



# CDFA FREP Nitrogen Management Efforts

June 11, 2012



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California Department of Food and Agriculture



# FREP Background

- Established in 1990 through legislative action
- Funds and coordinates research to advance the environmentally safe and agronomically sound use of fertilizing materials
- Funded by mill assessment on the sale of fertilizing materials
- FREP serves:
  - Growers
  - Agricultural advisors and consultants
  - Extension personnel
  - Agricultural supply and service professionals
  - Public agencies
  - The public
  - Other interested parties



# FREP Priorities

- Fertilizer Inspection Advisory Board and Technical Advisory Subcommittee advises FREP on research and education priorities and project selection
- 2012 priorities include:
  - Fertilizer use efficiency
  - Irrigation and water management
  - Nutrient requirements for specialty crops in environmentally sensitive areas
  - Education and outreach

# Funding Process

December 2011

- Request for project proposals announced

February 2012

- Concept proposals due

March 2012

- Advancement of concept proposals announced

May 2012

- Full proposals due

August 2012

- Award notification

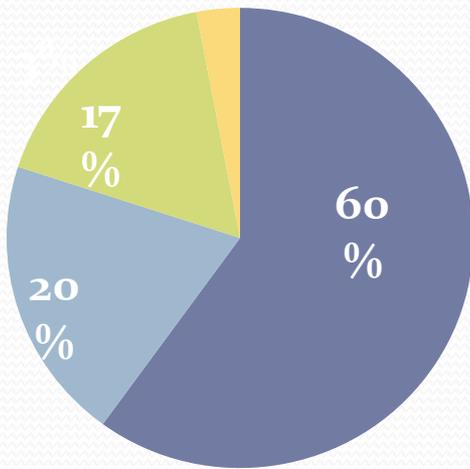
January 2013

- Project start date

# FREP Focus

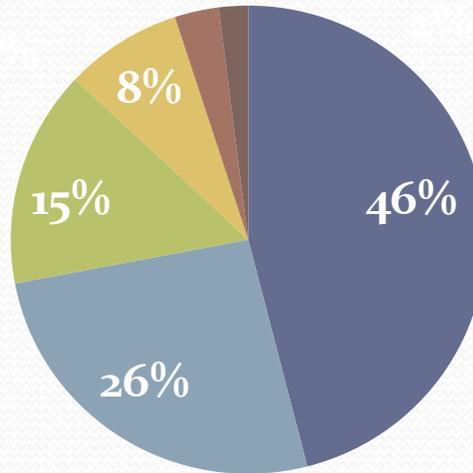
- Over \$12 million spent on 160 technical, research, and education projects across California over the last 20 years

### Location



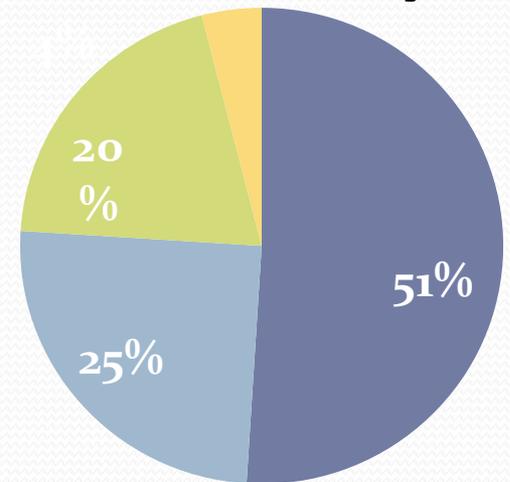
- Central Valley, 60%
- Statewide, 20%
- Coastal Regions, 17%
- Desert, 3%

### Type



- Nutrient/Soil Testing/Fertilizer Practice, 46%
- Irrigation/Fertigation/Precision Agriculture, 26%
- Educational, 15%
- Other (Pest Interactions, Heavy Metals), 8%
- Compost/Cover Crop, 3%
- Air Quality, 2%

### Commodity



- Tree and Field Crop, 51%
- Other (Soil, Multiple Commodities), 25%
- Vegetable Crop, 20%
- Nursery/Horticulture, 4%



# New Initiatives

- Three major initiatives are taken up by FREPP
  1. Online searchable FREPP research database
  2. Nutrient Management Plan (NMP) training and certification program
  3. Field demonstration of FREPP research



