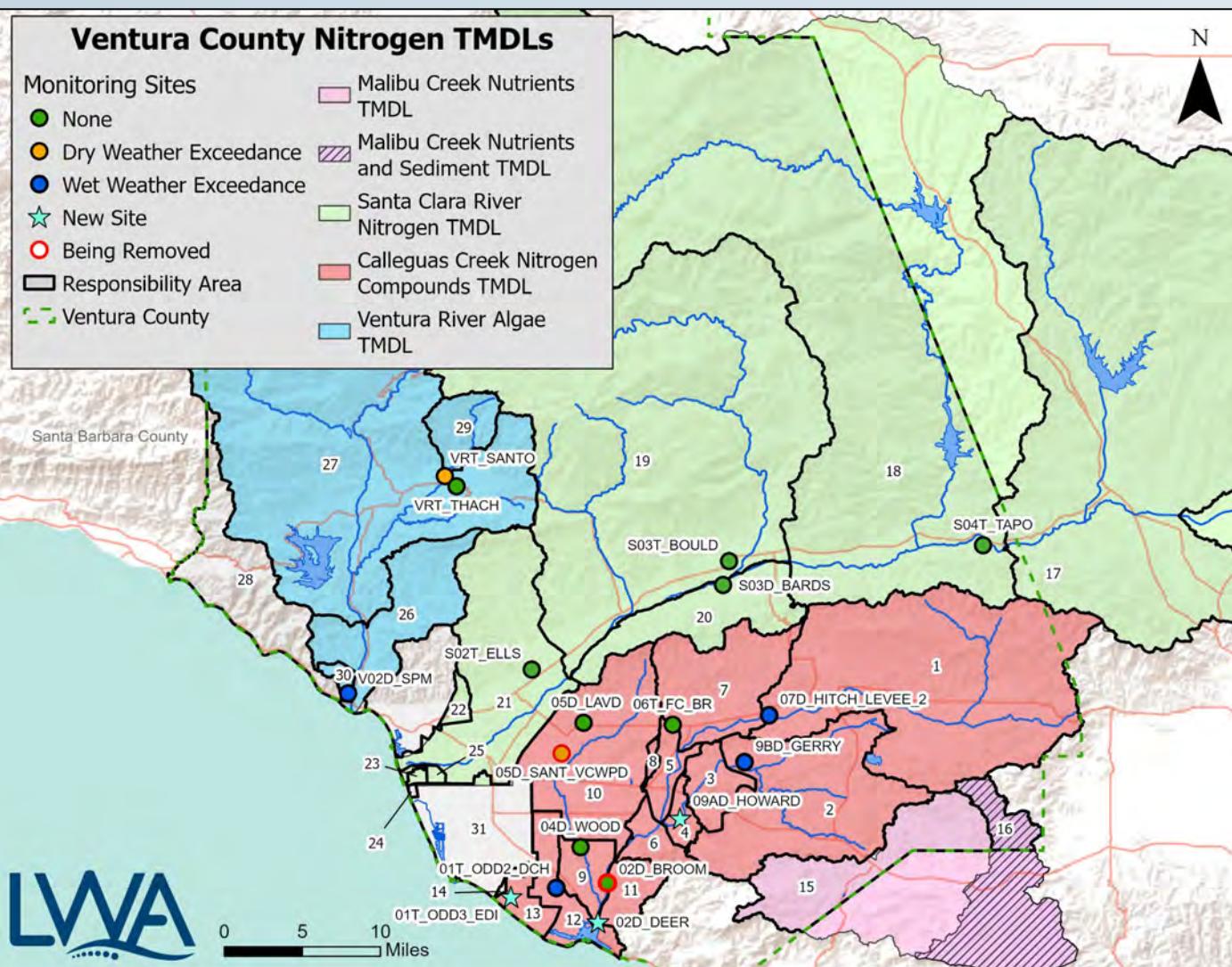


Drinking Water

Nitrate in Drinking Water



Nitrate in Surface Water



Ventura River Algae TMDL

- Compliance date: June 28, 2019
- Load Allocation (LA) for: Nitrate-N + Nitrite-N (Wet Weather) and Total N and P (Dry Weather)

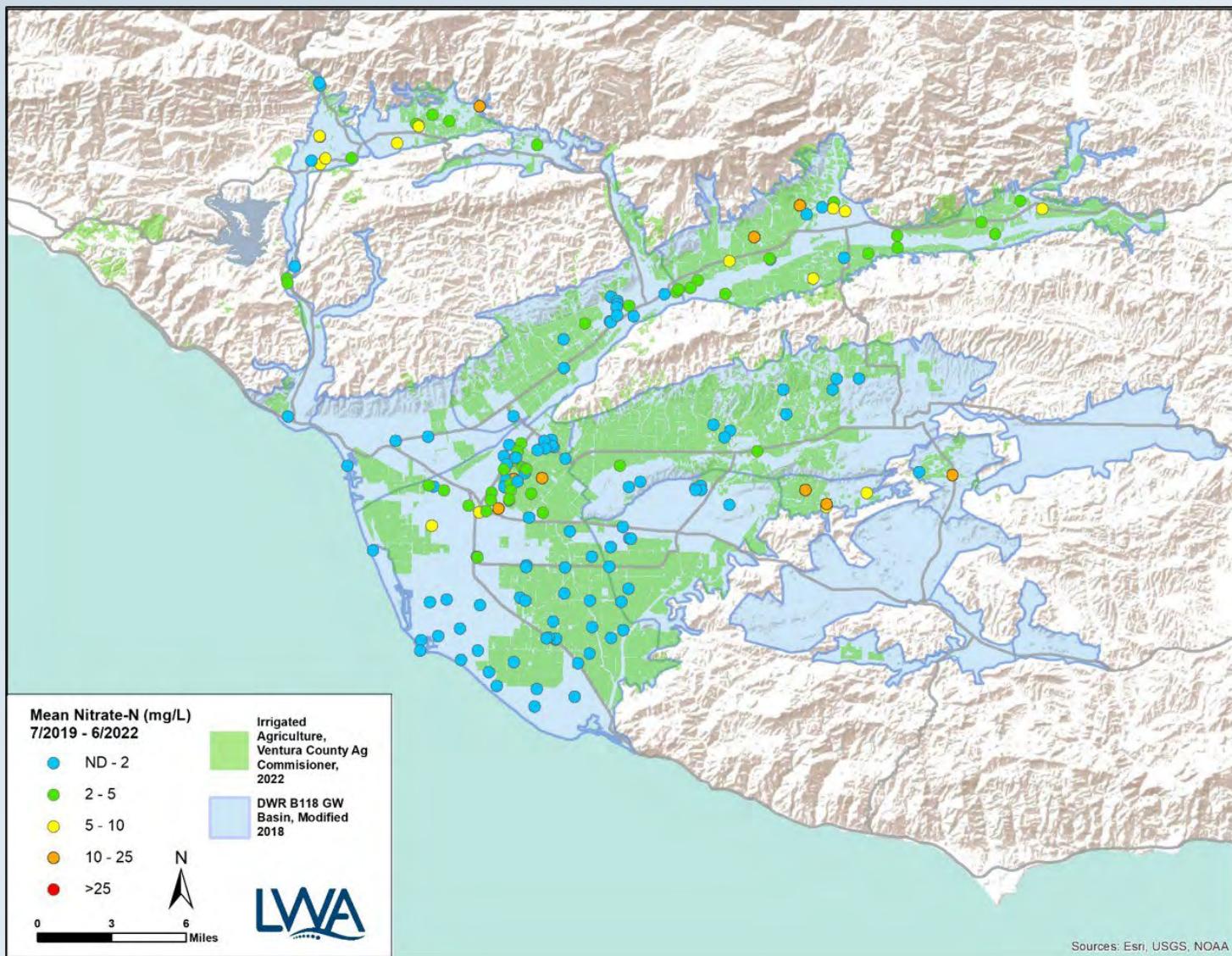
Santa Clara River Nitrogen TMDL

- Compliance date: March 23, 2004
- LA for: Ammonia-N + Nitrate-N + Nitrite-N (10 mg/L)

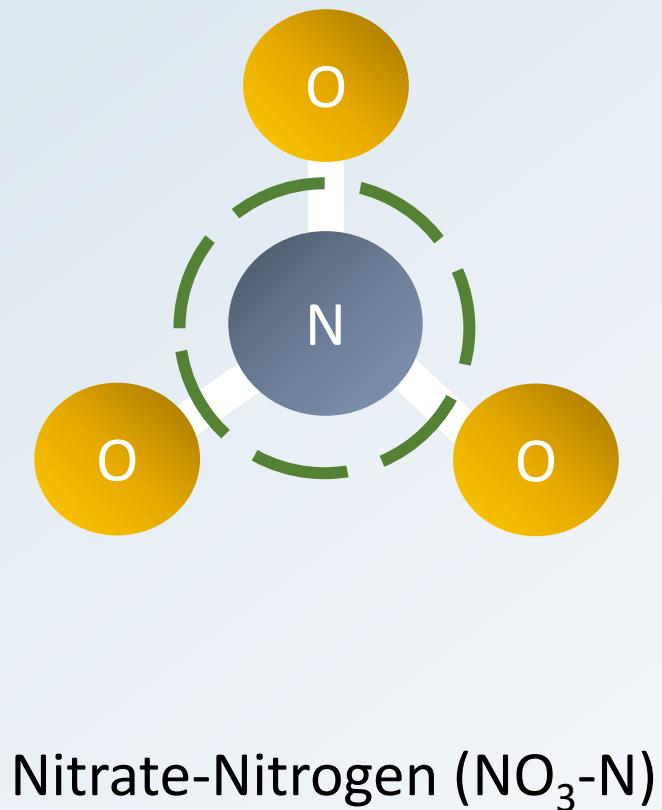
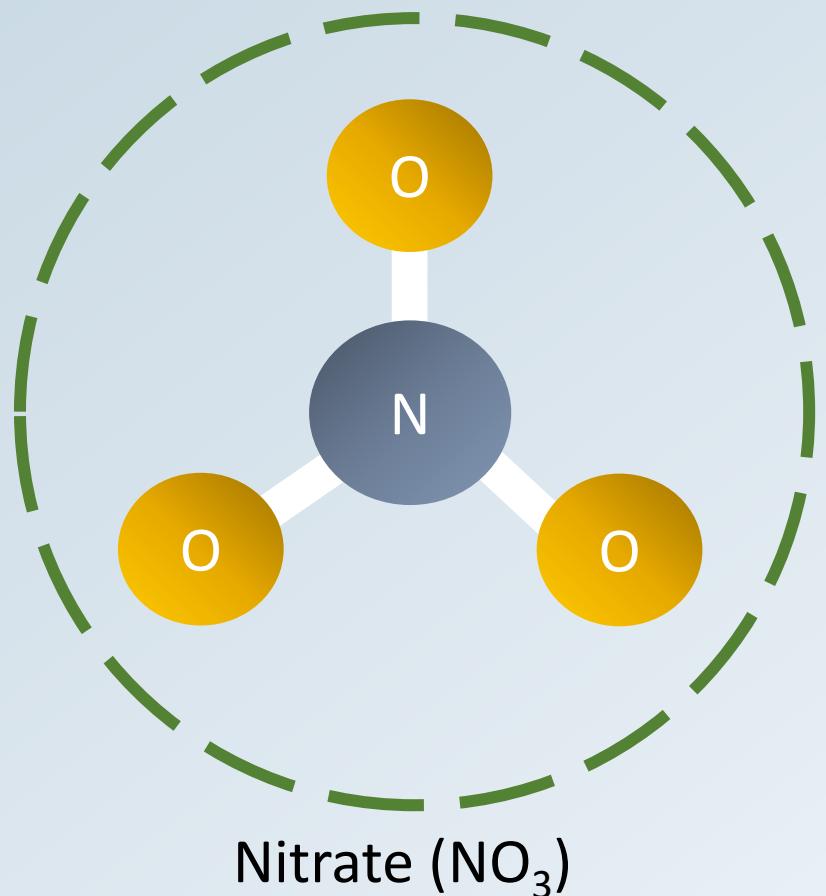
Calleguas Creek Watershed Nitrogen TMDL

- Compliance date: July 16, 2010
- Load Allocation (LA) for: Nitrate-N + Nitrite-N (9 mg/L)

Nitrate in Groundwater



Measuring Nitrate in Drinking Water



Maximum Contaminant Level

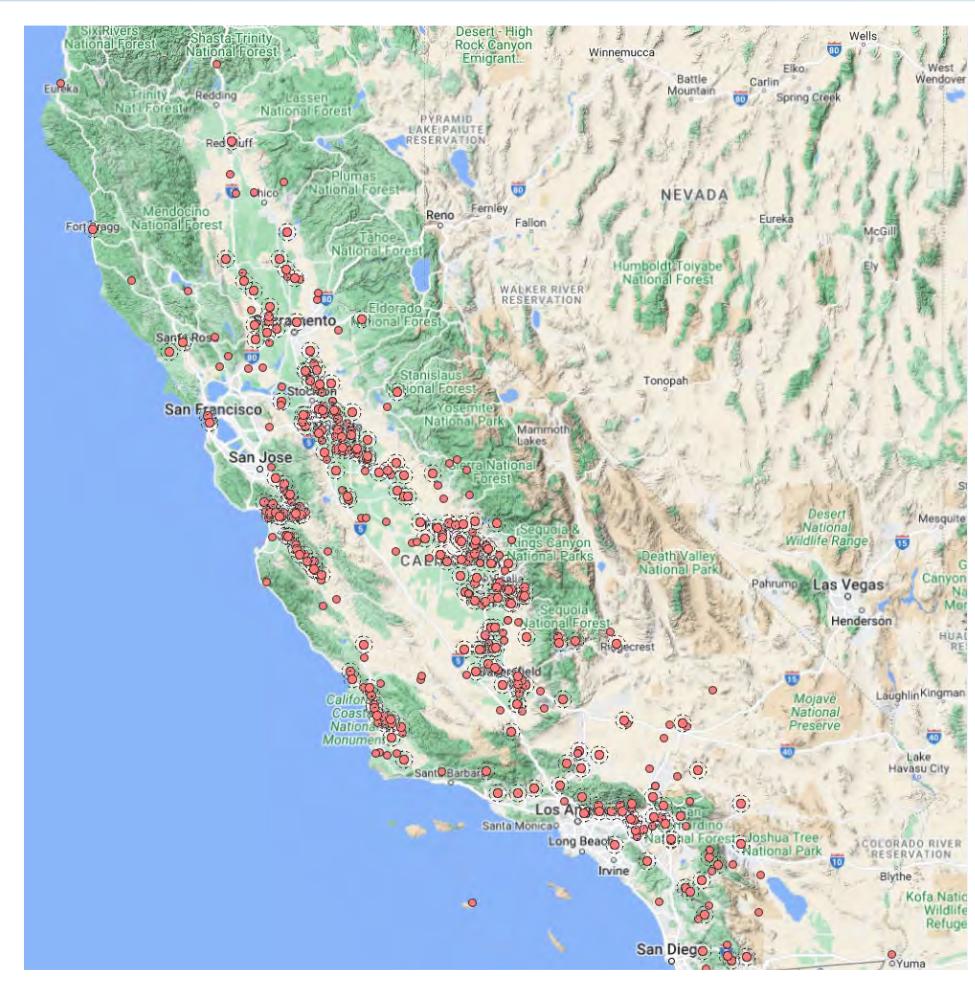


United States
Environmental Protection
Agency

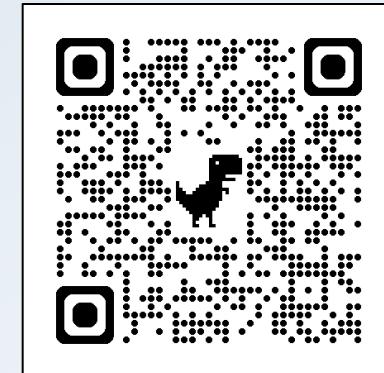


MCL = 10 ppm Nitrate-N or 45 ppm Nitrate

Nitrate Contaminated Drinking Water



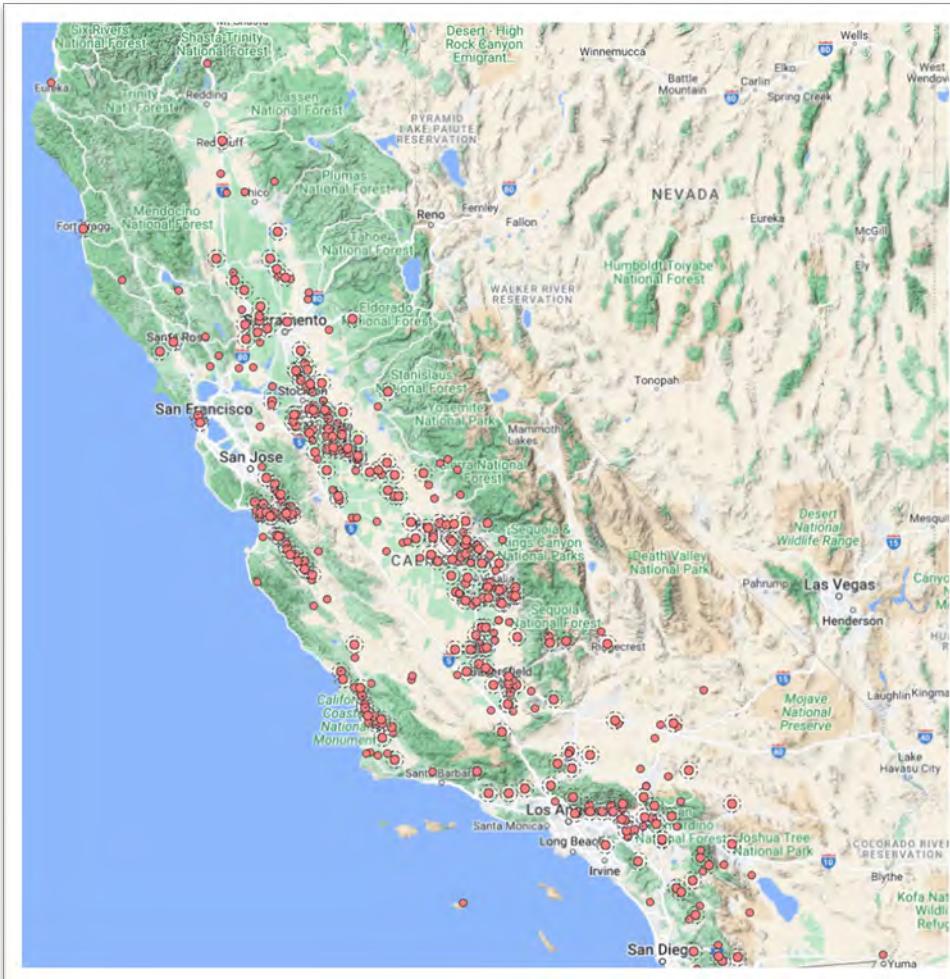
[https://gamagroundwater.
waterboards.ca.gov/gama/
gamamap/public/](https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/)



Interactive Map



Activity 1.2.1



Is there a nitrate-impacted well near your property?
[https://gamagroundwater.waterboards.ca.gov/
gama/gamamap/public/](https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/)

1.2 Key Points for Growers

Overapplying nitrogen can harm the atmosphere, drinking water sources, and a grower's profit.

Nitrate in drinking water can be dangerous for infants, pregnant women, and livestock.

Nitrate measured in drinking water can be reported as nitrate or nitrate-nitrogen.



Lesson 3: INMP Requirements and Deadlines

1.3 Learning Objectives

Summarize the goals of the INMP Worksheet and INMR.

Recall and be able to locate deadlines by which INMP Worksheets must be developed, and INMR submitted.

INMP Worksheet

| IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP) | | |
|--|--------------------------|---------------------------------------|
| Grower VCAILG ID: _____ MU Name: _____ Crop: _____ Total Acres: _____ | | |
| SECTION 1: PRE-SEASON PLANNING | | |
| Irrigation Management | | Harvest Projection |
| 1. Crop Evapotranspiration (ET _c , inches) | | 4. Production Unit* (lbs, tons, etc.) |
| 2. Anticipated Crop Irrigation (inches) | | 5. Projected Harvest Yield |
| 3. Irrigation Water N Concentration (ppm or mg/l, as NO ₃ -N) | | |
| SECTION 2: NITROGEN MANAGEMENT | | |
| | | Recommended/Planned N (A) |
| Applied Nitrogen Fertilizers | | Actual N (B)* |
| 7. Dry/Liquid Fertilizer N* (lbs/ac) | | |
| 8. Foliar Fertilizer N* (lbs/ac) | | |
| Applied Organic Material N | | |
| 9. Organic Amendments* (Manure/Compost/Other, lbs/ac estimate) | | |
| Applied Irrigation N | | |
| 10. N in Irrigation Water* (lbs/ac) | | |
| Nitrogen Credits | | |
| 11. Soil – Available N in Root Zone (lbs/ac) | | |
| Total Nitrogen Recommended/Applied | | |
| 12. TOTAL NITROGEN (lbs/ac) | Sum of boxes 7+8+9+10+11 | Sum of boxes 7+8+9+10 |
| SECTION 3: HARVEST YIELD | | |
| 13. Harvest Yield* ((lbs./ton/etc.)/ac) | Same as box 5 | |

*(Bold Text) Actuals to be reported to VCAILG on the INMR.

Plan Certifier Initials

Increase Efficiency

Kept On-Farm

Certification Required

INMR



Report Nitrogen Applied and Yield

Submitted to VCAILG Annually

Certification Exemptions



Total farming operation
acreage less than 10 acres

Alternative Reporting



Growers that (1) operate in areas with evidence of no or very limited nitrogen impacts to surface water or groundwater, (2) have minimal nitrogen inputs, and (3) have difficulty measuring yield



Diversified socially disadvantaged growers, as defined by the Farmer Equity Act of 2017, with (1) a maximum total acreage of 45 acres, (2) gross annual sales of less than \$350,000, and (3) a crop diversity greater than 0.5 crops per acre (one crop for every two acres).

Growers with (1) a maximum total acreage of 20 acres, and (2) a crop diversity greater than 0.5 crops per acre (one crop for every two acres).

Certification Exemptions and Alternative Reporting

The logo for Ventura County Agricultural Irrigated Lands Group. It features a stylized green mountain or hill shape above the text "VENTURA COUNTY" and "Agricultural Irrigated Lands Group".

IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP)

Member Information

Grower Name: _____ Grower VCAILG ID #: _____

Management Unit Information

Management Unit ID*: _____ Crop Year (Harvested): _____

Crop Type*: _____ Crop Age (Perennial only)*: _____

Was this Management Area identified as a statistical outlier by the Coalition last year?

Yes No

Does the Member meet the alternative reporting qualifications for "A" only reporting? *
Refer to "A" Only Reporting Qualifications listed in INMP Worksheet Instructions.

Yes No

Does the Member's total farming operation consist of ≤10 acres? *
If yes, INMP certification is not required unless previously identified as an outlier.

Yes No

Parcel Management

| APN* | Operator Field/Block Name | Irrigated Acres* |
|--------------|---------------------------|------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Total Acres: | | |

Comments/Notes:

*(Bold Text) Actuals to be reported to VCAILG on the INMR

INMP Worksheet
Version 3 (November 11, 2024)

Page 1 of 4

INMP Deadlines

Deadline to develop initial INMP

March 1, 2025

annually thereafter

Perennial Crops



Annual Crops



- Develop INMP for the **calendar year**
 - Update annually by March 1st.
- 1st INMP(s) should cover 2025 calendar year.
- Develop INMP for **each crop that will be established in that year**:
 - By March 1, develop INMP for crops anticipated to be planted.
 - If uncertain, develop INMP before planting each crop.
- 1st INMP(s) should cover crops established between March 1 – December 31, 2025

INMR Deadlines

Deadline to submit initial INMR

March 1, 2026

annually thereafter

Perennial Crops



Annual Crops



- Covers: **Previous calendar year** (Jan - Dec)
- 1st INMR will cover calendar year 2025
- Covers all crops that completed harvest in previous calendar year.
- 1st INMR will cover crops established and harvested between March 1 and December 31, 2025.

1st Year Reporting

Which Management Units
do I include on my 1st INMR
(Due March 1, 2026)?

Was the crop
planted before
March 1, 2025?

Yes

Exempt
(no INMP or INMR)

No

Was it harvested
before Dec 31, 2025?

Yes

Include Management
Unit on March 1, 2026
INMR

No

Include Management Unit
on March 1, 2027 INMR

(Note: you will still submit
an INMR in 2026 that
states “no completed crop
cycle to report”)

1st Year Reporting - Avocado



By March 1, 2025

- Develop INMP for 2025 calendar year

By March 1, 2026

- Develop INMP for 2026 calendar year
- Submit INMR for 2025 calendar year

By March 1, 2027

- Develop INMP for 2027 calendar year
- Submit INMR for 2026 calendar year

1st Year Reporting - Strawberries



By March 1, 2025

- Develop INMP for 2025 planting(s)

By March 1, 2026

- Develop INMP for 2026 planting(s)
- Submit INMR for 2025 stating no completed crop cycle

By March 1, 2027

- Develop INMP for 2027 planting(s)
- Submit INMR for crops harvested in 2026 (2025 planting)

1st Year Reporting - Cilantro

| 2025 | | | 2026 | | | 2027 | | |
|---------|----------|-----------|---------|----------|-----------|---------|----------|-----------|
| January | February | March | January | February | March | January | February | March |
| April | May | June | April | May | June | April | May | June |
| July | August | September | July | August | September | July | August | September |
| October | November | December | October | November | December | October | November | December |

1st INMP Due

2025 Planting →

**1st INMR Due
2nd INMP Due**

2026 Planting →

2027 Planting →

**2nd INMR Due
3rd INMP Due**



By March 1, 2025

- Develop INMP for 2025 planting(s)

By March 1, 2026

- Develop INMP for 2026 planting(s)
- Submit INMR for crop harvested in 2025

By March 1, 2027

- Develop INMP for 2027 planting(s)
- Submit INMR for crop harvested in 2026

INMR Submittal



Clearwater
By VCAI LG

Reporting access early 2026 – Due by March 1, 2026

Online

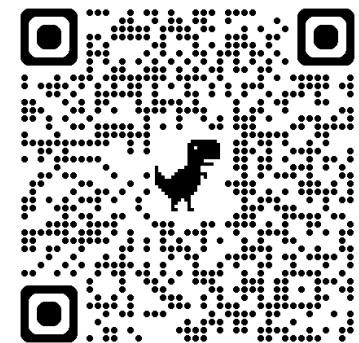
Office hours and call
support available
for those that need
assistance

Information from the INMP Worksheet/Spreadsheet that transfers to the
INMR is marked with an *

Waste Discharge Requirements

| Coalition Group | WDR Page #s |
|-----------------|--------------------------|
| VCAILG | Appendix 3, page 12 - 17 |
| LAILG | Appendix 2, page 11 - 15 |

https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/waivers_and_wdrs/index.html



1.3 Key Points for Growers

INMP Worksheets are kept on farm and are designed to help increase efficiency.

INMRs are submitted and are designed to monitor nitrogen applied and removed.

Certification exemptions, alternative reporting qualifications, and deadlines can be found in the Waste Discharge Requirements.

 Quiz

Activity 1.3.2

Directions: View the waste discharge requirements for the coalition(s) that you are a member of.

List one new thing that you learned from the waste discharge requirements.

All members must submit the first INMR to the Discharger Group by March 1, 2026, and annually thereafter.



Lesson 4: Statistical Outliers

1.4 Learning Objectives

Describe the general process under which a management unit may be identified as an outlier.

Summarize the purpose of outlier identification.

Recall additional requirements that may apply to growers with management units identified as outliers.

Step 1: Data Submitted



INMP Worksheet - Excel Version - Excel

Jodi Switzer

IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP)

VENTURA COUNTY Agricultural Irrigated Land Group

IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP)

Excel Version 7 (Nov 25, 2025)

| Grower Name*: | Grower VCAILG ID # *: | | | | | | | | |
|--|-----------------------|---------------------|---------------------|------------|--------------------------|-------------------------------|--|---|--|
| Ranch Management | | | | | | | | | |
| Ranch Name: | Ranch Notes: | | | | | | | | |
| APN(s) | Irrigated Acres | Total Ranch Acres: | | | | | | | |
| Management Unit (MU) Information | | | | | | | | | |
| List all MUs within the Ranch listed above | | | | | | | | | |
| MU Name* | Crop Type* | MU Irrigated Acres* | For Perennial Crops | | For Annual Crops | | Was this MU identified as a statistical outlier by the Coalition last year?* | Does the Grower meet the alternative reporting qualifications for "A" only reporting?* (Refer to "A" Only Reporting Qualifications listed in INMP Worksheet Instructions) | Does the Grower's total farming operation consist of 510 acres?* (If yes, INMP certification is not required unless previously identified as an outlier) |
| | | | Reporting Year | Crop Age * | Crop Establishment Date* | Crop Harvest Completion Date* | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| * Indicates an information field required to be reported to VCAILG on the Irrigation and Nutrient Management Report (INMR) | | | | | | | | | |

Step 2: A/R Ratio and A-R Difference Calculated

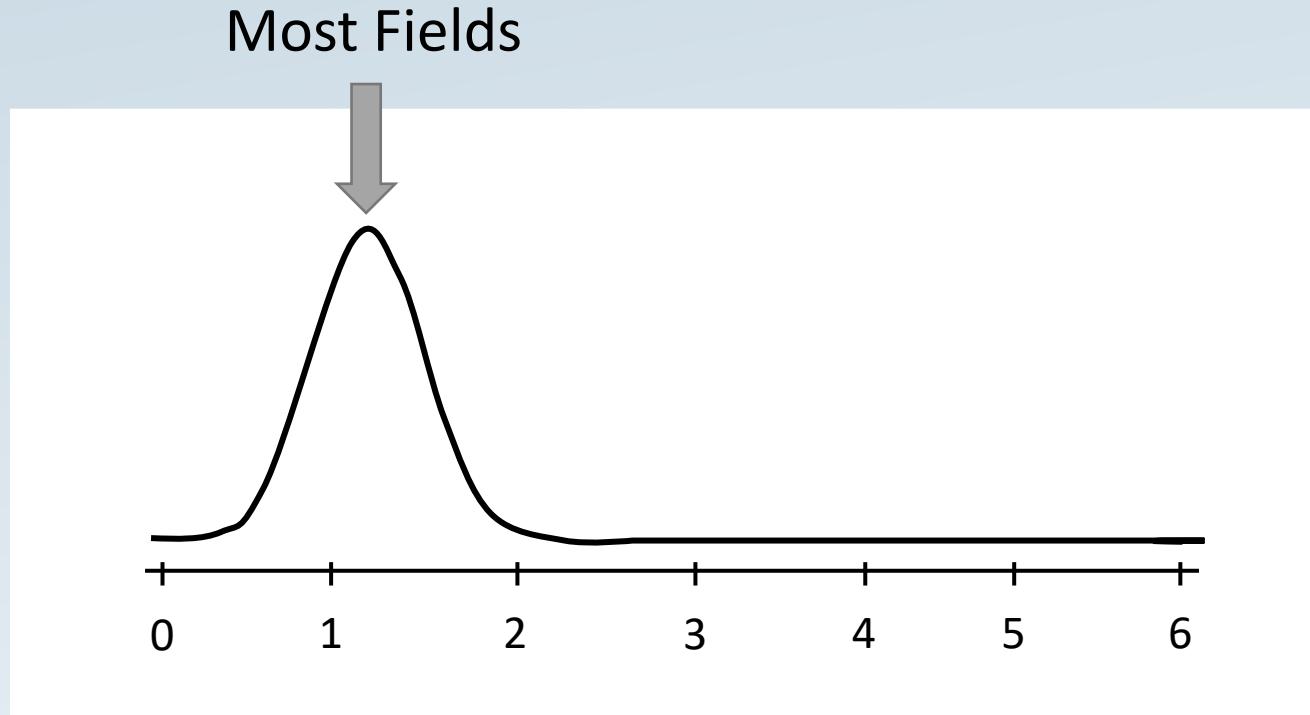
Applied (A)

- Fertilizer
- Organic Amendments
- Irrigation Water

Removed (R)

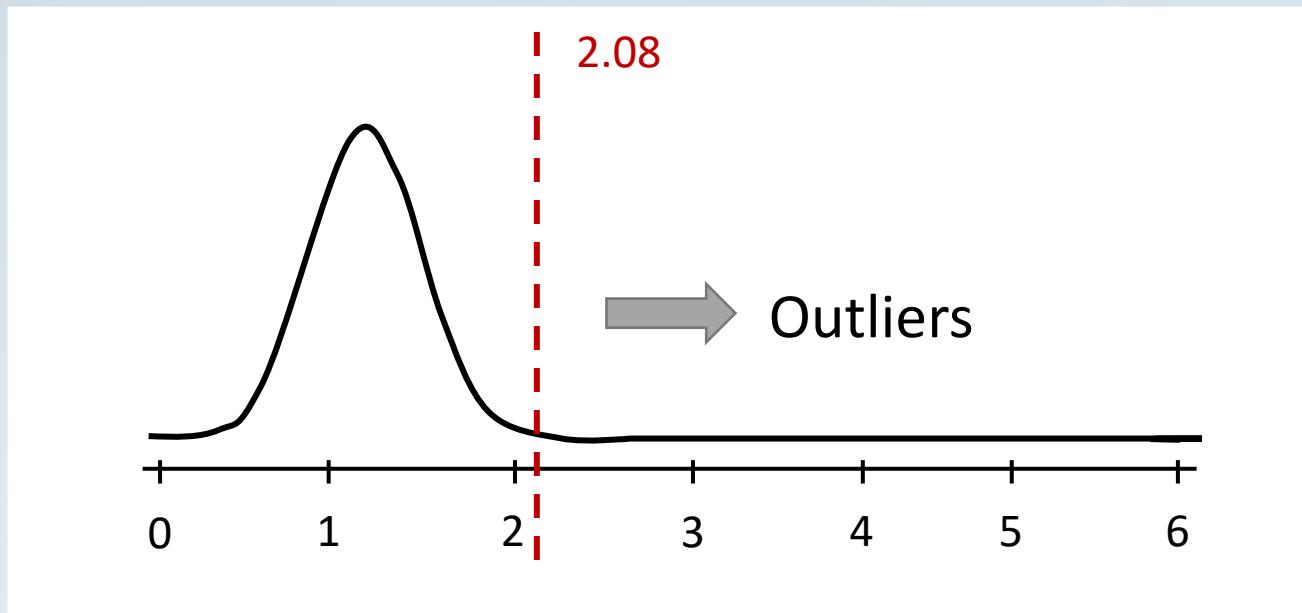
- Harvested Material
- Removal Coefficient

Step 3: Data Compared Across VCAILG



Distribution of A/R or A-R Values for Each Crop

Step 4: Outlier Threshold



A/R or A-R Values above the Threshold are Outliers

Reasons for High Values

Nitrogen Applications Greater than Crop Demand

Inefficient Application of Nitrogen or Irrigation Water

Reduced Yields or Crop Failure

Reporting Errors

Step 5: Notification

| Acala-Upland Cotton - Lint - All | | | | | | | |
|--|------------------------------------|-------------------------------|-------------------------------------|------------------------|-------------------------------|----------------|------|
| Field Information | Total N Applied (A) pounds/acre | Crop Yield (Y) pounds/acre | Nitrogen Removed (R) pounds/acre | 1 Year Percentile Rank | 1 Yr A/R Ratio 1 or 3 Year | 1 Yr A/R Stats | |
| | | | | | | | |
| Field 111 (99.3 ac.) Outlier | 180.10 | 1,540.00 | 95.50 | 81.60% 1.89 A/R | 1.89 1 Yr A/R | 0 | 1.31 |
| Field 5871 (152 ac.) | 180.00 | 2,000.00 | 124.00 | 7.90% 1.45 A/R | 1.45 1 Yr A/R | 0 | 1.31 |
| Field 5873 (75.8 ac.) | 181.00 | 1,890.00 | 117.20 | 44.70% 1.54 A/R | 1.54 1 Yr A/R | 0 | 1.31 |

Example: Kern River Watershed Coalition Authority

Purpose of Identifying Outliers

Early indicator that excess nitrogen is being applied

Helps growers implement improved practices

Outlier Requirements

Indicate “previously identified as outlier” on INMR

Attend nutrient-focused education meetings

Cannot claim INMP certification exemption (for those previously exempt due to operating <10 acres)

Others, as required by Regional Water Board

1.4 Key Points for Growers

Ensure the data you submit in your INMR is accurate.

If you have outlier fields, make sure you are aware of any additional requirements.



Quiz

Activity 1.4.1

Using the descriptions below, place the steps in the correct order.

| Step # (1-5) | Step Description |
|--------------|---|
| 5 | Notification |
| 3 | A/R or A-R values compared across coalition members for each crop |
| 1 | Data submitted to the Water Quality Coalition |
| 2 | A/R or A-R values calculated |
| 4 | Outlier threshold determined |



Module 2: Parcel Management



Lesson 1: Creating Ranches

2.1 Learning Objectives

Determine what fields and/or parcels can be combined to create a Ranch.



Ranch

A Ranch is a contiguous area of land operated by the same primary grower, and may include one or multiple parcels and one or multiple crops.



Same Primary Grower

Contiguous Land

Can Contain Multiple
Parcels

Can Contain Multiple
Crops

Parcel Management

| Ranch Management | |
|---------------------------------|-------------------------|
| Ranch Name*: | |
| APN(s)* (see note below) | Irrigated Acres* |
| | |
| | |
| | |
| | |
| | |
| Total Ranch Acres*: | |





Lesson 2: Assessor's Parcel Number

2.2 Learning Objectives

Define an APN

Recall how to locate an APN for a parcel

Outline the reporting process for when a management unit has multiple APNs

APN – Assessor's Parcel Number

| Ranch Management | |
|--|------------------|
| Ranch Name* : <u>Home Ranch</u> | |
| APN(s)* (see note below) | Irrigated Acres* |
| 220-0-455-205 | 22 |
| 220-0-455-215 | 7 |
| | |
| | |
| | |
| | |
| Total Ranch Acres: | 29 |



APN

Unique number assigned to a parcel of land by the county tax assessor

Used for record-keeping and to track land ownership

Where to Find Your APN

Tax Bill

Property Lease

County Assessor

SECURED TAX PAYMENT 2021-2022

Return Coupon with Payment
1ST INSTALLMENT

| ASSESSOR'S PARCEL NO. | STATEMENT NO. | MAIL CODE |
|-----------------------|---------------|-----------|
| 123-0-456-789 | 1234567 | 0225 |

AMOUNT DUE \$3,398.51
DU^E BY NOVEMBER 1, 2021

TAX PLUS PENALTY \$3,738.36
IF PAID AFTER DECEMBER 10, 2021

Make check payable to:
VC TAX COLLECTOR

Please put Assessor's Parcel Number on check

**To pay full tax, return both payment coupons by
DEC 10, 2021 with payment amount of \$6,797.02**

COUNTY OF VENTURA
TREASURER-TAX COLLECTOR
PO BOX 51179
LOS ANGELES, CA 90051-5479

2.2 Key Points for Growers

An APN is a unique number assigned to a parcel of land by the county tax assessor

An APN for a parcel can be found on the property tax bill, through the county assessor, or property owner

List the APN and irrigated acreage for each parcel in a Ranch

 Quiz

2.2.1 Activity

Identify the APN in the sample property tax bill.

| | | | | |
|--------------------------------------|----------------------|--|------------------------------------|--|
| SECURED TAX PAYMENT 2021-2022 | | Return Coupon with Payment 1ST INSTALLMENT | AMOUNT DUE DUE BY | \$3,398.51 NOVEMBER 1, 2021 |
| | | | TAX PLUS PENALTY IF PAID AFTER | \$3,738.36 DECEMBER 10, 2021 |
| ASSESSOR'S PARCEL NO. | STATEMENT NO. | MAIL CODE | | |
| 123-0-456-789 | 1234567 | 0225 | | |

Make check payable to:
VC TAX COLLECTOR
Please put Assessor's Parcel Number on check

To pay full tax, return both payment coupons by
DEC 10, 2021 with payment amount of \$6,797.02

COUNTY OF VENTURA
TREASURER-TAX COLLECTOR
PO BOX 51179
LOS ANGELES, CA 90051-5479



Lesson 3: Crop Name and Age

2.3 Learning Objectives

Describe the importance of identifying crops by a standard name and age

Determine which crops require reporting of age

Crop Name & Age

| Management Unit (MU) Information | | | | | | | |
|--|---|---------------------|------------------|------------------------------|--|-------------------------|---|
| MU Name*: _____ | | | | | | | |
| Crop Type*: _____ | MU Irrigated Acres*: _____ | | | | | | |
| <table border="1"><thead><tr><th>For Perennial Crops</th><th>For Annual Crops</th></tr></thead><tbody><tr><td>Reporting Year: _____</td><td>Crop Establishment Date*: _____</td></tr><tr><td>Crop Age*: _____</td><td>Crop Harvest Completion Date*: _____</td></tr></tbody></table> | | For Perennial Crops | For Annual Crops | Reporting Year: _____ | Crop Establishment Date*: _____ | Crop Age*: _____ | Crop Harvest Completion Date*: _____ |
| For Perennial Crops | For Annual Crops | | | | | | |
| Reporting Year: _____ | Crop Establishment Date*: _____ | | | | | | |
| Crop Age*: _____ | Crop Harvest Completion Date*: _____ | | | | | | |

Standard Crop Name

Linked to nitrogen removal coefficient

Ensures a fair evaluation of nitrogen applied vs. removed

Standard Crop Name List

List of approved Nitrogen Removal Coefficients by crop name <https://www.farmbureauvc.com/vcailg/>



INMP Standard Crop Type List

Version 1.4 (Nov 20, 2025)

| Crop* | INMP Development Period | Yield Reporting Units | N Coefficient | | N Coefficient Source |
|---------------------------------|--------------------------------|--------------------------------|----------------|-------------------------|---|
| | | | Fruit and Nuts | | |
| Asian Pears | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | none | | |
| Avocado | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | 4.4 | lbs/ton | Ag Order 4.0 Approved Coefficient ³ |
| Blackberry | Substrate Primocane | Calendar Year (perennial crop) | 4.46 | lbs/ton of fruits | CDFA FREP Project ² |
| | Substrate Florocane | Calendar Year (perennial crop) | 4.46 | lbs/ton of fruits | CDFA FREP Project ² |
| | In-Ground | Calendar Year (perennial crop) | 4.46 | lbs/ton of fruits | CDFA FREP Project ² |
| Blueberries | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | 1.56 | lbs/ton of fruits | CDFA FREP Project ² |
| Cherimoya | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | none | | |
| Lemons | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | 3.49 | lbs/ton of fruits | Geisseler Report ¹ |
| Mandarins & Tangelos | Calendar Year (perennial crop) | harvest weight (tons or lbs.) | 4.31 | lbs/ton of fruits | Geisseler Report ¹ |
| Oranges | Navel | Calendar Year (perennial crop) | 3.61 | lbs/ton of fruits | Geisseler Report ¹ |
| | Valencia | Calendar Year (perennial crop) | 4.66 | lbs/ton of fruits | Geisseler Report ¹ |
| Raspberries | Substrate Primocane | Calendar Year (perennial crop) | 3.60 | lbs/ton | CDFA FREP Project ² |
| | Substrate Florocane | Calendar Year (perennial crop) | 3.60 | lbs/ton | CDFA FREP Project ² |
| | In-Ground | Calendar Year (perennial crop) | 3.60 | lbs/ton | CDFA FREP Project ² |
| Strawberries | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 2.8 | lbs/ton | Hartz UC ANR Strawberry Publication ⁴ |
| Vegetables | | | | | |
| Artichokes | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 7.64 | lbs /ton | CDFA FREP Project ² |
| Arugula | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 11.6 | lbs /ton | CDFA FREP Project (2021) ³ |
| Beans | Green Snap | Crop Cycle (annual crop) | 5.76 | lbs/ton of fresh weight | Geisseler Report ¹ /Ag Order 4.0 Approved Coefficient ³ |
| | Lima | Crop Cycle (annual crop) | none | | |
| Beets | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 6.1 | lbs /ton | CDFA FREP Project ² |
| Brassica (not otherwise listed) | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | none | | |
| Broccoli | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 9.26 | lbs/ton | CDFA FREP Project ² |
| Brussels Sprouts | Crop Cycle (annual crop) | harvest weight (tons or lbs.) | 12.56 | lbs /ton | CDFA FREP Project ² |

Crop Age

Required for perennial crops only

Influences yield, nitrogen applied, and nitrogen removed with harvest

Based on the calendar year that the INMP covers.