# Initiative 1: Searchable FREP Database

*Phase 1: Database Development*



# Searchable Database

- Goal is to make FREP research readily available, easily understandable, and convenient to use
- Timeline:
  - Input template and user interface – COMPLETED
  - Summarize research reports and enter into the database UC Davis – ONGOING
  - Rollout (continue adding data) – July 1, 2012

# Current Information



## FERTILIZER RESEARCH AND EDUCATION PROGRAM

1220 N Street, Sacramento, CA 95814 • 916-900-5022 • Fax: 916-900-5349 • [frep@cdfa.ca.gov](mailto:frep@cdfa.ca.gov)



### INFORMATION ABOUT FREP

- [FREP Fact Sheet](#)
- [2012 Request For Project Solicitation \(RFPS\)](#)
- [2012 Full Proposal Submittal Requirements](#)
- [2011 CDFA/WPHA Conference November 16 & 17 Tulare, CA](#)
- [2011 Conference CEU's](#)
- [FREP Conference Proceedings](#)
- [FREP Competitive Grants Program](#)
- [FREP Research Projects – Completed](#)
- [FREP Research Projects – Ongoing](#)
- [FREP Publications](#)
- [FREP Videos](#)
- [About Fertilizer](#)
- [Other Related Links](#)

[Our Mission](#)

[Laws & Regulations](#)

[Search Staff Directory](#)

[FFLDRS Database](#)

#### MORE RESOURCES

[The American Society of Agronomy - California Chapter](#)

[Association of American Feed Control Officials](#)

[Association of American Plant Food Control Officials](#)

[CA Dept. of Health Services](#)

[CA Dept. of Pesticide Regulation](#)

[California Certified Crop Advisor Program](#)

[California Fertilizer Association](#)

[California Grain and Feed Association](#)

[National Grain and Feed Association](#)

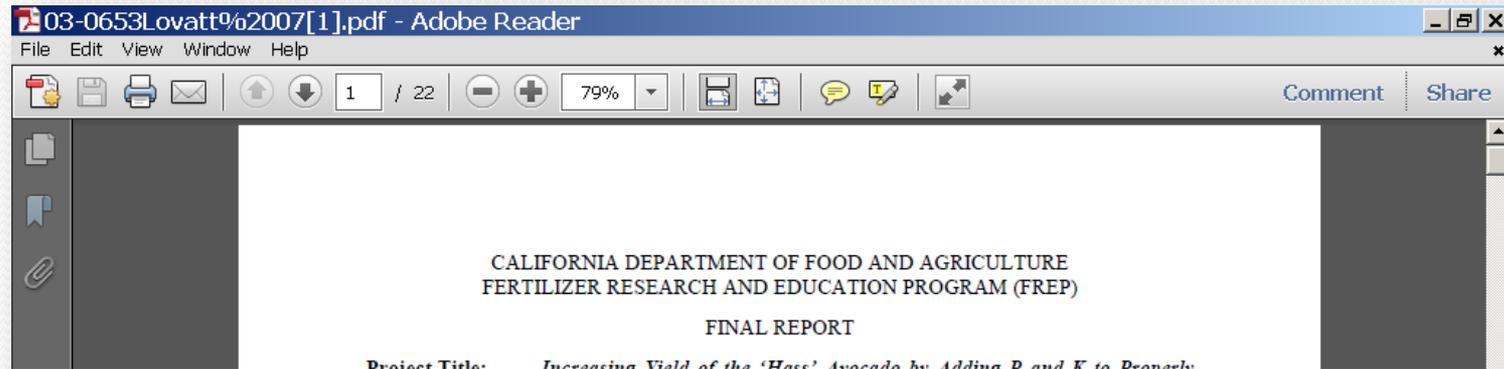
[U. S. Department of Agriculture](#)

[U. S. Food and Drug Administration](#)

[Western Plant Health Association](#)

CALIFORNIA AND THE  
**2012 Farm Bill**

# Current Information



**FULL “TECHNICAL” REPORT  
22 PAGES**

**NOT EASY FOR A GROWER OR CCA TO  
COMPREHEND AND APPLY**

yield of commercially valuable large size fruit (packing carton sizes 60+48+40, i.e., fruit weighing 178-325 g/fruit) for the 4 years of the study than multiple N treatments supplying 68% more N. The research was conducted in orchards with optimal nutrition based on standard leaf analysis and located in two climatically and edaphically different avocado-growing areas of California to determine whether strategies work across avocado-producing areas of the state. With identification of the proper time to apply N fertilizer, the next logical question was whether a greater response to N soil applications would be obtained if P and K were supplied simultaneously. Due to its immobility, P is commonly limiting. K runs a close second due to its high mobility and loss by leaching. In addition, avocado trees have a high demand for K because