 Quiz

Module 2 Review

A grower in Somis planted avocados in October 2018. The avocados were planted on an 85-acre block.

The APN for the block labeled as Avocados Westside is 230-0-295-120.

The INMP is being developed for calendar year 2025.

| | |
|--------------------------|----------------|
| Management Unit or Field | 1 |
| APN | 230-0-295-120 |
| County | Ventura County |
| Crop | Avocados |
| Crop Age | 6 |
| Irrigated Acres | 85-acre |

2.3 Key Points for Growers

Using a standard crop name and age ensures accurate data analysis

Crop age is required for perennial crops only.

Quiz

2.3.1 Activity

On the INMP Worksheet, Navel and Valencia oranges can both be listed as oranges. True or False?



True



False



Lesson 4: Management Units

2.1 Learning Objectives

Determine what crop acreage can be combined to create a Management Unit.



Management Unit



Same Ranch

Same Crop

Same Age

Same Management Practices
(irrigation & nutrient inputs)

MU Example 1

85-acre lemon orchard (located within the Ranch)

40-acre block of newly planted trees

45-acre block of 30-year-old trees

Same nutrient and water inputs within each block



MU Example 2

50-acre Ranch

Rotation of strawberry and celery

Each rotation receives its own
nutrient and water inputs



MU Example 3



30-acre Ranch

Rotations of cilantro, peppers,
and cabbage

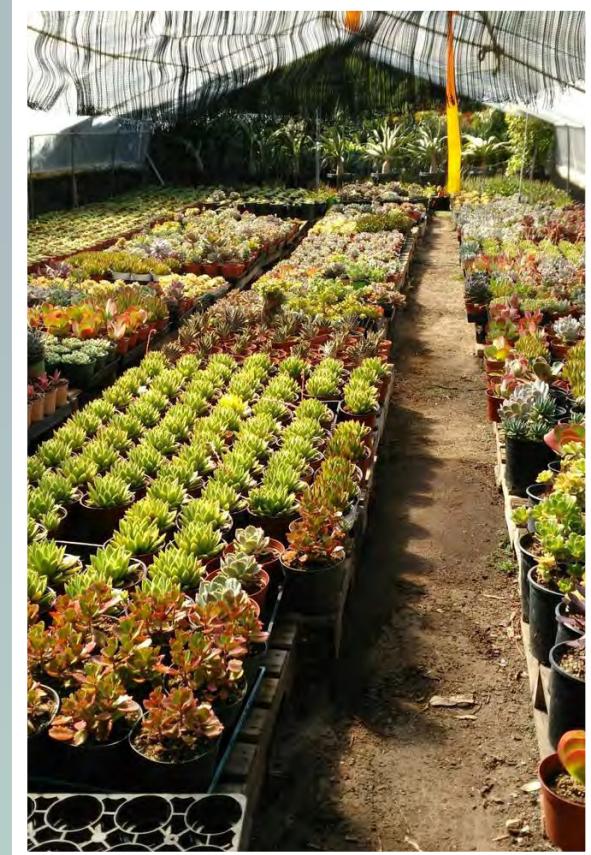
Each rotation receives same
nutrient and water inputs

MU Example 4

25-acre nursery

Within a single Ranch covering 2 contiguous parcels

Mix of drip and hand watering



2.4 Key Points for Growers

A MU must have the same crop, age, nutrient and irrigation inputs, and management practices

A MU must be located within a single Ranch

 Quiz

Activity 2.4.1

A grower has one 100-acre Ranch, which is split into a 40-acre and 60-acre field.

Rotational vegetables are grown on the 40-acre field, and include a rotation of cilantro, peppers, and cabbage. The 60-acre field is used to grow a rotation of strawberries and celery. Each individual crop rotation is irrigated from the same well and have the same fertilizer and irrigation inputs.

How many individual management units are there?

5 management units

Break



Module 3: Irrigation Management



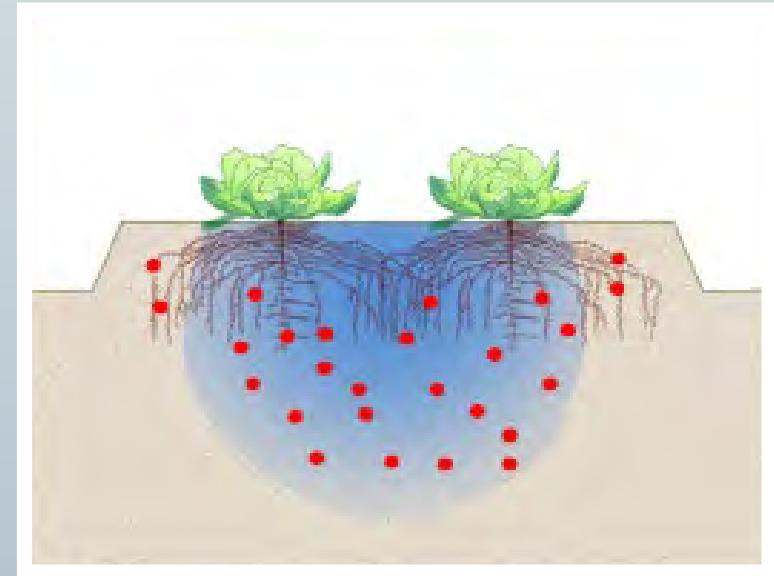
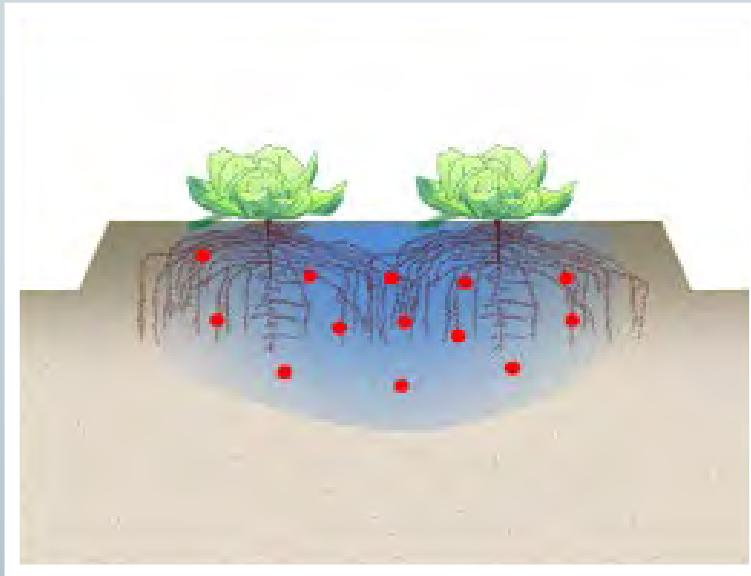
Lesson 1: Irrigation and Nitrogen Management

3.1 Learning Objectives

Describe the relationship between irrigation and nitrogen management

Differentiate between irrigation efficiency and distribution uniformity

Irrigation and Nitrogen Management





Quiz

Activity 3.1.1

Why does nitrate move so easily through the soil profile with water?

| Nitrate (NO_3^-) has a negative charge. Thus, it is not held by clay particles and moves easily through the soil with water.

Irrigation Efficiency (IE)

Percentage of applied water that is beneficially used

Examples:

Crop Water Demand

Climate Control

Leaching salts

Other?

Typical Irrigation Efficiency Ranges

| Irrigation Method | Typical Efficiency Range (%) |
|---------------------|------------------------------|
| Microsprinkler | 85-90 |
| Surface Drip | 85-90 |
| Subsurface Drip | 80-90 |
| Solid Set Sprinkler | 70-85 |
| Hand Move Sprinkler | 65-85 |
| Furrow | 55-75 |
| Basin | 60-75 |

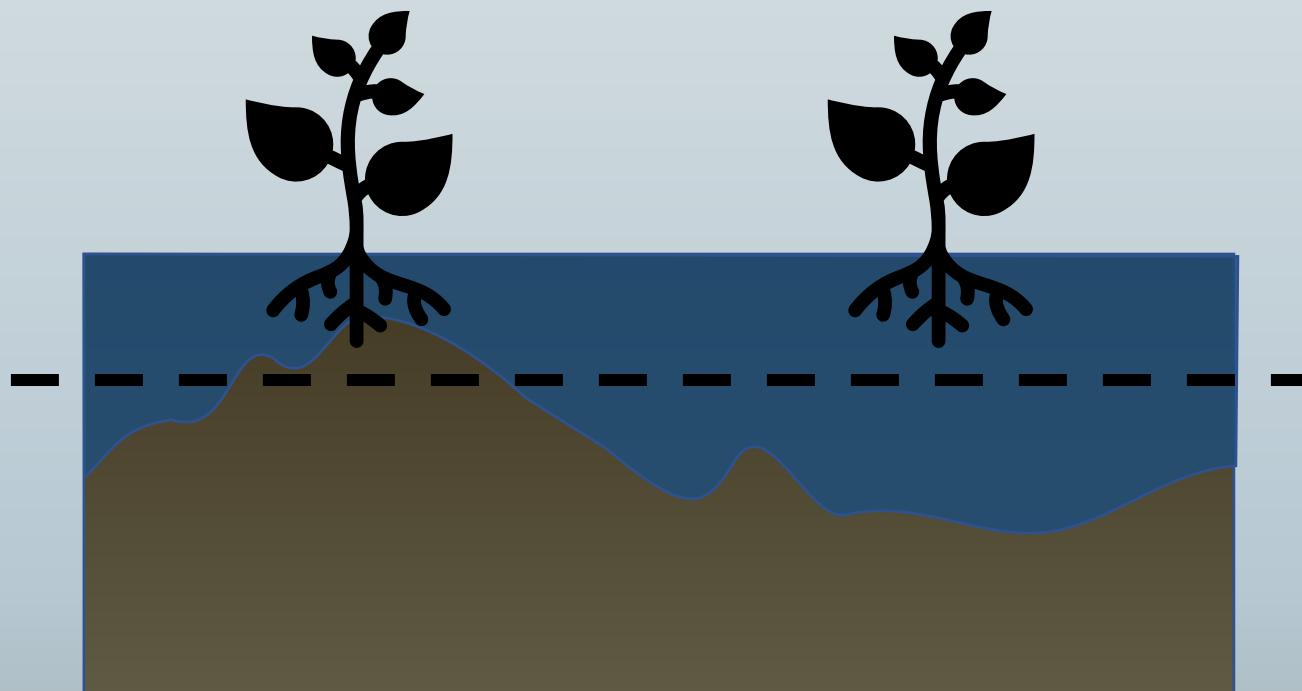
Distribution Uniformity (DU)

How evenly water is applied to the field

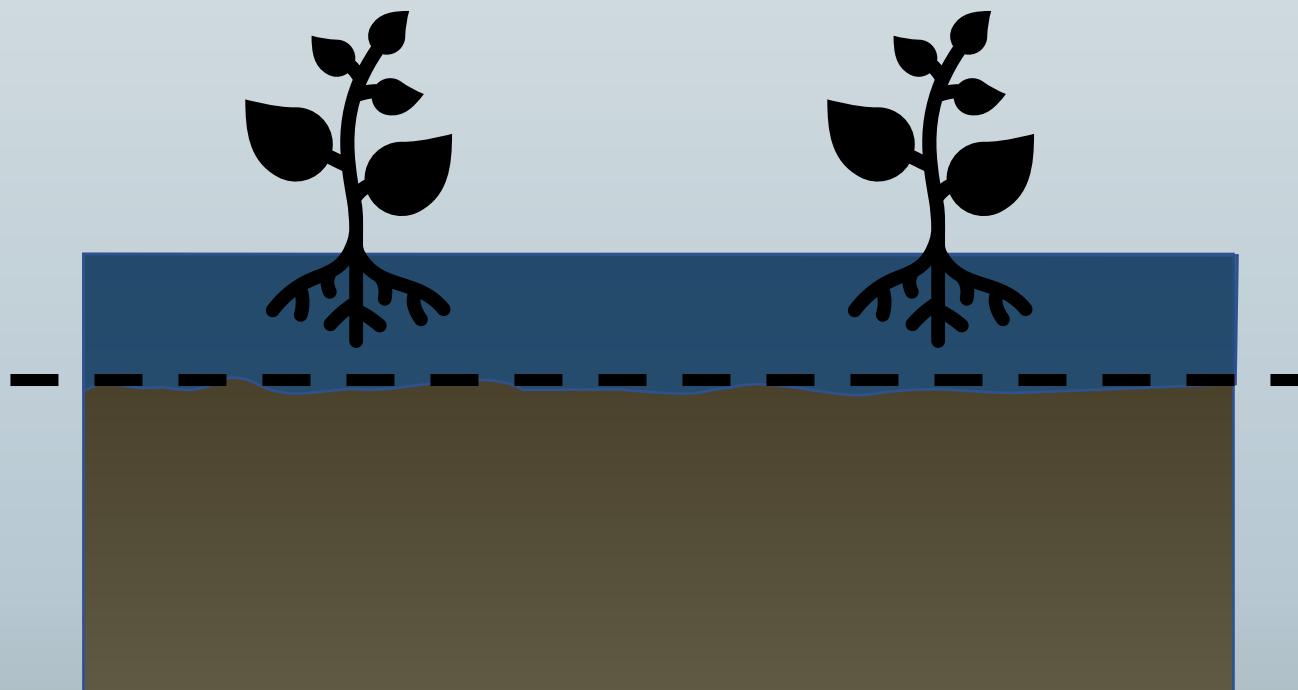
A good DU is above 0.85 for drip, microsprinkler, and sprinkler systems

A good DU is above 0.7 for furrow, flood, and basin methods

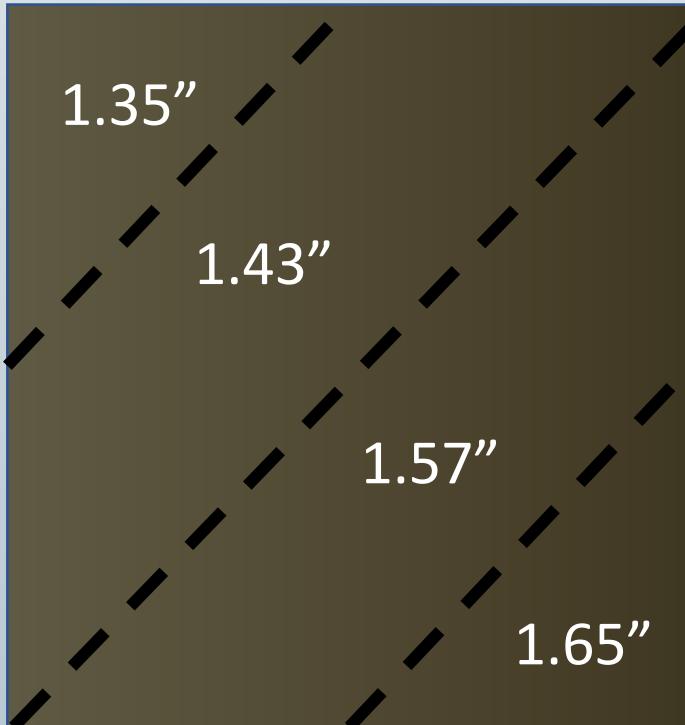
Poor Distribution Uniformity (DU)



Good Distribution Uniformity (DU)

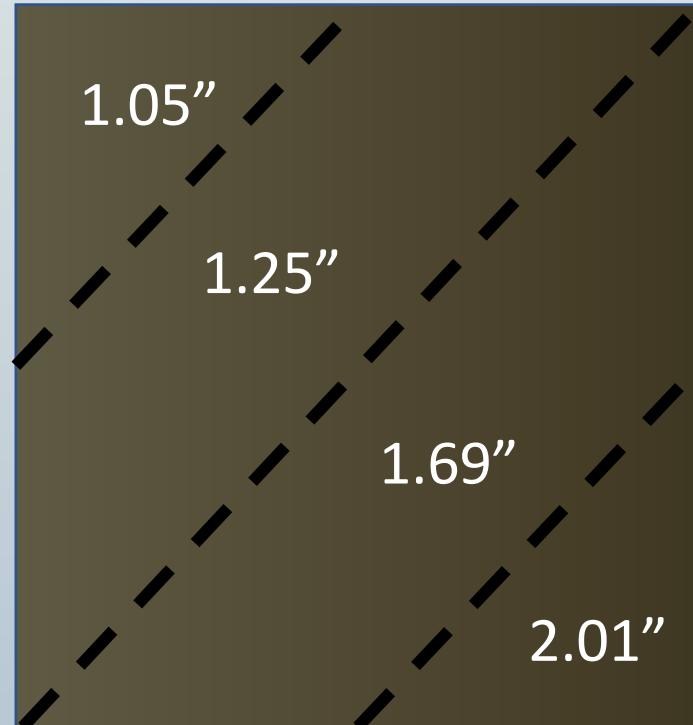


Distribution Uniformity Example



Application Rate 1.5"

DU = 0.9



Application Rate 1.5"

DU = 0.7

Testing Distribution Uniformity (DU)



Ventura County RCD



Activity 3.1.2

Have you had your irrigation system(s) evaluated recently?

|

3.1 Key Points for Growers

Poor irrigation management decreases the efficiency of nitrogen applications and can cause nitrate leaching

A well irrigated field has good distribution uniformity and high irrigation efficiency



Quiz

Activity 3.1.3

Water was delivered evenly across the field and the application exceeded the amount needed to meet crop demand and the leaching requirement. **Select all that apply:**

- Good Uniformity
- Good Efficiency
- Poor Uniformity
- Poor Efficiency



Lesson 2: Irrigation Methods

3.2 Learning Objectives

Identify the role of a primary irrigation method.

Identify common uses for a secondary irrigation method.

INMP Worksheet Box 14

| SECTION 4: IRRIGATION MANAGEMENT PRACTICES | | | | | |
|---|--------------------------|------------------------|--------------------------|--------------------------|--|
| 14. Irrigation Method | | | 15. Irrigation Source | | |
| (check one for Primary; if applicable, check one for Secondary) | | | | | |
| Primary | | Secondary ¹ | (check all that apply) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Drip | <input type="checkbox"/> | Well | |
| <input type="checkbox"/> | <input type="checkbox"/> | Micro Sprinkler | <input type="checkbox"/> | Water Purveyor or Agency | |
| <input type="checkbox"/> | <input type="checkbox"/> | Overhead Sprinkler | <input type="checkbox"/> | Recycled Water | |
| <input type="checkbox"/> | <input type="checkbox"/> | Furrow/flood | <input type="checkbox"/> | Surface Diversion | |
| <input type="checkbox"/> | <input type="checkbox"/> | Hand Watering | | | |

INMP Worksheet Box 15

| SECTION 4: IRRIGATION MANAGEMENT PRACTICES | | | | | |
|---|--------------------------|------------------------|--------------------------|--------------------------|--|
| 14. Irrigation Method | | | 15. Irrigation Source | | |
| (check one for Primary; if applicable, check one for Secondary) | | | | | |
| Primary | | Secondary ¹ | (check all that apply) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Drip | <input type="checkbox"/> | Well | |
| <input type="checkbox"/> | <input type="checkbox"/> | Micro Sprinkler | <input type="checkbox"/> | Water Purveyor or Agency | |
| <input type="checkbox"/> | <input type="checkbox"/> | Overhead Sprinkler | <input type="checkbox"/> | Recycled Water | |
| <input type="checkbox"/> | <input type="checkbox"/> | Furrow/flood | <input type="checkbox"/> | Surface Diversion | |
| <input type="checkbox"/> | <input type="checkbox"/> | Hand Watering | | | |

Secondary Irrigation

Crop Establishment

Climate Control



3.2 Key Points for Growers

Primary irrigation method is the system used to provide water for crop growth and development.

Examples of secondary irrigation use include crop establishment and climate control.



Activity 3.2.1

What other purposes may a secondary irrigation system be used for? (select two)

- Crop growth
- Fertilizer application
- Cover crop growth
- Crop establishment
- Climate control



Lesson 3: Crop Evapotranspiration

3.3 Learning Objectives

Estimate potential crop evapotranspiration for a growing season.

Recall where to find resources for estimating crop evapotranspiration.

INMP Worksheet Box 1

| SECTION 1: PRE-SEASON PLANNING | |
|---|---|
| Irrigation Management | Harvest Projection |
| 1. Crop Evapotranspiration (ET _c , inches) | 4. Production Units* (with weight in lbs./tons, if required) |
| 2. Anticipated Crop Irrigation (inches) | 5. Projected Harvest Yield |
| 3. Irrigation Water N Concentration (ppm or mg/L, as NO ³ – N) | |

Crop Evapotranspiration

Transpiration

Evaporation



Estimating Crop Evapotranspiration (ETc)

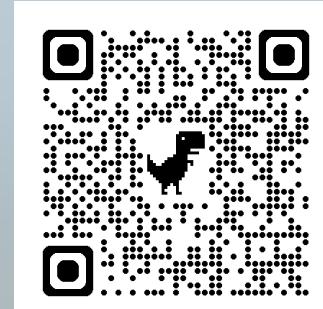
1

Calculate ETc using a reference ET (ETo) and a crop coefficient (Kc).

2

Use seasonal ETc estimates provided by Fox Canyon Groundwater Management Agency:

[https://fcgma.org/wp-content/uploads/2022/06/
IA Table with map August 1 2014.pdf](https://fcgma.org/wp-content/uploads/2022/06/IA-Table-with-map-August-1-2014.pdf)



Option 1

Reference ET

X

Crop Coefficient

=

Crop ET

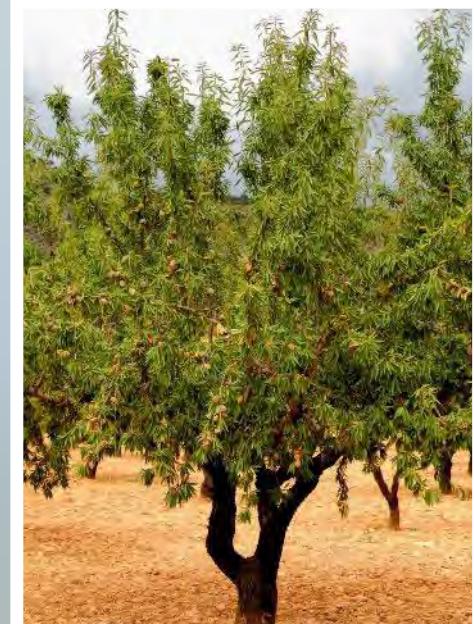
ETo

X

Kc

=

ETc



Option 1 Example

Lemons in Saticoy

$$K_c \times ETo = ET_c$$

$$0.65 \times 40 = 26 \text{ applied inches}$$

Option 2 Example

Crop Year Irrigation Allowance (Reduced 25%)*

Starting August 1, 2014

Acre-Feet/Acre

| SEASONAL CROPS | # OF CROPS | OXNARD (ZONE 1) | | | CAMARILLO (ZONE 2) | | | SANTA PAULA (ZONE 3) | | |
|---|------------|------------------|----------------------|------------------|--------------------|----------------------|------------------|----------------------|----------------------|------------------|
| | | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ |
| | | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A |
| Celery - Fall ¹ | 1 | 1.6 | 1.5 | 1.4 | 1.8 | 1.7 | 1.5 | 1.9 | 1.8 | 1.6 |
| Celery - Spring ¹ | 1 | 1.6 | 1.5 | 1.4 | 1.8 | 1.7 | 1.5 | 1.9 | 1.8 | 1.6 |
| Cover Crop | 1 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.2 | 1.1 | 1.0 |
| Lima Beans | 1 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 0.9 |
| Misc. Vegetable Greenhouse - Fall ¹ | 1 | 0.9 | 0.9 | 0.8 | 1.0 | 1.0 | 0.9 | 1.1 | 1.0 | 1.0 |
| Misc. Vegetable Greenhouse - Spring ¹ | 1 | 1.1 | 1.0 | 0.9 | 1.2 | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 |
| Misc. Vegetable Greenhouse - Summer ¹ | 1 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 |
| Misc. Vegetable - Fall ¹ | 1 | 1.1 | 1.0 | 1.0 | 1.2 | 1.1 | 1.0 | 1.3 | 1.2 | 1.1 |
| Misc. Vegetable - Spring ¹ | 1 | 1.3 | 1.2 | 1.1 | 1.4 | 1.3 | 1.2 | 1.6 | 1.5 | 1.4 |
| Misc. Vegetable - Summer ¹ | 1 | 1.5 | 1.5 | 1.5 | 1.7 | 1.7 | 1.6 | 1.9 | 1.8 | 1.8 |
| Strawberries - Main Season (October Planting) | 1 | 2.5 | 2.3 | 2.2 | 2.7 | 2.6 | 2.4 | 2.9 | 2.8 | 2.6 |
| Strawberries - Summer (July Planting) | 1 | 1.4 | 1.4 | 1.3 | 1.6 | 1.5 | 1.4 | 1.7 | 1.6 | 1.5 |
| Tomatoes - Peppers | 1 | 1.7 | 1.7 | 1.6 | 1.9 | 1.9 | 1.8 | 2.1 | 2.1 | 2.0 |
| | | | | | | | | | | |
| YEAR-ROUND CROPS | # OF CROPS | OXNARD (ZONE 1) | | | CAMARILLO (ZONE 2) | | | SANTA PAULA (ZONE 3) | | |
| | | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ |
| | | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A |
| Year-Round Vegetables - Not Including Celery ² | >2 | 3.1 | 2.9 | 2.8 | 3.5 | 3.3 | 3.1 | 3.8 | 3.6 | 3.4 |
| Year-Round Vegetables - Including Celery ³ | >2 | 3.4 | 3.2 | 3.1 | 3.8 | 3.6 | 3.5 | 4.0 | 4.0 | 3.8 |
| | | | | | | | | | | |
| ANNUAL CROPS | # OF CROPS | OXNARD (ZONE 1) | | | CAMARILLO (ZONE 2) | | | SANTA PAULA (ZONE 3) | | |
| | | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ | DRY ³ | TYPICAL ³ | WET ³ |
| | | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A | Total AF/A |
| Avocado < 20% Ground Shading | 1 | 1.5 | 1.4 | 1.3 | 1.7 | 1.6 | 1.5 | 1.9 | 1.7 | 1.6 |
| Avocado 20 - 70% Ground Shading | 1 | 2.2 | 2.0 | 1.9 | 2.5 | 2.3 | 2.1 | 2.8 | 2.5 | 2.3 |
| Avocado > 70% Ground Shading | 1 | 3.1 | 2.7 | 2.6 | 3.5 | 3.1 | 3.0 | 3.8 | 3.4 | 3.2 |
| Blueberries < 20% Ground Shading | 1 | 1.4 | 1.4 | 1.3 | 1.8 | 1.5 | 1.5 | 1.9 | 1.8 | 1.7 |
| Blueberries 20 - 70% Ground Shading | 1 | 2.1 | 2.0 | 1.9 | 2.3 | 2.2 | 2.2 | 2.5 | 2.4 | 2.4 |
| Blueberries > 70% Ground Shading | 1 | 2.9 | 2.7 | 2.6 | 3.3 | 3.1 | 3.0 | 3.6 | 3.4 | 3.2 |
| Citrus < 20% Ground Shading | 1 | 1.6 | 1.4 | 1.3 | 1.8 | 1.6 | 1.5 | 1.9 | 1.8 | 1.6 |
| Citrus 20 - 70% Ground Shading | 1 | 2.0 | 1.9 | 1.8 | 2.3 | 2.2 | 2.0 | 2.5 | 2.4 | 2.2 |
| Citrus > 70% Ground Shading | 1 | 2.7 | 2.6 | 2.4 | 3.0 | 2.9 | 2.7 | 3.3 | 3.2 | 2.9 |
| Nursery - Non-Greenhouse | 1 | 3.4 | 3.2 | 3.1 | 3.8 | 3.6 | 3.5 | 4.0 | 4.0 | 3.8 |
| Nursery - Greenhouse | 1 | 3.5 | 3.4 | 3.3 | 3.9 | 3.8 | 3.7 | 4.0 | 4.0 | 4.0 |
| Raspberries - Tunnel | 1 | 3.4 | 3.2 | 3.1 | 3.8 | 3.7 | 3.6 | 4.0 | 4.0 | 3.9 |
| Sod | 1 | 3.2 | 3.0 | 2.9 | 3.6 | 3.4 | 3.3 | 3.9 | 3.7 | 3.6 |

3.3 Key Points for Growers

There are two available methods for estimating seasonal crop ET.

Estimating crop ET can help you plan irrigation water use for the growing season.



Activity 3.3.1

Method 1: Complete the table below to calculate the seasonal ETc for an avocado orchard in Camarillo.

| | ETo (in)* | x | Kc | = | ETc |
|-------|------------------|----------|-----------|----------|------------|
| Jan | 2.5 | | 0.85 | | 2.13 |
| Feb | 2.7 | | 0.85 | | 2.30 |
| Mar | 3.9 | | 0.85 | | 3.32 |
| Apr | 4.7 | | 0.85 | | 4.00 |
| May | 5.2 | | 0.85 | | 4.42 |
| Jun | 5.4 | | 0.85 | | 4.59 |
| Jul | 6.0 | | 0.85 | | 5.10 |
| Aug | 5.5 | | 0.85 | | 4.68 |
| Sep | 4.4 | | 0.85 | | 3.74 |
| Oct | 3.4 | | 0.85 | | 2.89 |
| Nov | 2.6 | | 0.85 | | 2.21 |
| Dec | 2.2 | | 0.85 | | 1.87 |
| Total | 48.3 | | | | 41.23 |

*Historical ETo average for CIMIS station 152 in Camarillo



Lesson 4: Anticipated Crop Irrigation

3.4 Learning Objectives

Estimate leaching requirement based on a crop's salinity tolerance and irrigation water salinity levels

Estimate maximum anticipated crop irrigation rate based on estimated water requirements

INMP Worksheet Box 2

| SECTION 1: PRE-SEASON PLANNING | |
|---|---|
| Irrigation Management | Harvest Projection |
| 1. Crop Evapotranspiration (Etc, inches) | 4. Production Units* (with weight in lbs./tons, if required) |
| 2. Anticipated Crop Irrigation (inches) | 5. Projected Harvest Yield |
| 3. Irrigation Water N Concentration (ppm or mg/L, as NO ³ – N) | |

Estimating Crop Irrigation Rate



Crop Demand (ET_c)

Additional Water Requirements

Irrigation Efficiency

Additional Water Requirements

Leaching Salts

Germination and crop
establishment

Climate Control



Leaching Salts

High salinity levels in the root zone hinder the crop's ability to take up water. Certain salts can also be toxic at certain levels.

Leaching moves salts below the root zone to prevent a decline in yield

Leaching should be conducted when soil nitrate levels are low

Leaching Requirement

LR is the amount of excess water that needs to be applied to move salts below the rootzone

Based on average salinity of the water (ECw) and the soil salinity threshold of the crop (ECe)

$$LR = (ECw \times 100) \div [(ECe \times 5) - ECw]$$

 Quiz

Activity 3.4.2

The orange orchard in Moorpark has an irrigation water salinity level of 1.3 dS/m. The soil salinity threshold for oranges is 1.7 dS/m. What is the leaching requirement?

$$LR (\%) = (ECw \times 100) \div [(ECe \times 5) - ECw]$$

- 15%
- 18%
- 0%
- 35%

$$LR (\%) = (1.3 \times 100) \div [(1.7 \times 5) - 1.3]$$

$$LR (\%) = (130) \div [7.2]$$

3.4 Key Points for Growers

In season rainfall can contribute to crop water needs.

Crop Irrigation amounts are based on water needed to meet crop demand and additional water requirements



Lesson 5: Irrigation Set Times

3.5 Learning Objectives

Estimate irrigation set times based on a desired water application in inches.



Calculating Irrigation Set Times

Translate desired water application (in) into system run time (hr.)

1

Flow Meter Data

2

System Application Rates

Flow Rate to Run Time

$$\text{Time (hr.)} = \frac{\text{water application (in) x area (acres) x 43,560}}{96.3 \times \text{flow rate (gpm)}}$$

<http://irrigation.wsu.edu/Content/Calculators/General/Set-Times.php>



 Quiz

Activity 3.5.1

A grower is irrigating 25 acres with an average water flow rate of 850 gpm. If the desired water application depth is 0.5 in. how long should they run the irrigation system?

$$\text{Time (hr.)} = \frac{\text{water application (in) x area (acres) x 43,560}}{96.3 \times \text{flow rate (gpm)}}$$

| **6.65 hrs**

Application Rate to Run Time

Run Time (hr) = water application (in) ÷ application rate (in/hr)

[http://irrigation.wsu.edu/Content/
Calculators/Popular.php](http://irrigation.wsu.edu/Content/Calculators/Popular.php)





Quiz

Activity 3.5.2

A drip irrigation system has an application rate of 0.15 in/hr.

How long should the grower run the system to apply 0.5 in of water?

Run Time (hr) = water application (in) ÷ application rate (in/hr)

3.33 hrs

3.5 Key Points for Growers

System run times can be calculated based on flow meter data or system application rates



Lesson 6: Irrigation Water Nitrogen Concentration

3.6 Learning Objectives

Describe how to sample irrigation water for nitrate-nitrogen.

Estimate the concentration of nitrate-nitrogen in an irrigation water sample.

INMP Worksheet Box 3

| SECTION 1: PRE-SEASON PLANNING | |
|---|---|
| Irrigation Management | Harvest Projection |
| 1. Crop Evapotranspiration (Etc, inches) | 4. Production Units* (with weight in lbs./tons, if required) |
| 2. Anticipated Crop Irrigation (inches) | 5. Projected Harvest Yield |
| 3. Irrigation Water N Concentration (ppm or mg/L, as NO ³ – N) | |

Irrigation Water Testing



Irrigation Suitability Test



Nitrate Quick Test Strips

Collecting Water Samples

1

Allow irrigation well to run for 30 minutes

2

Take sample prior to injection stations

3

Fill container completely with water (no air gap)

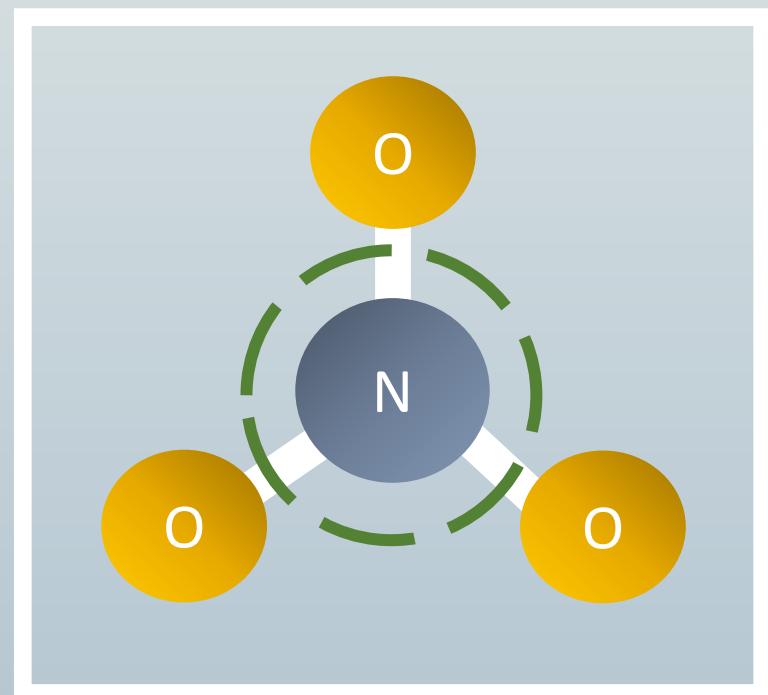
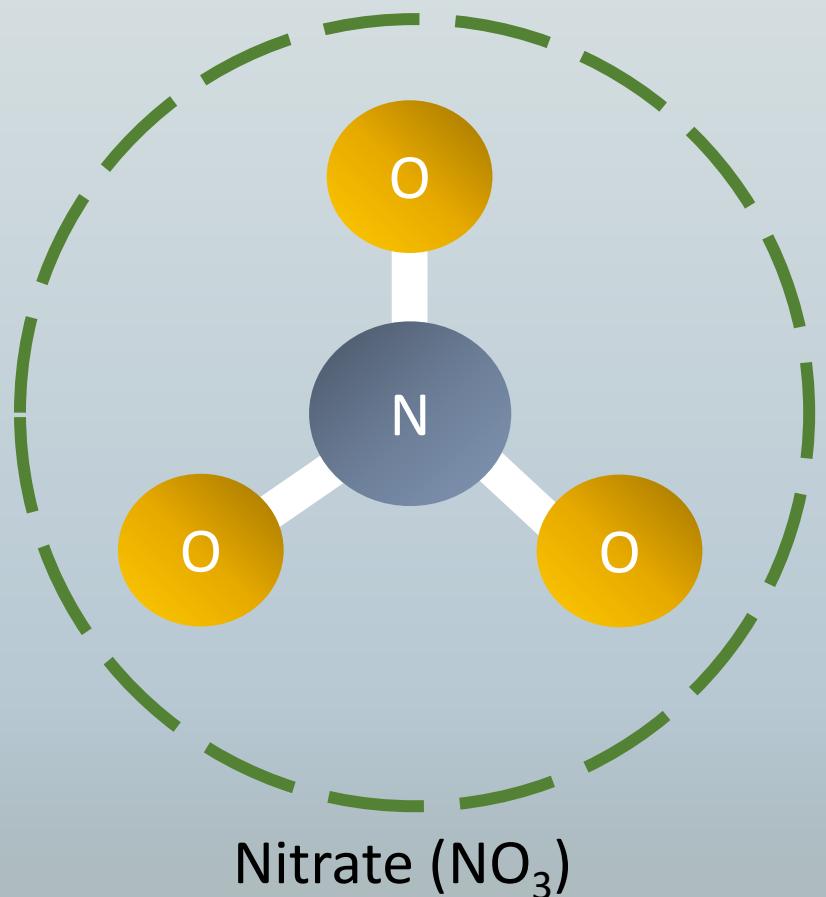
4