# Future: Accessing FREP Data





CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE  
INSPECTION SERVICES DIVISION

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Meetings



CDFA Home > Inspection Services > FREP Database

## FREP DATABASE

The Fertilizer Research and Education Program (FREP) funds and coordinates research to advance the environmentally safe and agronomically sound use and handling of fertilizer materials. Since 1990, FREP has funded research on many of California's important and environmentally sensitive cropping systems. This database aims to make the wealth of information contained in FREP research projects readily available, easily understandable, and convenient for growers to implement.

Please enter search criteria:

Keyword(s)	<input type="text" value="Potassium"/>
Type of Crop	<input type="text" value="View All"/>
County	<input type="text" value="View All"/>
Date Range	<input type="text" value="View All"/>



# Search Results



## FREP DATABASE

Search results:

Study Title	Project County	Crop Type
Can We Predict K Fixation in the San Joaquin Valley from Soil Texture and Mineralogy?	Fresno, Kings, Tulare, Kern	Cotton
Crop Nitrate Availability and Nitrate Leaching under Micro-Irrigation for Different Fertigation Strategies		Tomato, Strawberry, Grape, Citrus
Determination of Nursery Crops Yields, Nutrient Content, and Water Use for Improvement of Water and Fertilizer Use Efficiency		Nursery crops
Effect of Different Rates of N and K on Drip Irrigated Beauregard Sweetpotatoes	Merced	Sweetpotato
Establishing Updated Guidelines for Cotton Nutrition	Merced, Madera, Fresno, Tulare, Kings, Kern	Cotton
Evaluating and Demonstrating the Effectiveness of In-Field Nitrate Testing for Drip and Sprinkler Irrigated Vegetables	Santa Clara	Lettuce, Pepper, Celery, Onion, Cabbage, Broccoli
Improving the procedure for nutrient sampling in stone fruit trees	San Joaquin Valley	Peach, Nectarine
Interaction of Cotton Nitrogen Fertility Practices and Cotton Aphid Population Dynamics in California Cotton	Tulare, Fresno, Kings, Kern, Merced, Madera	Cotton
Potassium Fertility Management for Optimum Tomato Yield and Fruit Color	Yolo	Tomato, "Bonzei" Fescue

# Summary of the Report



## STUDY RECORD

### Can We Predict K Fixation in the San Joaquin Valley from Soil Texture and Mineralogy?

*G.S. Pettygrove, R.J. Southard, Department of Land, Air and Water Resources, University of California, Davis*

#### Project Highlights

- Soils formed in Sierra Nevada alluvium tend to fix K.
- Samples with exchangeable K levels of 50 ppm or less always fixed K, while samples with >200 ppm exchangeable K did not fix K.
- Soils formed in Coastal Range alluvium do not fix K.

#### Introduction

Vermiculite is the soil mineral present in San Joaquin Valley soils that is responsible for making potassium (K) unavailable or less available to the cotton plant during flowering and boll fill. In spite of much research to relate this problem to field symptoms and to develop diagnostic criteria, no one has described the location of K-fixing soils.

#### Methods/Management

The objective of this research was to use information from digitized USDA country soil survey databases to map the location of soils in the San Joaquin Valley cotton production areas that potentially possess a high capacity to fix K in mineral interlayers.

The study covered the cotton production areas of Fresno, Kings, Tulare, and Kern counties in the southern San Joaquin Valley.

#### Findings

Generally speaking there are two conditions that result in K fixation: Weakly developed soils with high mica content (when derived from granitic parent materials) and intermediately developed soils having high vermiculite clay mineralogy. We were able to infer the potential for K fixation based on degree of soil development and other properties, which were extracted from soils database using taxonomic criteria. The resulting map shows that the total area of potentially K-fixing soils is approximately 1.4 million acres.