Label container based on lab's instructions

5

Keep sample cold during shipment until delivery

Recording the Results



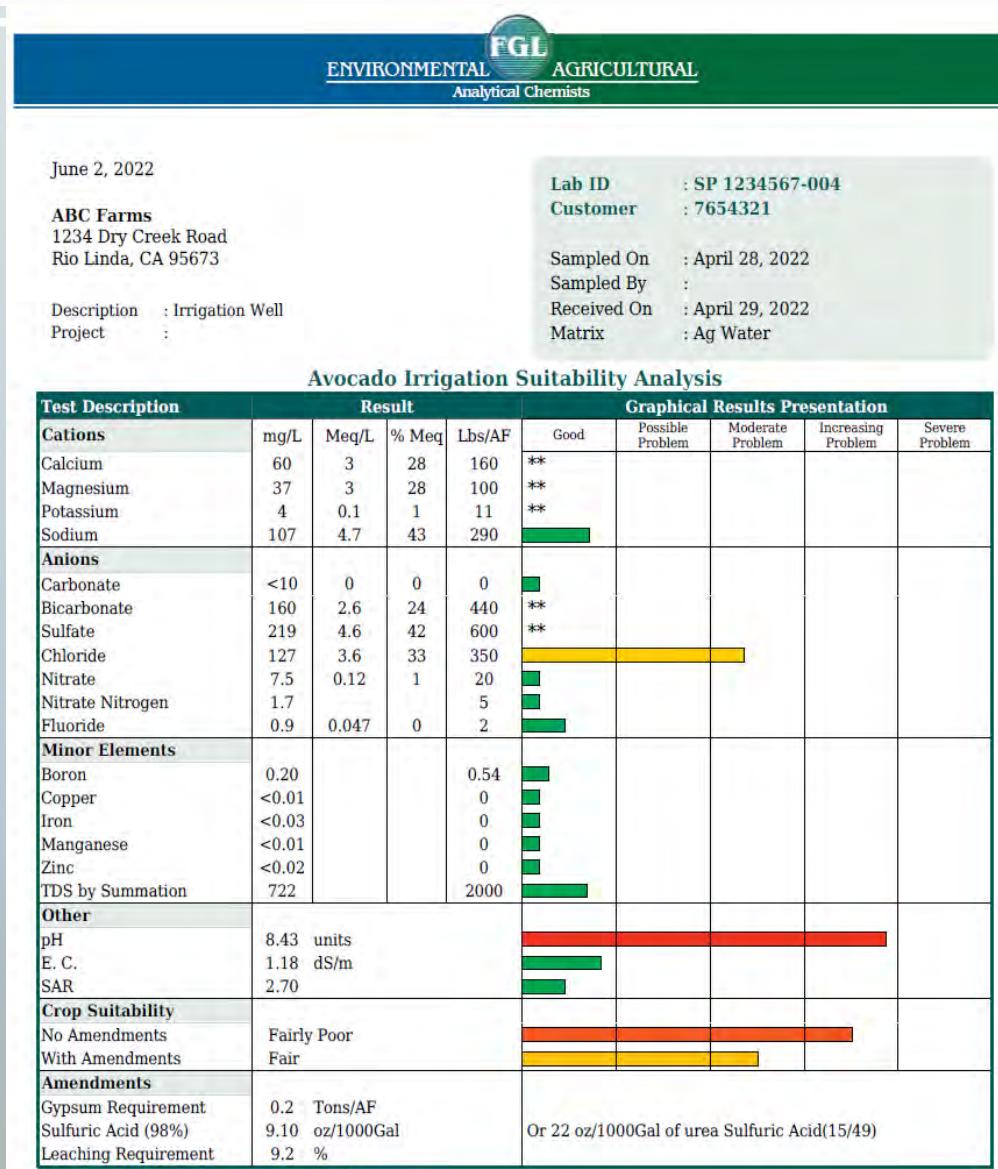
Nitrate-Nitrogen ($\text{NO}_3\text{-N}$)

Converting the Results

$$\text{ppm} = \text{mg/l}$$

$$\text{ppm NO}_3 \times 0.23 = \text{ppm NO}_3\text{-N}$$

Lab Example: Avocado Irrigation Suitability Analysis



Calculating lb N/acre from irrigation water

mg/L (ppm) $\text{NO}_3\text{-N}$ \times 0.227 = lb of N/ac-in of water

Irrigation water of 10mg/L $\text{NO}_3\text{-N}$

✓ 1.5 AF: 41 lbs N/acre

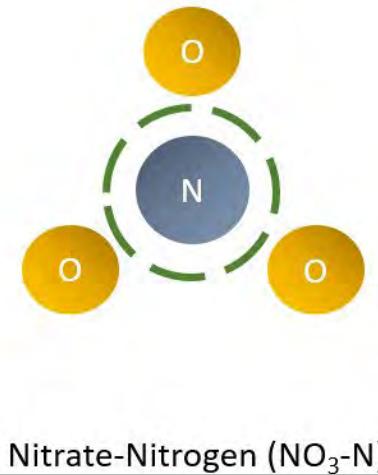
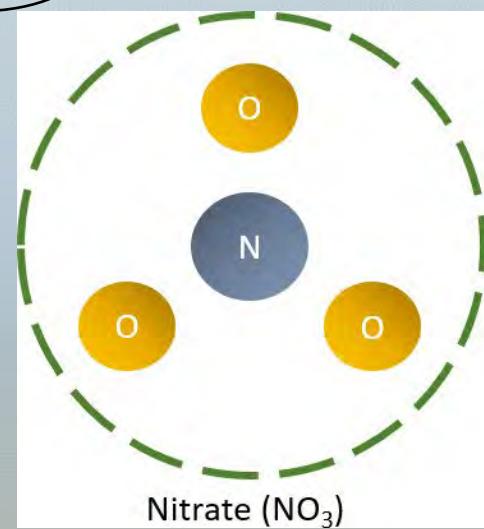
✓ 2.5AF: 68 lbs N/acre

Quiz

Activity 3.6.1

Which measurement includes the 3 oxygen molecules?

- nitrate-N
- nitrate



3.6 Key Points for Growers

Growers can use a lab or nitrate quick test strips to estimate nitrate-nitrogen in their irrigation water.

If results are reported as mg/L or ppm nitrate, they need to be converted to nitrate-nitrogen.



Lesson 7: Irrigation Efficiency Practices

3.7 Learning Objectives

Identify management practices and tools that can increase irrigation efficiency.

Differentiate between the three methods for determining irrigation application timing and rates.

INMP Worksheet Box 16

16. Irrigation Efficiency Practices

(check all that apply)

Laser Leveling

Distribution uniformity testing conducted at least every 3 years

Use of ET and/or CIMIS data in scheduling irrigations (e.g. atmometer)

Use of soil moisture measurement to inform irrigation (e.g. sensor, tensiometer)

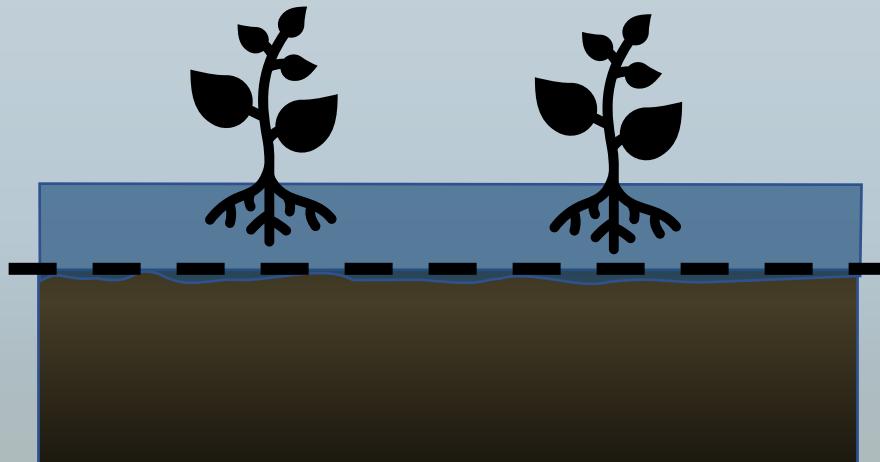
Use of variable speed water pump

Other _____

Irrigation Efficiency (IE)

Percentage of applied water that is beneficially used.

Influenced by irrigation scheduling and maintenance.



Irrigation Scheduling

Guides when and how much to irrigate.



Soil



Plant



Weather

Soil Moisture Monitoring



Measure Water Tension



Estimate Water Content



Quiz

Activity 3.7.1

What are some disadvantages of soil based monitoring?

The reading needs to be representative

Plant Based Monitoring



Direct



Indirect



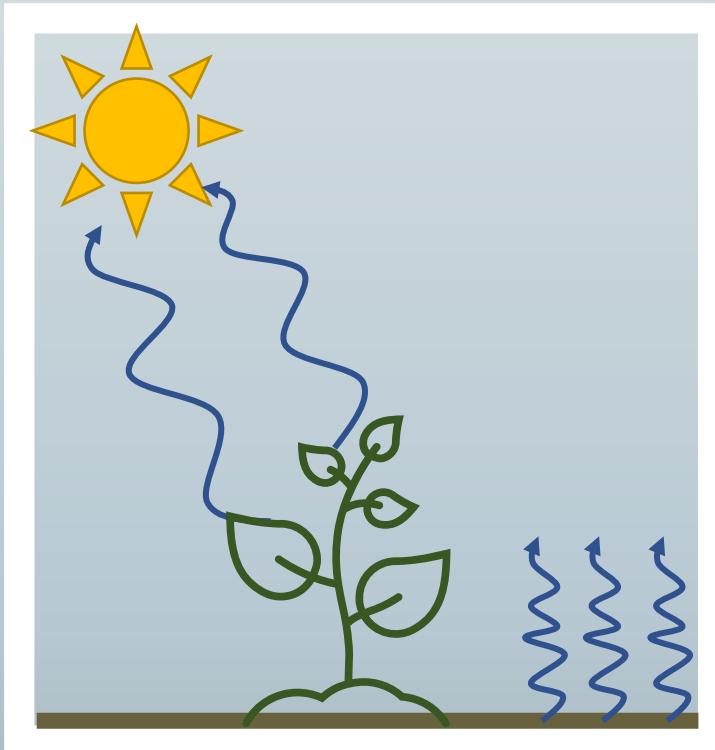
Quiz

Activity 3.7.2

What are some disadvantages of plant based monitoring?

Plant-based methods cannot determine how much water to apply

Weather Based Monitoring



Evapotranspiration (ET)



CIMIS Stations

 Quiz

Activity 3.7.3

What are some disadvantages of weather based monitoring?

Time consuming, needs a representative weather station data, and needs estimation of the crop coefficient.

Irrigation Maintenance

Clean and inspect for damages



Filters



Electronics



Lines

Irrigation Maintenance II

Check for plugging and pressure losses



Emitters



Lines



System

Other Efficiency Practices



Laser Leveling



Variable Frequency
Drives



PC Emitters

Quiz

3.7 Review Activity

Match the tool with the irrigation scheduling method

Tensiometer

ET Based

Weather station

Plant based

Pressure bomb

Soil based



3.7 Key Points for Growers

There are three irrigation scheduling methods: soil-based, plant-based, and weather-based.

Irrigation maintenance is key to even distribution and efficient irrigation.

Questions?

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Irrigation and Nutrient Management Training

for Grower Nitrogen Management Plan Self-Certification





Agenda – Day 1

Day 1

| | | |
|------------------------|---|---|
| 1:00 – 4:00 | Welcome and Introduction ILRP Background Ag Order Requirements | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| | Module 1: Introduction Lesson 1: Nitrogen Cycle Lesson 2: Nitrogen Contamination Lesson 3: INMP Requirements and Deadlines Lesson 4: Statistical Outliers | Andre Biscaro <i>Irrigation and Water Resources Advisor</i> UC Cooperative Extension |
| | | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| | Module 2: Parcel Management Lesson 1: Management Units Lesson 2: Assessor's Parcel Number Lesson 3: Crop Name and Age | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| 15-Minute Break | | |
| | Module 3: Irrigation Management Lesson 1: Irrigation and Nitrogen Management Lesson 2: Irrigation Methods (INMP Worksheet Box 1) Lesson 3: Crop Evapotranspiration (INMP Worksheet Box 2) Lesson 4: Anticipated Crop Irrigation (INMP Worksheet Box 3) Lesson 5: Irrigation Set Times Lesson 6: Irrigation Water Nitrogen Concentration (INMP Worksheet Box 4) Lesson 7: Irrigation Efficiency Practices (INMP Worksheet Box 5) | Andre Biscaro <i>Irrigation and Water Resources Advisor</i> UC Cooperative Extension |



Agenda – Day 2

Day 2

| | | |
|--------------------------------------|--|---|
| 1:00 – 4:00 | Module 4: Harvest Information Lesson 1: Production Units (INMP Worksheet Box 6) Lesson 2: Expected Crop Yield (INMP Worksheet Box 7A) Lesson 3: Actual Crop Yield (INMP Worksheet Box 7B) | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| | Module 5: Nitrogen Management Lesson 1: Nitrogen Efficiency Practices (INMP Worksheet 8) Lesson 2: Soil Available Nitrogen (INMP Worksheet Box 9) Lesson 3: Nitrogen in Irrigation Water (INMP Worksheet Box 10) Lesson 4: Nitrogen in Organic Amendments (INMP Worksheet Box 11) Lesson 5: Dry/Liquid Nitrogen Fertilizer (INMP Worksheet Box 12) Lesson 6: Foliar Nitrogen Fertilizer (INMP Worksheet Box 13) | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| 15-Minute Break | | |
| | Lesson 7: Total Nitrogen (INMP Worksheet Box 14) Lesson 8: Nitrogen Applied Vs Nitrogen Removed | Ben Waddell Director of Agricultural Services Fruit Growers Laboratory |
| Module 6: Certification | | |
| | Lesson 1: Certification Options and Requirements | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| Module 7: INMP Summary Report | | |
| | Lesson 1: Reporting Data | Jodi Switzer Water Program Director Farm Bureau of Ventura County |
| Review and Test | | |



Module 4: Harvest Information



Lesson 1: Production Units

4.1 Learning Objectives

Label production units appropriately for yield reporting

Identify production units that require additional detail

INMP Worksheet Box 4

| SECTION 1: PRE-SEASON PLANNING | |
|---|--|
| Irrigation Management | Harvest Projection |
| 1. Crop Evapotranspiration (Etc, inches) | 4. Production Units* (with weight in lbs./tons, if required) |
| 2. Anticipated Crop Irrigation (inches) | 5. Projected Harvest Yield |
| 3. Irrigation Water N Concentration (ppm or mg/L, as $\text{NO}_3^- - \text{N}$) | |

Production Units

Most common production units are lbs. and tons

For production units other than lbs. or tons, the approximate weight should be listed

Production Unit Exceptions

For some crop types, production units do not need to include a corresponding weight

| Crop Type | Production Units |
|---|------------------|
| Nursery Stock | Acre Harvested |
| Cut Flowers | Acre Harvested |
| Sod/Groundcover | Acre Harvested |
| Direct Sales Operations (w/ high crop diversity) | Acre Harvested |
| Research Operations (w/ high crop diversity) | Acre Harvested |

 Quiz

4.1 Review Activity

3,000 lbs of avocados is equivalent to _____.

1.5 tons

2 tons

1 ton

4.1 Key Points for Growers

The production unit serves as a basis for nitrogen management planning

If a production unit other than lbs. or tons is used, provide the approx. weight of the reported unit



Lesson 2: Expected Crop Yield

4.2 Learning Objectives

Estimate yield based on field conditions, historical yields, and experience

Describe possible implications for overestimating yield

INMP Worksheet Box 5 and 13A

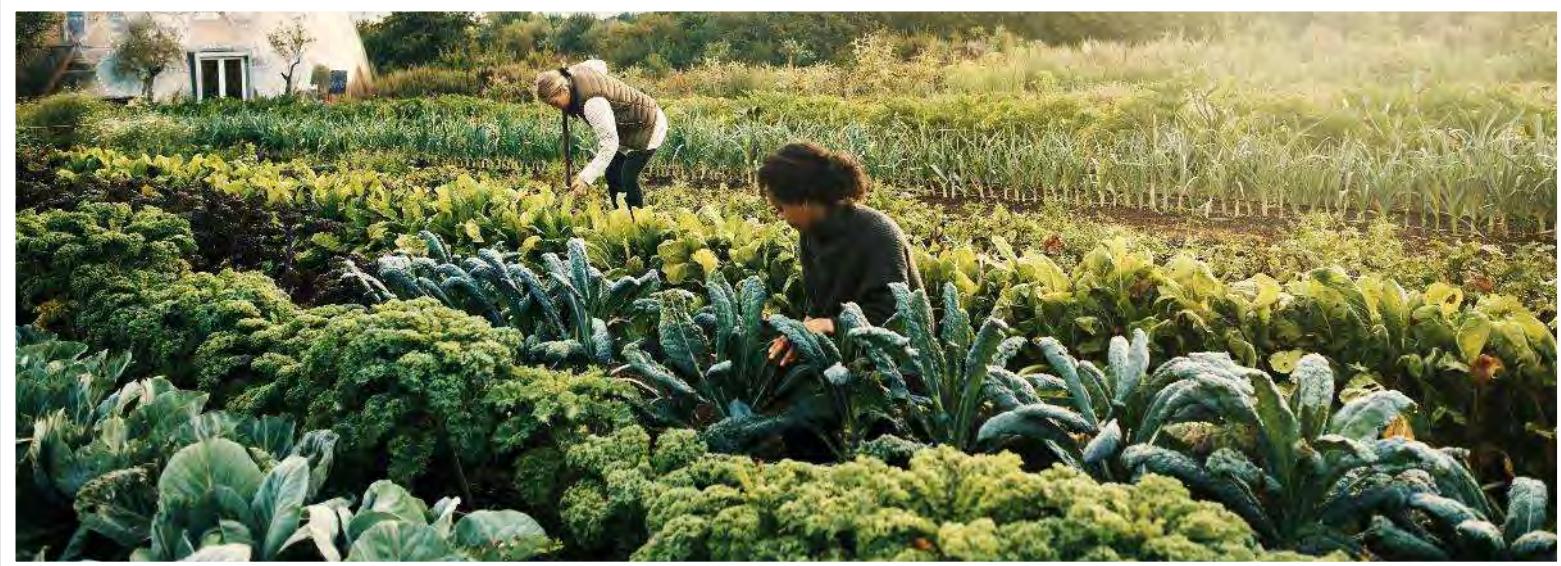
| SECTION 1: PRE-SEASON PLANNING | | | |
|---|--|---|--|
| Irrigation Management | | Harvest Projection | |
| 1. Crop Evapotranspiration (Etc, inches) | | 4. Production Units* (with weight in lbs./tons, if required) | |
| 2. Anticipated Crop Irrigation (inches) | | 5. Projected Harvest Yield | |
| 3. Irrigation Water N Concentration (ppm or mg/L, as NO ³ – N) | | | |

| SECTION 2: NUTRIENT MANAGEMENT | | | |
|--|--|-------------------------------|--------------------------|
| | | Recommended/ Planned N (A) | Actual Applied N (B)* |
| 12. Irrigation Water N Concentration (ppm or mg/L, as NO ³ – N) | | | |
| 13. Harvest Yield * (lbs., tons, etc.) | | Same as box 5 | |

*(Bold Text) Actuals to be reported to VCAILG on the INMR.

Column (A) Recommended/Planned N

Used to calculate nitrogen requirements for annuals and mature perennial crops



Overestimating Yield



Can lead to overapplication of nitrogen

Adjustments should be made with
changing field and weather conditions

Method 1: Cropping History

Average yields from the previous 3-5 seasons

Omit any unusually bad or good years from average

Adjust based on field and market conditions

Example: Fresh Market Carrots

~~580 Crates~~, 640 Crates, 630 Crates, 680 Crates, 650 Crates



AVG = 650 Crates
per acre

Method 2: County Crop Reports

1

Locate County Crop Reports



2

Average yields from previous 3-5 seasons

3

Adjust for field/market conditions



Quiz

Activity 4.2.1

The yields are 25.73, 24.08, 21.87, and 24.33 ton per acre. What is the average expected yield in tons/ac?

Expected yield= 24 tons/ac

4.2 Key Points for Growers

A realistic yield estimate can be made by averaging yields from the previous 3-5 seasons

Overestimating yield can lead to an overapplication of nitrogen



Lesson 3: Actual Crop Yield

4.3 Learning Objectives

Accurately report yield

Indicate what additional yield information should be reported

INMP Worksheet Box 13B

| Recommended/ Planned N (A) | Actual Applied N (B)* |
|-------------------------------|--------------------------|
|-------------------------------|--------------------------|

SECTION 3: HARVEST YIELD

13. Harvest Yield *

(lbs., tons, etc.)

Same as box 5

*(Bold Text) Actuals to be reported to VCAILG on the INMR.

Column (B) Actual Yield

Reporting an accurate yield ensures an accurate evaluation of nitrogen applied vs. nitrogen removed

$$R = \text{Yield} \times \text{N Removal Coefficient}$$

Additional Yield Information



Severe Yield Loss

Fallowed

Non-Bearing

Not Harvested

Difficult to quantify yield operation
(nursery, U-pick, sod, etc.)



Report in INMR and considered
when identifying outliers



Quiz

4.3.1 Activity

True or False: If my field is fallow, I do not need to submit an INMR.

True

False

4.3 Key Points for Growers

Reporting an accurate yield ensures an accurate evaluation of nitrogen applied vs. removed

Additional information on yield can be reported in the INMR



Module 5: Nitrogen Management



Lesson 1: Nitrogen Efficiency Practices

5.1 Learning Objectives

Define nitrogen use efficiency

Describe the 4R principles of nitrogen management

Match nitrogen efficiency practices with their corresponding 4R principle

Nitrogen Use Efficiency

Measure of how well available nitrogen matches nitrogen uptake by the crop

In California agriculture, 70% efficiency is achievable

4Rs of Nitrogen Management



Right
Source



Right
Rate



Right
Time



Right
Place

Right Source

Select nitrogen sources that best meet the crop requirements and field conditions



Right Rate

Ensure that the amount of nitrogen available to the crop is sufficient to meet crop demand.



Right Time

Time applications for periods of high nitrogen demand



Right Place

Target applications to ensure nitrogen is available in the crop's effective rootzone



INMP Worksheet Boxes 17 and 18

| SECTION 5: NITROGEN MANAGEMENT PRACTICES | |
|--|---|
| 17. Nitrogen Efficiency Practices* | 18. Nitrogen Application Practices* |
| (Check all that apply) | (Check all that apply) |
| <input type="checkbox"/> Irrigation Water N Testing <input type="checkbox"/> Soil residual nitrate testing <input type="checkbox"/> Tissue/Petiole Testing <input type="checkbox"/> Cover Crops <input type="checkbox"/> Other _____ | <input type="checkbox"/> Split Fertilizer Applications <input type="checkbox"/> Fertigation <input type="checkbox"/> Foliar N Application <input type="checkbox"/> Variable Rate Applications within Management Unit <input type="checkbox"/> Other _____ |

INMP Worksheet Box 19

19. Data Informed Decision Making

Do you adjust fertilizer applications on this Management Unit based on irrigation water, soil residual, or tissue/petiole testing results?

Yes

No

 Quiz

Activity 5.1.1

Directions: Match the nitrogen efficiency practices with the corresponding 4R principle. Practices may fit under more than one 4R principle but select the best match.

| Practice | 4R Principle |
|---|--------------|
| Splitting nitrogen fertilizer applications | Right time |
| Testing nitrogen levels in irrigation water | Right rate |
| Testing for residual soil nitrate | Right rate |
| Applying ammonium-based fertilizer to minimize leaching | Right source |

5.1 Key Points for Growers

Nitrogen use efficiency is a measure of how well available nitrogen matches nitrogen uptake by the crop

Nitrogen use efficiency can be improved by following the 4R principles



Lesson 2: Soil Available Nitrogen

5.2 Learning Objectives

Describe how to take a representative soil sample

Estimate the availability of nitrogen to plants within a given volume of soil

INMP Worksheet Box 11

| Recommended/ Planned N (A) | Actual Applied N (B) |
|-------------------------------|-------------------------|
|-------------------------------|-------------------------|

SECTION 2: NITROGEN MANAGEMENT

Nitrogen Credits

11. Soil – Pre-Season Available N in
Root Zone
(lbs/ac)

Soil Available Nitrogen



Significant Source



Not Significant Source

Residual Soil Nitrate



Previous Crop

Fertilizer/Irrigation

Organic Materials

Soil Sample Timing

Collect soil samples as close as possible to a planned fertilizer application

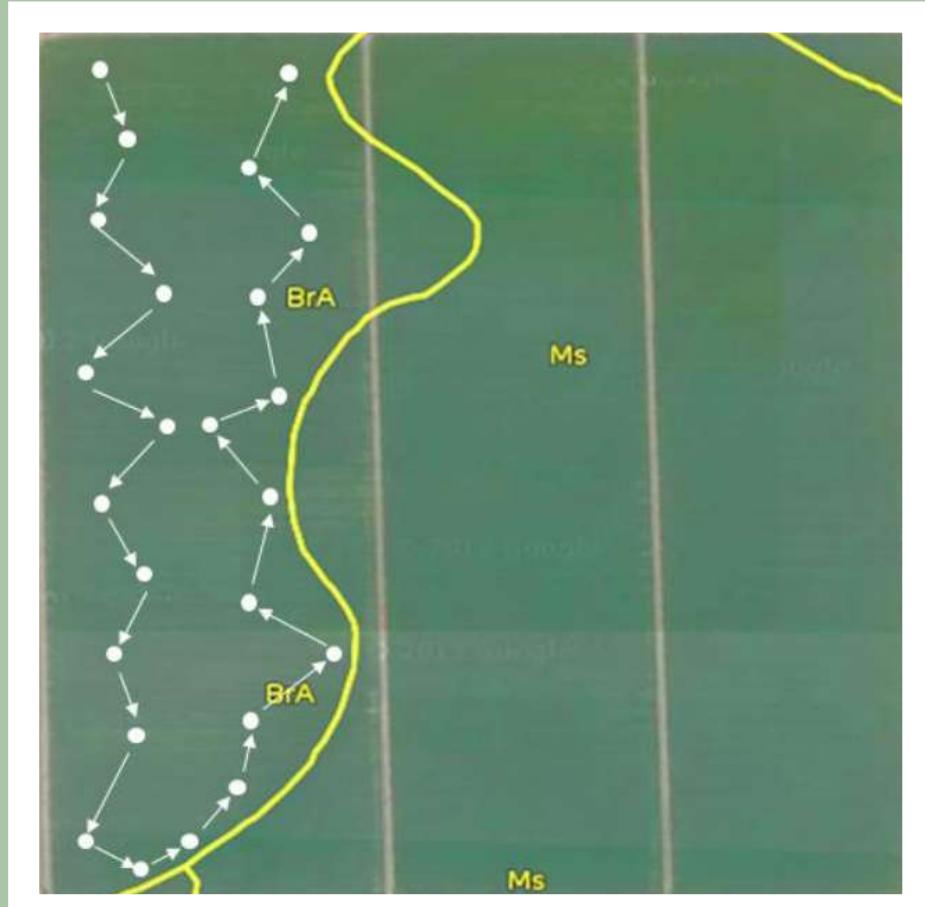


Soil Sample Location

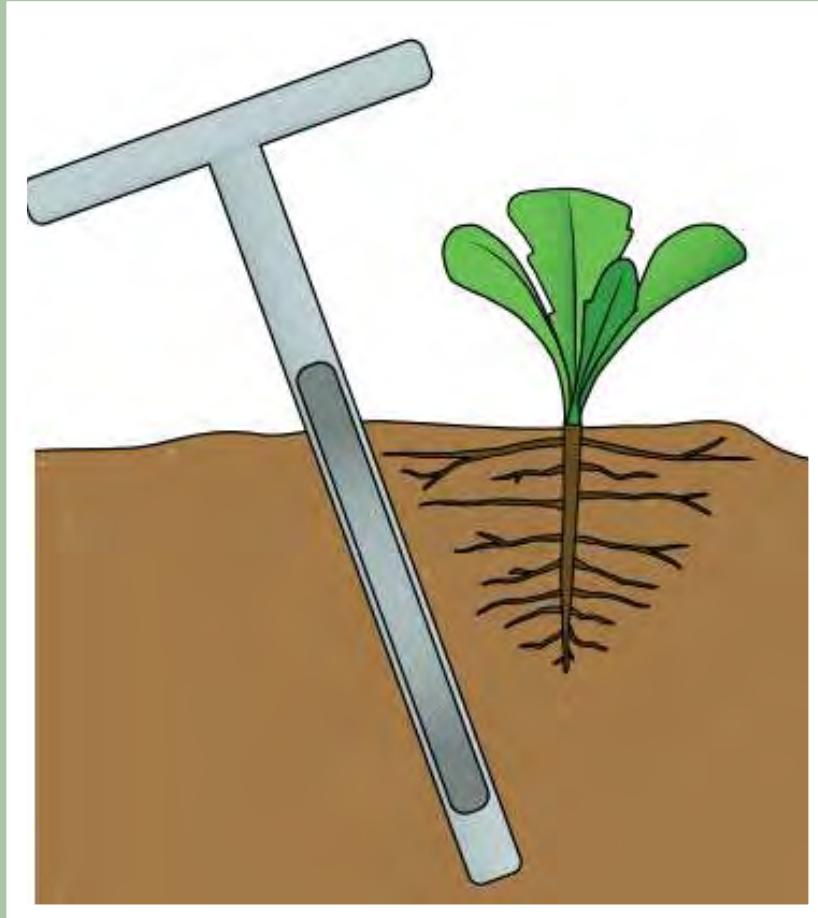
20 + soil cores

Zigzag or “X” pattern

Angle soil probe



Soil Sample Depth



Top 1 – 2 feet

Remove residues

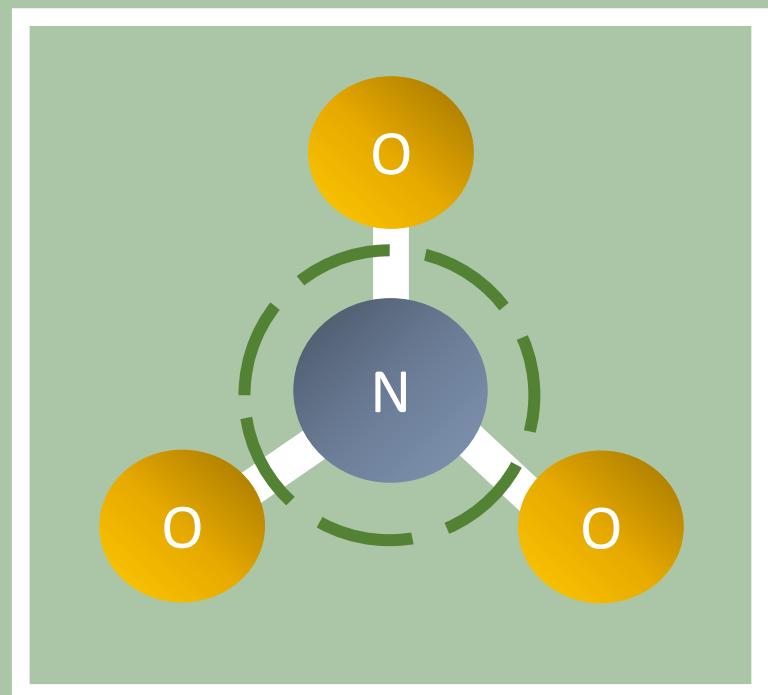
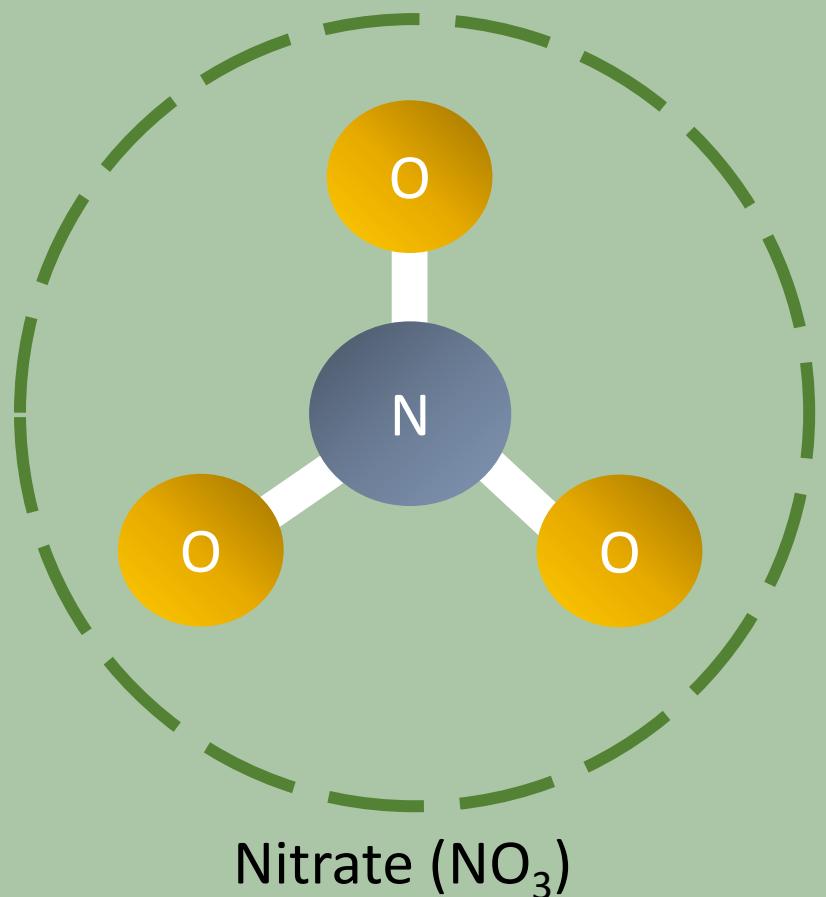
Mix samples thoroughly

Handling Soil Samples

Keep cool and deliver promptly to the lab or quickly air-dry sample



Test Results



Nitrate-Nitrogen ($\text{NO}_3\text{-N}$)

Converting Test Results

1

Convert ppm nitrate to ppm nitrate-N

$$\text{ppm nitrate} \times 0.23 = \text{ppm nitrate-N}$$

2

Convert ppm nitrate-N to lbs. N per acre

$$\text{ppm nitrate-N} \times 4 = \text{lbs. N per acre in top 12 in}$$

 Quiz

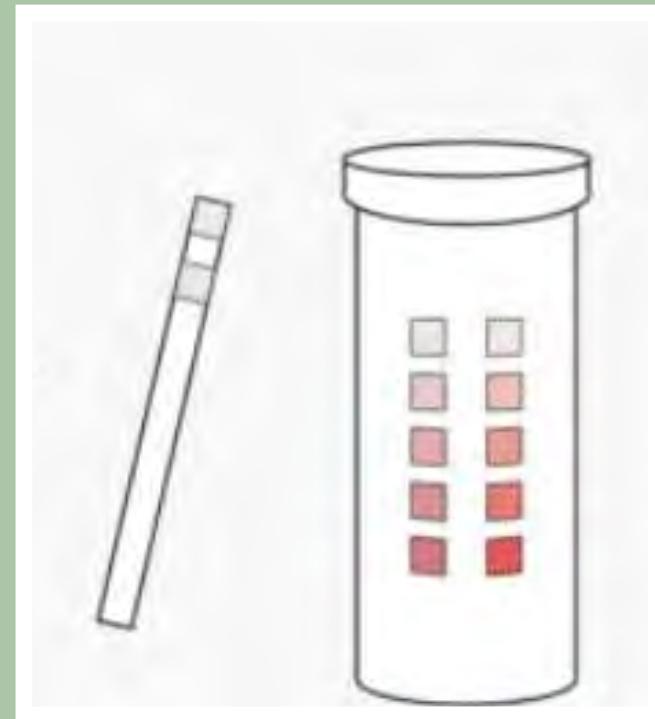
Activity 5.2.1

Convert 20 ppm nitrate to ppm nitrate-N.

ppm nitrate x 0.23 = ppm nitrate-N

20 ppm nitrate x 0.23 = 4.6 ppm nitrate-N

Soil Nitrate Quick Test



https://smallgrains.ucanr.edu/Nutrient_Management/snqt/

Soil Nitrate Quick Test



<https://www.youtube.com/watch?v=V1sDtkGm760&t=466s>

 Quiz

Activity 5.2.2

How many lbs. of nitrogen are available per acre in the top 12 inches of soil? (17.5ppm nitrate-N)

ppm nitrate-N x 4 = lbs. N/ac in the top 12 in of soil

| 17.5ppm nitrate-N x 4= 70 lbs. N/ac

5.2 Key Points for Growers

For a representative sample, collect a min of 20 soil cores throughout the field or management unit

Pounds of nitrogen available in the top foot of a mineral soil can be determined by multiplying ppm nitrate-N by 4



Lesson 3: Nitrogen in Irrigation Water

5.3 Learning Objectives

Estimate the amount of nitrate-N applied in a volume of irrigation water

INMP Worksheet Box 10

| | Recommended/ Planned N (A) | Actual Applied N (B)* |
|---|-------------------------------|--------------------------|
| SECTION 2: NITROGEN MANAGEMENT | | |
| Applied Irrigation N | | |
| 10. N in Irrigation Water* (lbs/ac) | | |

Nitrogen in Irrigation Water

As effective as nitrogen in inorganic fertilizer



Box 10(A) Pre-Season

Estimate using anticipated crop irrigation (Box 2) and the nitrate-N concentration of the water (Box 3)

$$\text{Lbs. N/ac} = \text{Box 3} \times 0.23 \times \text{Box 2}$$

Box 10(B) Post-Season

Calculate using actual crop irrigation and the nitrate-N concentration of the water (box 3)

lbs N/ac = Box 3 x 0.23 x in of water applied

Determining Applied Water

1

Based on flow meter totalizer data

2

Based on system application rate and duration



Quiz

Activity 5.3.1

What method do you use to determine how much water you applied over the season?

Flow Meter Totalizer

Flow Meter Totalizer Data

Reading (End of Season) – Reading (Beginning of Season)

Gallons \div 27,154 \div acres = in/ac

Ac-ft \times 12 \div acres = in/ac



System Application Rate

[Application rate (in/hr) x run time (hr)] ÷ acres

Application Rate Calculators



<http://irrigation.wsu.edu/Content/Calculators/Drip/Drip-Line-Rate.php>

 Quiz

Activity 5.3.2

How many pounds of nitrogen per acre will be applied?

- Anticipated water application is 27in
- Well water contains 20 ppm nitrate-N

$\text{lbs. N/acre} = \text{ppm nitrate-N} \times 0.23 \times \text{in. of water}$

5

20

124

5.3 Key Points for Growers

Nitrogen in irrigation water can be estimated based on inches of water and the nitrate-N concentration



Lesson 4: Nitrogen in Organic Amendments

5.4 Learning Objectives

Recall the importance of the C:N ratio and its effect on nitrogen availability

Estimate the seasonal nitrogen contribution of an organic amendment

INMP Worksheet Box 9

| | Recommended/ Planned N (A) | Actual Applied N (B)* |
|--|-------------------------------|--------------------------|
| SECTION 2: NITROGEN MANAGEMENT | | |
| Applied Organic Material N | | |
| 9. Organic Amendments* (Manure/Compost/Other, lbs/ac estimate) | | |

Organic Amendments



Composts

Animal Manure

Animal Based Fertilizers

Plant Based Fertilizers

Cover Crop & Crop Residue

Plant Available Nitrogen

Organic amendments contain organic (unavailable) and inorganic (available) nitrogen

Transformation of organic nitrogen depends on soil temperature, moisture and C:N ratio of amendment

Nitrogen Availability

| Amendment | C:N Ratio | N Available after 12 weeks |
|---------------------------------|----------------|----------------------------|
| Yard Waste Compost | 13 – 20 | <10% |
| Poultry Manure & Manure Compost | 6 – 8 | 30 – 40% |
| Blood & Feather Meal, Guano | 3 – 4 | 60 – 75% |
| Cover Crop Residue | 12 – 18 | 4 – 35% |
| Vegetable Crop Residue | <15 | 4 – 45% |

UCANR Resources



Article

<https://ucanr.edu/sites/SFA/files/322312.pdf>



Worksheet

<https://ucanr.edu/sites/SFA/files/322313.pdf>



Calculator

http://geisseler.ucdavis.edu/Amendment_Calculator.html

Organic Amendment Calculator

Included Amendments:

- Feather & Blood Meal
- Guano
- Poultry Manure
- Poultry Manure Compost
- Pelleted Materials
- Vermicompost
- Yard Waste Compost



Calculator Example Inputs

Amendment Application

Region*:

Type of amendment*:

Application rate*: tons/ac

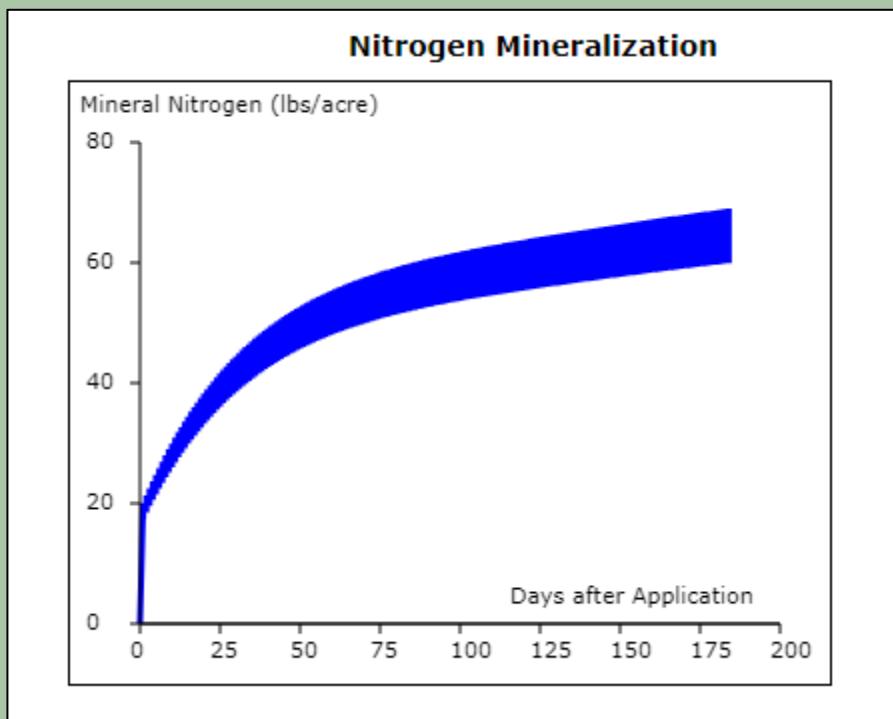
Application date*:

Period of interest:

Depth of incorporation*:

* Required input.