**Crop:**  
Cotton

**Counties:**  
Fresno, Kings, Tulare, and Kern

**Years of Study:**  
1997-1999

**FREP Article:**  
<http://www.cdfa.ca.gov/IS/docs/Pettygrove-oo.pdf>

**Fertilization Guidelines:**  
- Cotton

**Related FREP Reports:**

**External Links:**



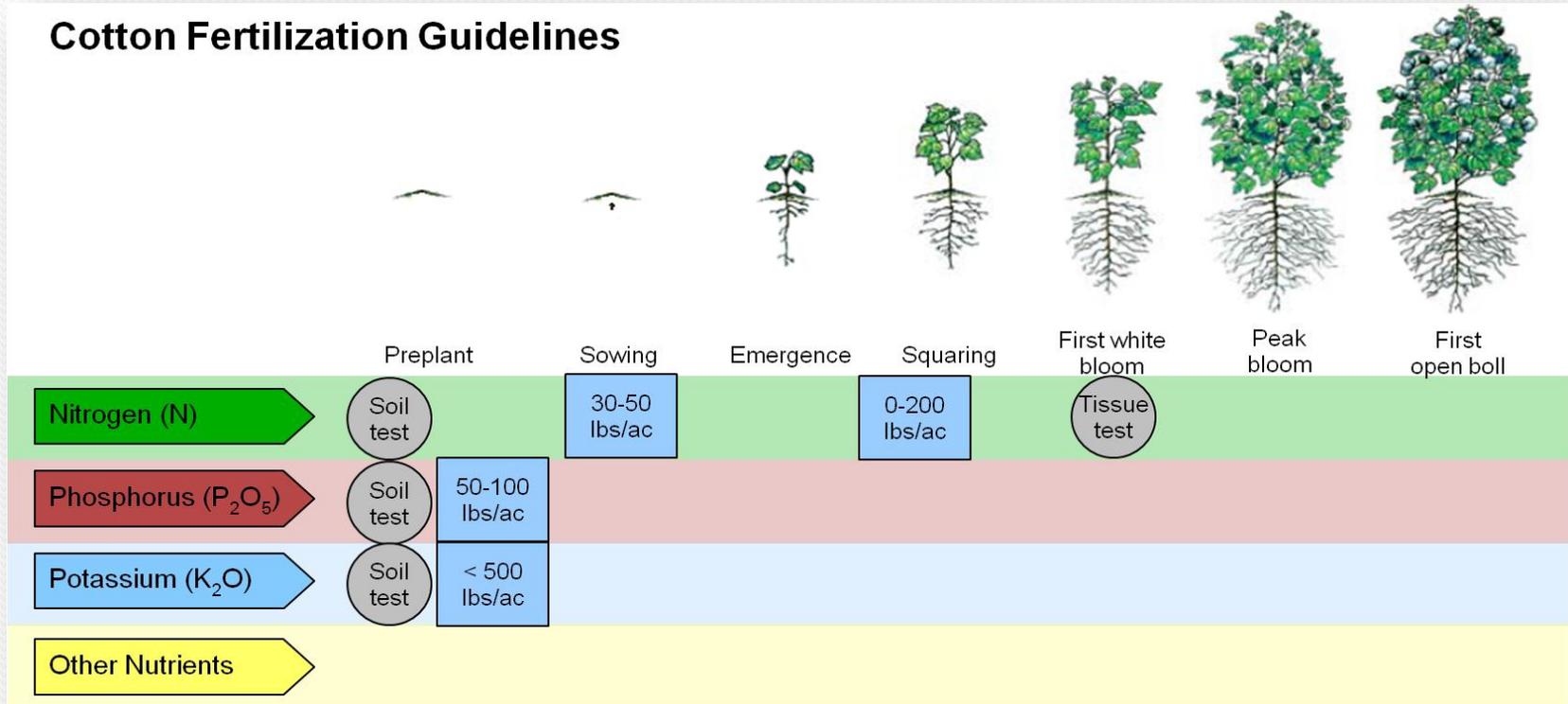


# Initiative 1: Searchable FREP Database

*Phase 2: Fertilization Guidelines*

# Phase 2: Fertilization Guidelines

## Cotton Fertilization Guidelines



### References:

- 1) Weir, B.L., Kerby, T.A., Hake, K.D., Roberts, B.A., Zelinski, L.J., 1996. Cotton fertility. In: HAKE, S.J., KERBY T.A., HAKE, K.D. (Eds.) Cotton Production Manual. University of California, Division of Agriculture and Natural Resources, Publication 3352. p. 210-227.
- 2) **FREP Report:** Establishing Updated Guidelines for Cotton Nutrition (Link to summary)

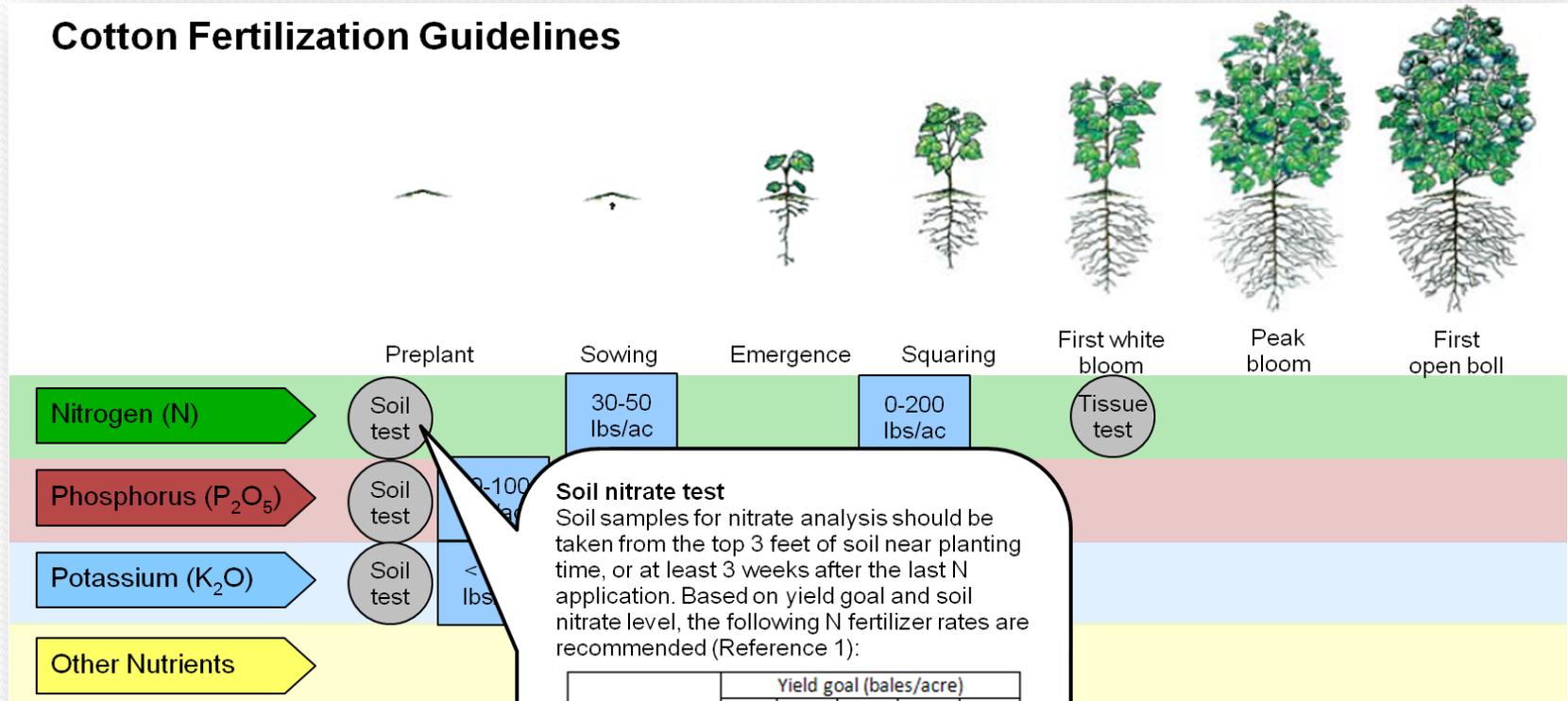
### Additional information:

- **FREP Report:** Interaction of Cotton Nitrogen Fertility Practices and Cotton Aphid Population Dynamics in California Cotton. (Link to summary)
- **FREP Report:** Can We Predict K Fixation in the San Joaquin Valley from Soil Texture and Mineralogy? (Link to summary)

- **Links**

# Phase 2: Fertilization Guidelines

## Cotton Fertilization Guidelines



### Soil nitrate test

Soil samples for nitrate analysis should be taken from the top 3 feet of soil near planting time, or at least 3 weeks after the last N application. Based on yield goal and soil nitrate level, the following N fertilizer rates are recommended (Reference 1):

Soil nitrate level (NO <sub>3</sub> -N)	Yield goal (bales/acre)				
	1.5	2.0	2.5	3.0	3.5
50	55	115	170	200	200
100	0	40	115	190	200
150	0	0	25	120	200
200	0	0	0	30	130
250	0	0	0	0	50