Calculator Example Results



Total N applied:

ⓘ 260 lb/ac

Total mineral N applied:

ⓘ 20 lb/ac

Estimated available N from amendment:

ⓘ 60 - 69 lb/ac

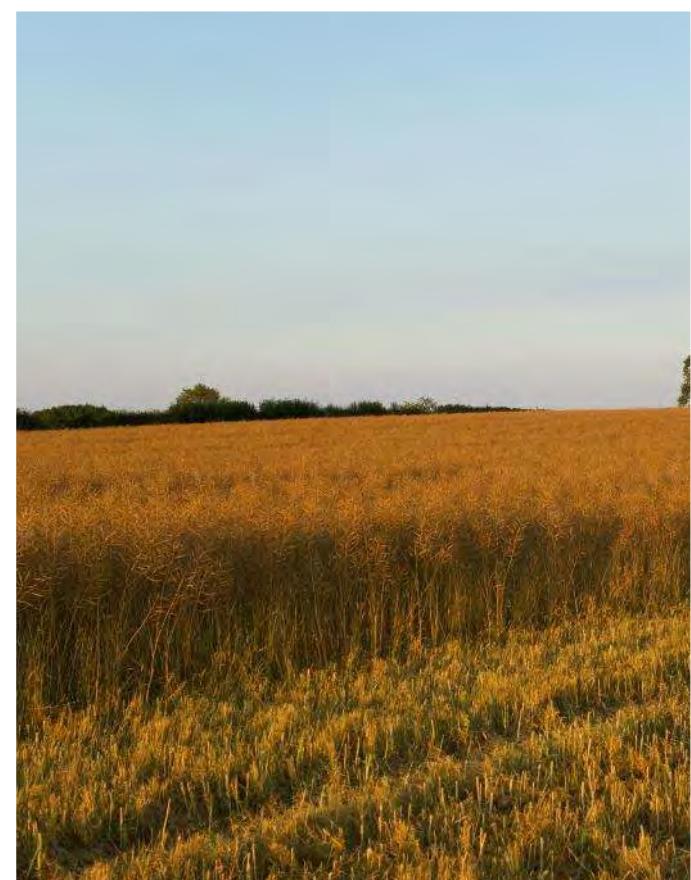
Percent available:

ⓘ 23 - 27 %

Organic Amendment Worksheet

Included Amendments:

- Cover Crops
- Crop Residues
- Composts
- Organic Fertilizers



5.4 Key Points for Growers

The availability of nitrogen is closely related to the C:N ratio of the organic amendment

The nitrogen contribution of an organic amendment can be estimated using the UCANR worksheet or calculator



Lesson 5: Dry and Liquid Nitrogen Fertilizers

5.5 Learning Objectives

Identify fertilizer formulations that contain nitrogen based on the fertilizer grade or name

Calculate the fertilizer application rate when presented with a target nitrogen rate

Calculate the amount of nitrogen applied in a known quantity of fertilizer

INMP Worksheet Box 7

| | Recommended/ Planned N (A) | Actual Applied N (B)* |
|---|-------------------------------|--------------------------|
| SECTION 2: NITROGEN MANAGEMENT | | |
| Applied Nitrogen Fertilizer | | |
| 7. Dry/Liquid Fertilizer N* (lbs/ac) | | |

Fertilizer Labels

Super Excellent Grow

20- 10 – 10

Total Nitrogen (N)

20%

Available Phosphate (P_2O_5)

10%

Soluble Potash (K_2O)

10%



Grade



Guaranteed
Analysis

 Quiz

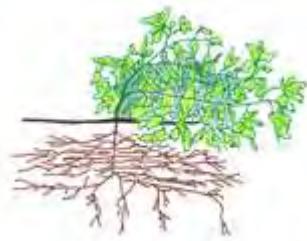
Activity 5.5.1

Directions: Based on the fertilizer name or grade listed below determine the %N.

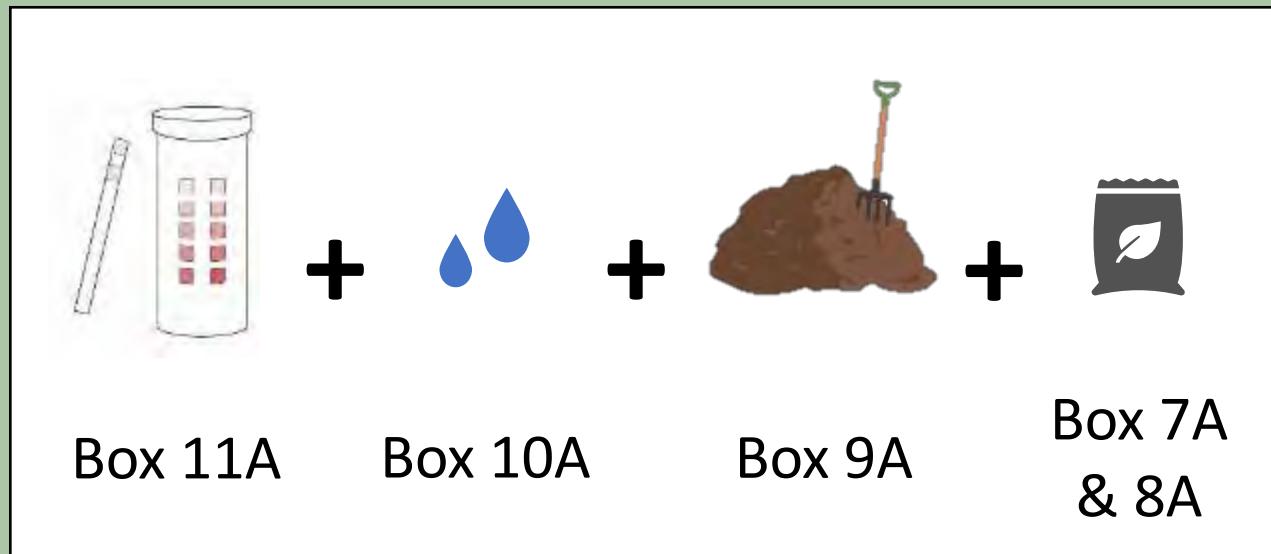
| Fertilizer | %N |
|------------|-----|
| 2-4-6 | 2% |
| CAN-17 | 17% |
| UAN 32 | 32% |
| AN-20 | 20% |

Box 7(A) Pre-Season

How much nitrogen to apply through granular or liquid fertilizer?



Box 12A



Granular Nitrogen Fertilizers

A granular fertilizer application rate is based on the %N of the fertilizer and the desired N rate

Fertilizer Rate = [nitrogen rate (lb. N/ac) x 100] ÷ % N

Liquid Nitrogen Fertilizers

A liquid fertilizer application rate is based on the product density and %N and the desired N rate

$$\text{Rate} = [\text{nitrogen rate (lb. N/ac)} \times 100] \div [\% \text{ N} \times \text{density}]$$

Quiz

Activity 5.5.2

A grower needs to apply 50 lbs. of nitrogen fertilizer per acre.

How many gallons of UAN 32 would they apply? (UAN 32 density = 11.0 lbs./gallon)

$$\text{Rate} = [\text{nitrogen rate (lb. N/ac)} \times 100] \div [\% \text{ N} \times \text{density}]$$

14

2

11

Box 7(B) Post-Season

How much nitrogen was actually applied through granular or liquid fertilizer?



Granular Fertilizers

The amount of nitrogen applied is determined using the %N of fertilizer and the fertilizer application rate

$$N \text{ Applied} = (\% N \div 100) \times \text{application rate (lbs./ac)}$$

Liquid Fertilizers

The amount of nitrogen applied is determined using the product density and %N and the application rate

N Applied= density (lbs./gal) x (% N ÷ 100) x rate (gal/ac)

 Quiz

Activity 5.5.3

A grower applied 10 gallons of CAN 17 (density = 12.7 lbs./gal) per acre and 200 lbs. of granular urea (46-0-0) per acre. In total how many lbs of nitrogen were applied?

- 92
- 114
- 22

Granular N= $(\% \text{ N} \div 100) \times \text{application rate (lbs./ac)}$

Liquid N= $\text{density (lbs./gal)} \times (\% \text{ N} \div 100) \times \text{rate (gal/ac)}$

5.5 Key Points for Growers

The fertilizer grade shows the percentage of nitrogen (N), phosphate (P₂O₅), and Potash (K₂O) in a product

Understanding the information on a fertilizer label will help determine the amount of nitrogen in a fertilizer application



Lesson 6: Foliar Nitrogen Fertilizers

5.6 Learning Objectives

Describe methods of foliar application that can increase absorption

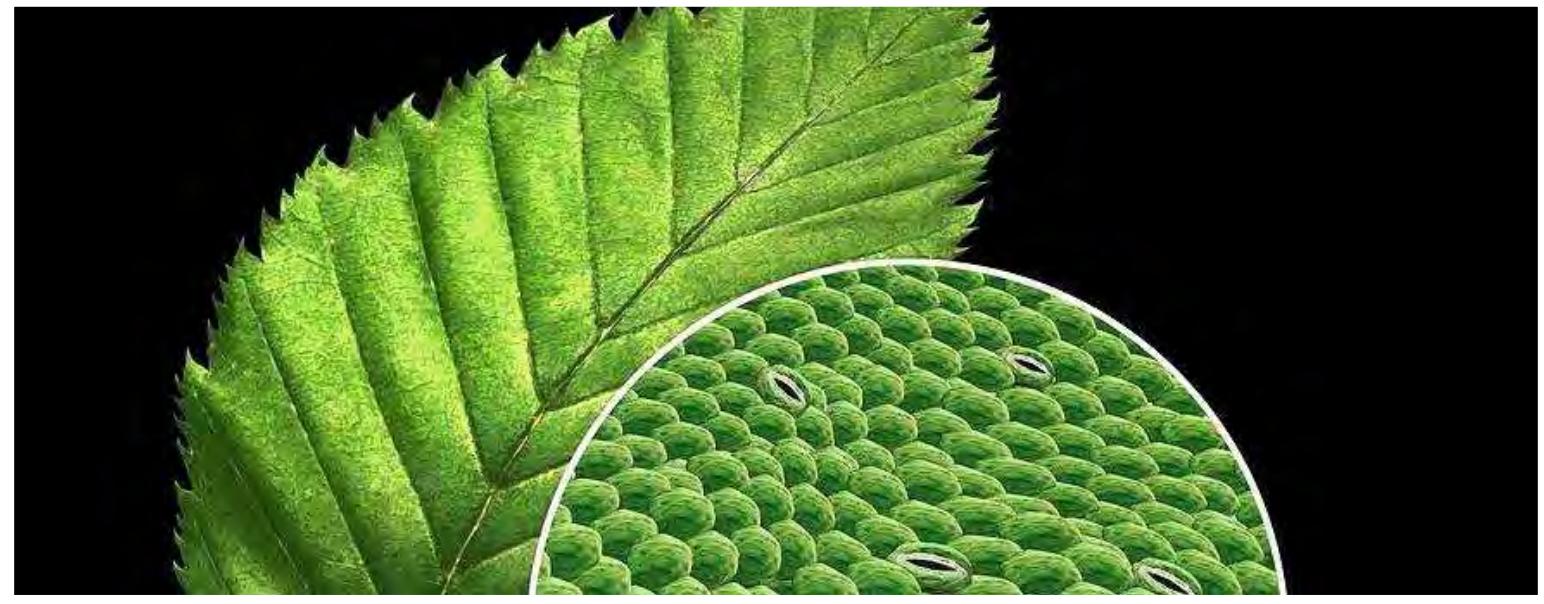
Calculate the amount of nitrogen applied in a foliar fertilizer application

INMP Worksheet Box 8

| | Recommended/ Planned N (A) | Actual Applied N (B)* |
|---|-------------------------------|--------------------------|
| SECTION 2: NITROGEN MANAGEMENT | | |
| Applied Nitrogen Fertilizer | | |
| 8. Foliar Fertilizer N* (lbs/ac) | | |

Foliar Nitrogen Fertilizers

Plant leaves can absorb urea, ammonium, and nitrate through small pores called stomata



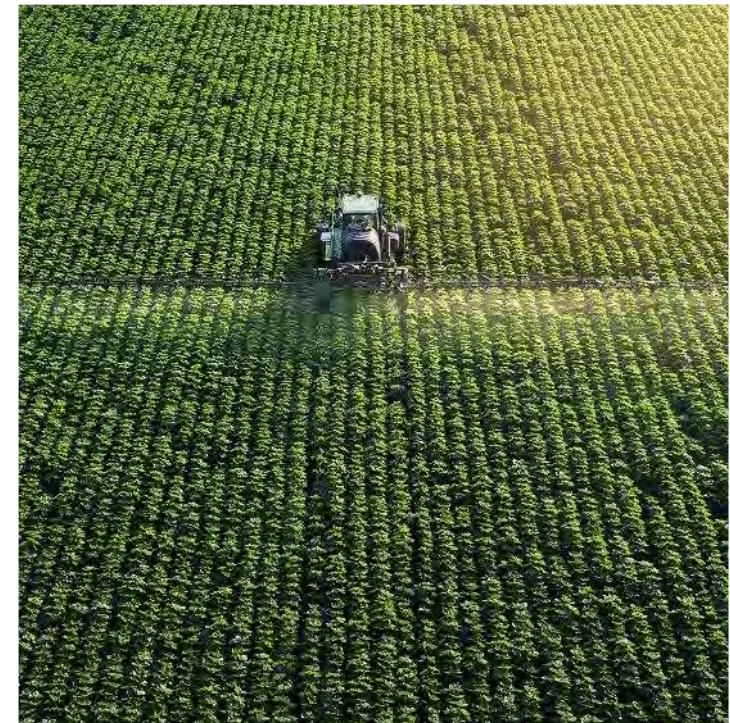
Foliar Applications

Coat plant leaf

Apply in morning or evening

Add surfactant to spray

Use electrostatic sprayer



Use Caution

Highly concentrated sprays can “burn” plant tissues and cause crop damage



Foliar Fertilizer Recommendations

Foliar fertilizers are not a replacement for soil applied macronutrients

Should be used as a supplemental source of nitrogen

Box 8(A) Pre-Season

The application rate is determined using the product density (lbs./gallon), %N and the desired nitrogen rate

Rate= [desired N rate (lbs. N/ac) x 100] ÷ [%N x density]

Box 8(B) Post-Season

The amount of nitrogen applied is determined using the product density and %N and the application rate

N Applied= density (lbs./gal) x (% N ÷ 100) x rate (gal/ac)

 Quiz

Activity 5.6.1

Which of the following application techniques can increase the absorption or efficiency of foliar nitrogen fertilizers?

- applying in low temperatures
- applying in high temperatures
- applying in low humidity
- adding a surfactant
- applying in high humidity

5.6 Key Points for Growers

To reduce evaporation, applications should be made in low temperatures or when the relative humidity is high

The amount of nitrogen in a foliar application is based on the product density, %N and the application rate

Break



Lesson 7: Total Nitrogen – Recommended and Applied

5.7 Learning Objectives

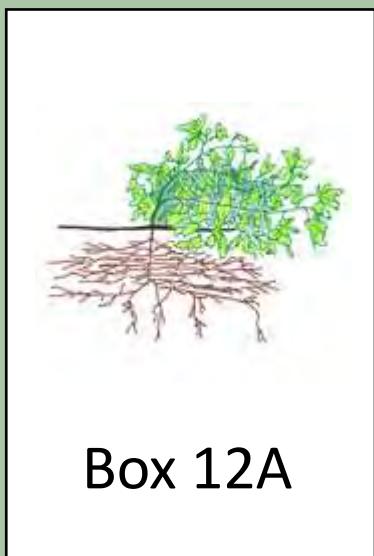
Estimate total nitrogen required for the upcoming season

Calculate total nitrogen applied based on all nitrogen inputs

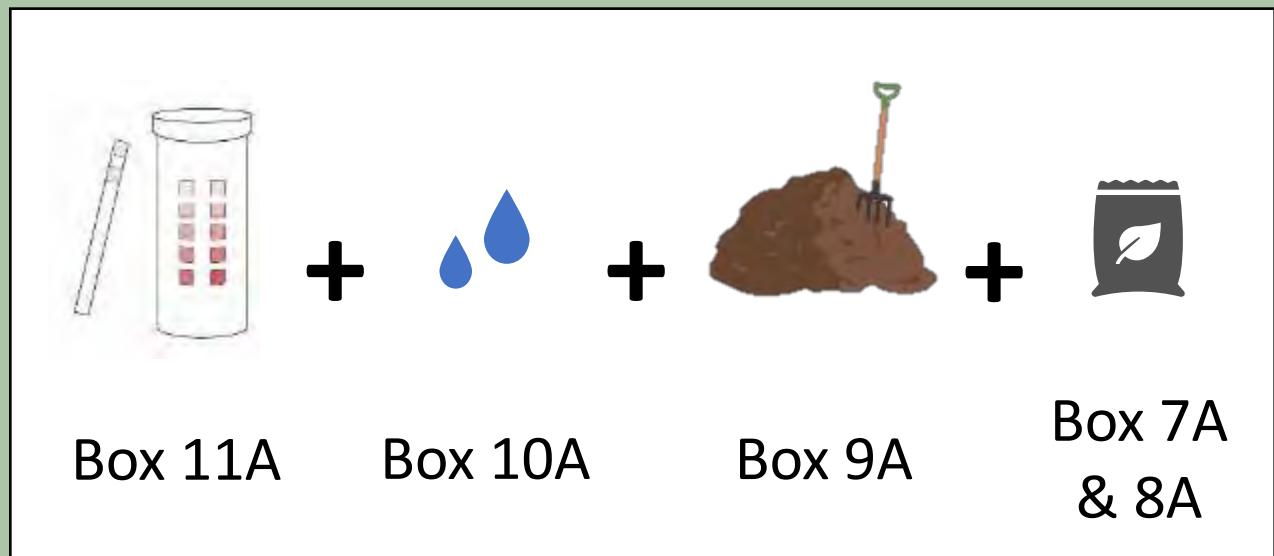
INMP Worksheet Box 12

| | Recommended/ Planned N (A) | Actual Applied N (B)* |
|--|-------------------------------|--------------------------|
| SECTION 2: NITROGEN MANAGEMENT | | |
| Total Nitrogen Recommended/Applied | | |
| 12. TOTAL NITROGEN (7+8+9+10) (lbs/ac) | | |

Box 12(A) Pre-Season



=



Estimating Nitrogen Required

1

N removed from the field with harvest

2

Recommend N rates from field research

Method 1: N Removed with Harvest

Use for orchard crops and field/vegetable crops where the majority of crop residue is removed with harvest



Method 1 Calculation

Total N = (Expected Yield x N Removal Coefficient) ÷ NUE

List of Approved Nitrogen Removal
Coefficients

<https://www.farmbureaucv.com/vcailg/>



Method 1 Calculation Cont.

Some mature orchard crops require additional nitrogen for perennial tissue growth (10-40 lbs.)

Total N = [(Expected Yield x N Removal Coefficient) + N for perennial growth] ÷ NUE

Method 1 Calculation Cont.



Fruit Growers Laboratory - Avocado Nitrogen Management Plan – Calculating Nitrogen Demand

| Yield (1000 lbs.) | Percent Canopy | N RATE (lbs.) for Season |
|-----------------------|----------------|--------------------------|
| 0 | | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 (See example) | 100 | 79 |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 18+ (same rate as 18) | | |

Example: 10,000 lb. yield = 10 X 2.50 lbs. + 30 lbs. (% canopy maintenance N) divided by 0.7
NUE (70 % nitrogen use efficiency for solid set sprinklers) = 79 lbs. of N required for season.

| *Percent Canopy | Tree Maintenance N (lbs.) | Approximate Tree Age (Years) |
|-----------------|---------------------------|------------------------------|
| 100 | 30 | 8+ |
| 80 | 27 | 6-7 |
| 60 | 24 | 5-6 |
| 40 | 21 | 4-5 |
| 20 | 18 | 3-4 |
| 10 or less | 15 | 1-2 |

***Projected Yield** is determined by calculating total yield in lbs. from previous years pack out records as well as field estimates. Actual Yield (Pack out) values from your packing company will

Method 1 Calculation Cont.

FGL
ENVIRONMENTAL AGRICULTURAL
Technical Services

Fruit Growers Laboratory - Citrus
Nitrogen Management Plan – Calculating Nitrogen Demand

| *Yield (1000 lbs.) | *Percent Canopy | N RATE (lbs.) for Season |
|--------------------|-----------------|--------------------------|
| <3 use canopy only | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 10 | | |
| 15 | | |
| 20 [See Example] | 100 | 86 |
| 25 | | |
| 30 | | |
| 35 | | |
| 40 | | |
| 45 | | |
| 50 | | |
| 50+ same as 50 | | |

* RATE recommendation assumes average NUE (nitrogen use efficiency) of 70 %.

Example: 20,000 lb. yield X 1.5 lbs. per 1000 lbs. fruit = 30 lbs. for (maintenance N rate for 100 % canopy) divided by 0.7 NUE (70 % nitrogen use efficiency for solid set sprinklers) = rate for season. Calculation: $20 \times 1.5 = 30$ plus 30 maintenance = 60 divided by 0.7 = **85.7 RATE**

| *Percent Canopy | Tree Maintenance N (lbs.) | Approximate Tree Age |
|-----------------|---------------------------|----------------------|
| 100 | 30 | 8+ |
| 80 | 27 | 6-7 |
| 60 | 24 | 5-6 |
| 40 | 21 | 4-5 |
| 20 | 18 | 3-4 |
| 10 or less | 15 | 1-2 |

***Projected Yield** is determined by calculating total yield in lbs. from previous years pack out records as well as field estimates. Actual Yield (Packout) values from your packing company will be used at the end of the season and reported on the NMP worksheet to evaluate program efficiency. This information should be available from your fruit pack.

***Percent Canopy** is determined by estimating the shaded or vegetated coverage area of an orchard from an aerial view. This method determines the amount of nitrogen needed by trees.

 Quiz

Activity 5.7.1

Calculate the pounds of nitrogen needed per acre for a 10-year-old avocado orchard:

- Expected yield= 2.75 tons/ac.
- N Removal coefficient= 4.4 lbs. N/ton of avocados
- Perennial growth requirement = 15 lbs. N/ac

$$\text{Total N} = \frac{[(\text{Expected Yield} \times \text{N Removal Coefficient}) + \text{N for perenial growth}]}{\text{NUE}}$$

$$\text{Total N} = \frac{[(2.75 \text{ tons/ac.} \times 4.4 \text{ lbs. N/ton}) + 15 \text{ lbs. N/ac}]}{0.7}$$

$$\text{Total N} = 38.7 \text{ lbs. N/ac}$$

Method 2: Rates from Research

Use for field/vegetable crops where a significant amount of crop residue is left in the field after harvest



Method 2 Example



California Fertilization Guidelines

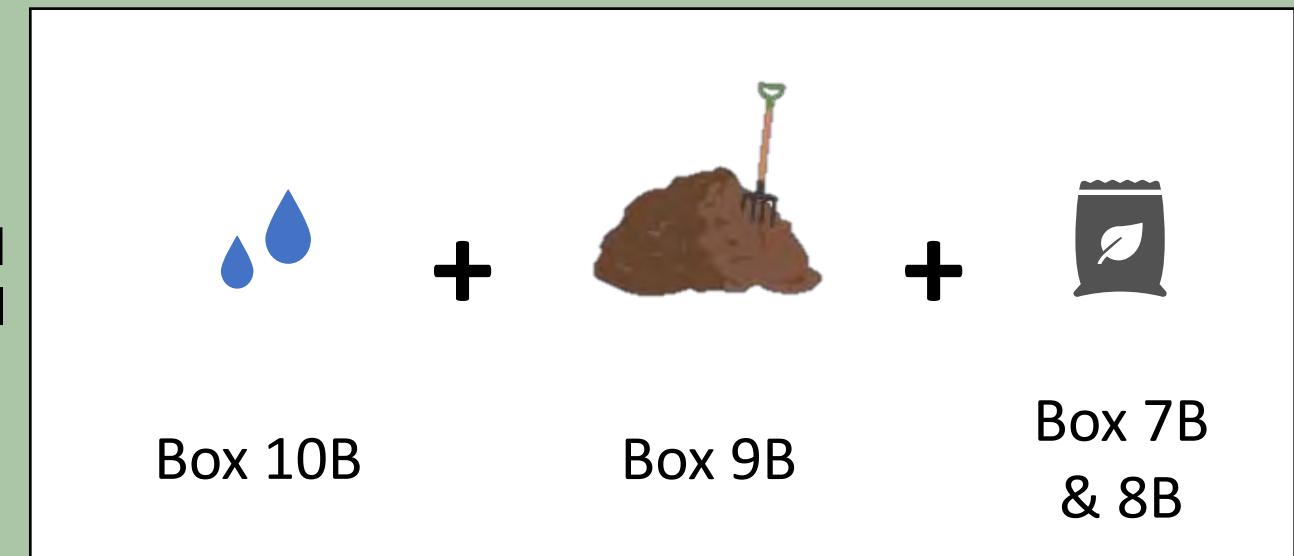
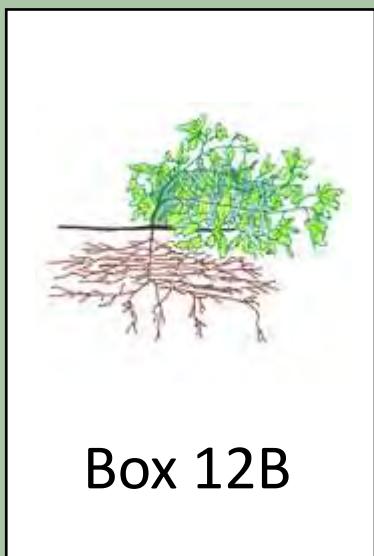
Total N Recommended = 200 lbs. N/ac

Box 12(B) Post-Season

Total nitrogen applied (Box 12B) can be calculated by adding together all N inputs (Box 7B through 10B)



Box 12(B) Post-Season



 Quiz

Activity 5.7.2

Based on the provided values below for Boxes 7B-10B calculate total nitrogen applied (Box 12B).

| Nitrogen Sources | Recommended / Planned N (A) | Actual N (B) |
|---|--------------------------------|--------------|
| 7. Dry/Liquid Fertilizer N (lbs./ac) | | 80 |
| 8. Foliar Fertilizer N (lbs./ac) | | 10 |
| 9. Organic Amendments (lbs./ac) | | 12 |
| 10. N in Irrigation Water (lbs./ac) | | 20 |
| 11. Soil - Available N in Root Zone (lbs./ac) | | -- |
| 12. Total Nitrogen (lbs./ac) | | 122 |

5.7 Key Points for Growers

Crop N requirement can be estimated based on N removed during harvest or crop specific field research

Total nitrogen applied (Box 12B) is a sum of nitrogen applied from all sources (Boxes 7B through 10B)



Lesson 8: Nitrogen Applied Vs Nitrogen Removed

5.8 Learning Objectives

Calculate nitrogen removed during harvest based on yield and a nitrogen removal coefficient

Calculate the ratio between total nitrogen applied and nitrogen removed during harvest

Nitrogen Applied Vs. Nitrogen Removed

Regional Water Quality Control Board is interested in
Nitrogen Applied (A) vs Nitrogen Removed (R)

Used as a metric to determine the potential for
nitrogen loss

Not required on INMP Worksheet or INMR (values are
calculated by VCAILG)

Nitrogen Applied (A)

N in Irrigation Water

N in Organic Amendments

Dry/Liquid N Fertilizer

Foliar N Fertilizer



 Quiz

Activity 5.8.1

Which nitrogen source is included on the INMP Worksheet, but is not included in the A/R calculation?

Box 11: Soil- Available N in Root Zone

Nitrogen Removed (R)

(R) = yield x nitrogen removal coefficient

List of approved Nitrogen Removal



<https://www.farmbureauvc.com/vcailg/nitrogen-management-planning/>

 Quiz

Activity 5.8.2

Directions: Complete the table below using the list of nitrogen removal coefficients found on VCAILG Irrigation and Nutrient Management Plan webpage <https://www.farmbureauvc.com/vcailg/> .

| Crop | Yield/acre | N Removal Coefficient | N Removed (R)/acre |
|--------------|--------------|-----------------------|---|
| Lemons | 19 tons/acre | 3.49 lbs/ton of fruit | $(R) = 19 \text{ tons} \times 3.49 \text{ lbs/ton of fruit}$ 66.31 lbs./acre |
| Celery | 50 tons/acre | 2.12 lbs/ton | $(R) = 50 \text{ tons} \times 2.12 \text{ lbs/ton}$ 106 lbs./acre |
| Strawberries | 24 tons/acre | 2.8 lbs/ton | $(R) = 24 \text{ tons} \times 2.8 \text{ lbs/ton}$ 67.2 lbs./acre |

Calculating A/R and A-R

Nitrogen Applied (A) ÷ Nitrogen Removed (R)

Nitrogen Applied (A) - Nitrogen Removed (R)



Interpreting A/R Values

$A/R < 1$: more nitrogen was removed from the field with harvest than was applied

$A/R = 1$: the same amount of nitrogen that was applied to the field was removed with harvest

$A/R > 1$: more nitrogen was applied to the field than was removed with harvest

Quiz

Activity 5.8.3

A strawberry grower in Oxnard applied 300 lbs. N/ac and yielded 25 ton/ac. The nitrogen removal coefficient for strawberries is 2.8 lbs. N/ton. Calculate the A/R value.

- 2
- 4.3
- 12
- 20

$$A = 300 \text{ lbs. N/ac}$$

$$\begin{aligned} R &= 25 \text{ ton/ac} \times 2.8 \text{ lbs. N/ton} \\ &= 70 \text{ lbs. N/ac} \end{aligned}$$

5.8 Key Points for Growers

Calculating A/R and/or A-R is not required for the INMP Worksheet or Summary Report, but it can be useful in monitoring N

To calculate A/R and/or A-R growers need total nitrogen applied, yield, and nitrogen removal coefficient



Module 6: Certification



Lesson 1: Certification Options & Requirements

6.1 Learning Objectives

Determine when an INMP Worksheet requires certification.

List the options for INMP Worksheet certification.

Recall the requirements to obtain and maintain the eligibility to self-certify INMP Worksheets

INMP Worksheet Certification

All INMPs must be certified

Exception: INMPs of landowners/growers whose farming operation is less than 10 acres and has not been identified as an outlier



Certification Section

I, [REDACTED], certify this INMP in accordance with the statement above.

INMP NO. 

[REDACTED] (Signature)

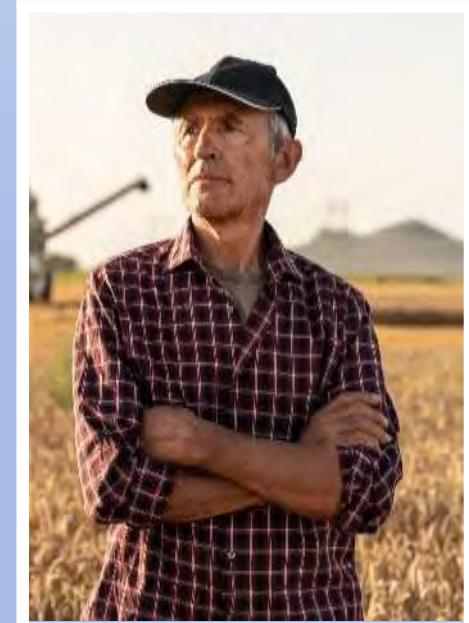
[REDACTED] (Date)

Certification Options

CCA

NRCS

Self-
Certification



Option 1: CCA

Certified Crop Adviser certified by the American Society of Agronomy

Option 2: NRCS

Certified by NRCS Nutrient Management Technical Service Provider

OR

Certified by grower who follows site-specific recommendation from NRCS

Option 3: Self-Certification

Certified by grower who completes CDFA Training Program

Grower must:

- Complete Irrigation and Nitrogen Management Training and Exam
- Participate in Continuing Education



Continuing Education

3 hours every 3 years -
Content with focus in
irrigation and/or nitrogen
management

VCAILG advertised events
listed as “INMP Self-
Certification CEUs”

On-Demand video or
podcast CEUs available on
CDFA FREP Continuing
Education webpage



The screenshot shows the CDFA (California Department of Food and Agriculture) website. The top navigation bar includes links for Home, IS, FFDRS, FREP, and Continuing Education. The main content area is titled "Continuing Education" and "IRRIGATION AND NITROGEN MANAGEMENT TRAINING PROGRAM". It features a sub-section for "Continuing Education Courses" which describes the requirement for 3 hours of credit every 3 years. It also includes sections for "Live or In-Person Continuing Education (CE)" and "Self-Study Continuing Education (CE)" with links to their respective course lists.

https://www.cdfa.ca.gov/is/ffldr/frep/continuing_education.html

 Quiz

Activity 6.1.1

How do growers maintain their eligibility to self-certify INMP Worksheets?

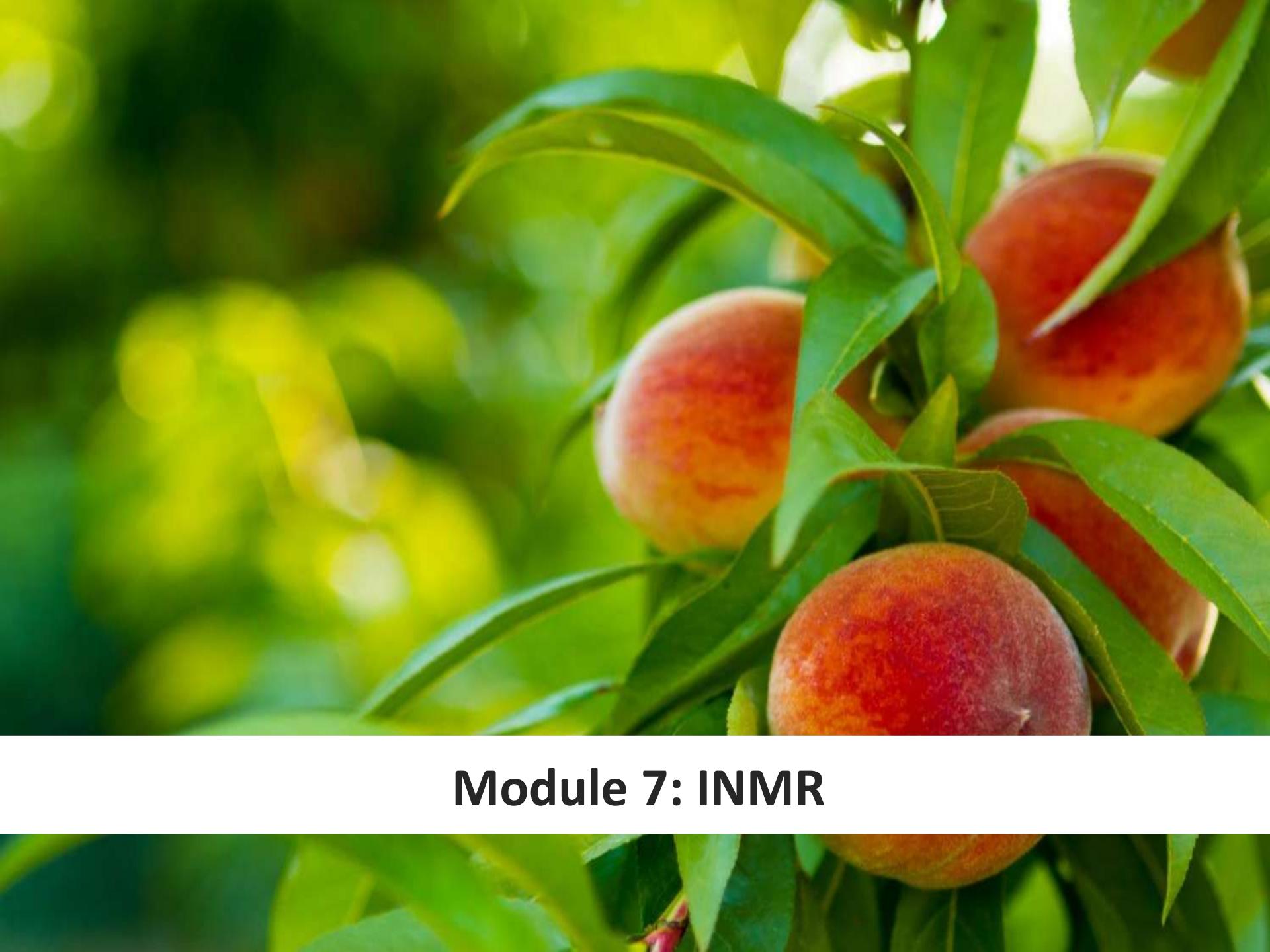
A grower must complete 3 hour of CDFA INMP continuing education hours every three years.

6.1 Key Points for Growers

All INMP Worksheets must be certified (exemption for ≤ 10 acres and not outlier)

INMP Worksheets may be certified by a CCA, NRCS, or self-certified by a grower

For the CDFA Training Program, growers must complete this training and exam and participate in continuing education



Module 7: INMR



Lesson 1: Reporting Data

7.1 Learning Objectives

Identify components of the INMP Worksheet that are transferred to the INMR

Recognize the deadlines for submittal of the INMR

Outline the process for submitting INMR

INMR

Information from the INMP Worksheet that transfers to the INMR is marked with an asterisk (*) or are highlighted in green in the Excel version.

Data from multiple INMP Worksheets can be reported on one INMR

INMR Parts

1

Ranch Management and Management Unit (MU) Information

2

Irrigation and Nutrient Management Report

3

Irrigation and Nutrient Management Practices

4

Certification

Part 1: Ranch Management and MU Information

Pulls information from the Ranch Management and Management Unit Information section of the associated INMP Worksheet(s)



Part 1: Ranch Management and MU Information



IRRIGATION AND NUTRIENT MANAGEMENT PLAN (INMP)

Excel Version 2 (Revised Nov 21, 2025)

| Grower Name*: | | | | Grower VCAILG ID # *: | | | | |
|--|-----------------|---------------------|----------------|-----------------------|--------------------------|--|---|--|
| Ranch Management | | | | | | | | |
| Ranch Name: | | | | | | | | |
| APN(s) | Irrigated Acres | Ranch Notes: | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Total Ranch Acres: | | | | | | | | |
| Management Unit (MU) Information | | | | | | | | |
| List all MUs within the Ranch listed above | | | | | | | | |
| MU Name* | Crop Type* | For Perennial Crops | | For Annual Crops | | Was this MU identified as a statistical outlier by the Coalition last year?* | Does the Grower meet the alternative reporting qualifications for "A" only reporting?* (Refer to "A" Only Reporting Qualifications listed in INMP Worksheet Instructions) | Does the Grower's total farming operation consist of ≤10 acres?* (If yes, INMP certification is not required unless previously identified as an outlier) |
| | | MU Irrigated Acres* | Reporting Year | Crop Age * | Crop Establishment Date* | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

* Indicates an information field required to be reported to VCAILG on the Irrigation and Nutrient Management Report (INMR)

Part 2: Irrigation and Nitrogen Management Report

Pulls information from the Nitrogen Management and Harvest Yield sections of the INMP Worksheet (INMP Sections 1, 2, and 3).



Section 1: Pre-Season Planning

Section 2: Nitrogen Management

Section 3: Harvest Yield

Part 3: Irrigation and Nutrient Management Practices

Pulls information from INMP Worksheet(s) on irrigation methods and management practices



Irrigation Management Practices

Nitrogen Management Practices

INMR Deadlines

Deadline to submit initial INMR

March 1, 2026

annually thereafter

Perennial Crops



Annual Crops



- Covers: **Previous calendar year** (Jan - Dec)
- 1st INMR will cover calendar year 2025
- Covers all crops that completed harvest in previous calendar year.
- 1st INMR will cover crops established and harvested between March 1 and December 31, 2025.

1st Year Reporting

Which Management Units
do I include on my 1st INMR
(Due March 1, 2026)?

Was the crop
planted before
March 1, 2025?

Yes

Exempt
(no INMP or INMR)

No

Was it harvested
before Dec 31, 2025?

Yes

Include Management
Unit on March 1, 2026
INMR

No

Include Management Unit
on March 1, 2027 INMR

(Note: you will still submit
an INMR in 2026 that
states “no completed crop
cycle to report”)

INMR Submittal



Reporting access early 2026 – Due by March 1, 2026

Online

Office hours and call support available for those that need assistance

Information from the INMP Worksheet/Spreadsheet that transfers to the INMR is marked with an *

Part 4: Certification

Asks growers to select the method of certification that was used on the associated INMP Worksheet(s).



Certification Method



Quiz

Activity 7.1.1

Information that is transferred from the INMP Worksheet to the INMR is marked with which of the following?

- underlined font
- bold font
- an asterik *

7.1 Key Points for Growers

Components of the INMP Worksheet that transfer to the INMR are marked with an asterisk *

To maintain compliance, INMRs must be submitted by the deadline

Check with your coalition prior to the deadline for submittal guidance and instructions

Questions?

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Exam

30 question, multiple choice exam

You must take the test individually, but it is open book

Test results will be emailed to you within one week

Need a score of 80% or greater to pass the test

Passing rate over 90% for previous exams (retake exams available – just contact VCAILG)

Exam – For Zoom Attendees

Link in the chat

Must complete exam within 24 hours (only take once!)

Must have attended full Zoom training to be eligible for certification

Link will also be emailed to all attendees approx.
1 hour after training ends