### References:

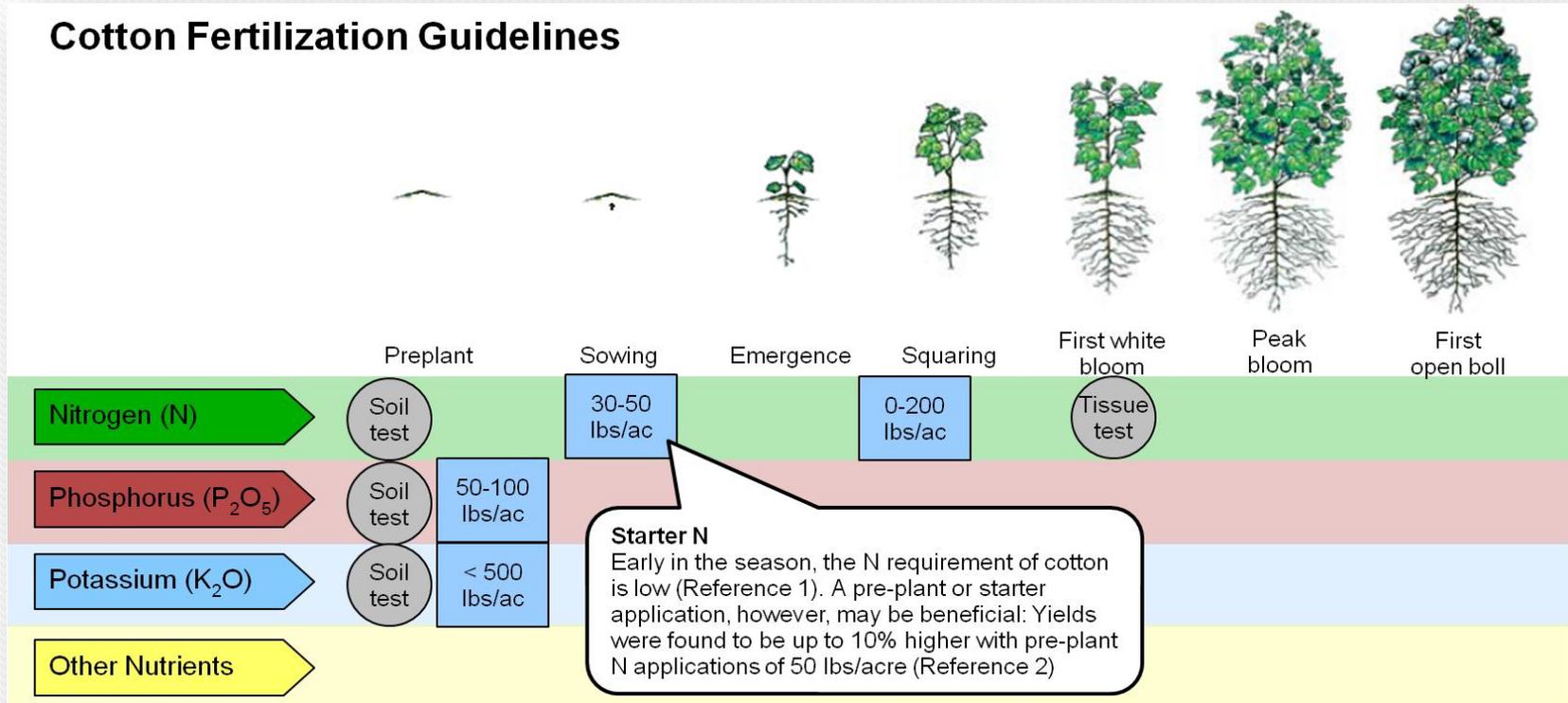
- 1) Weir, B.L., Kerby, T.A., Hake, K.D., Robert... 1996. Cotton fertility. In: HAKE, S.J., KER... (Eds.) Cotton Production Manual. Univers... Agriculture and Natural Resources, Public...
- 2) **FREP Report:** Establishing Updated Guide... (Link to summary)

### Information:

- Interaction of Cotton Nitrogen Fertility and Aphid Population Dynamics in... (Link to summary)
- Can We Predict K Fixation in the San... Soil Texture and Mineralogy? (Link to...)

# Phase 2: Fertilization Guidelines

## Cotton Fertilization Guidelines



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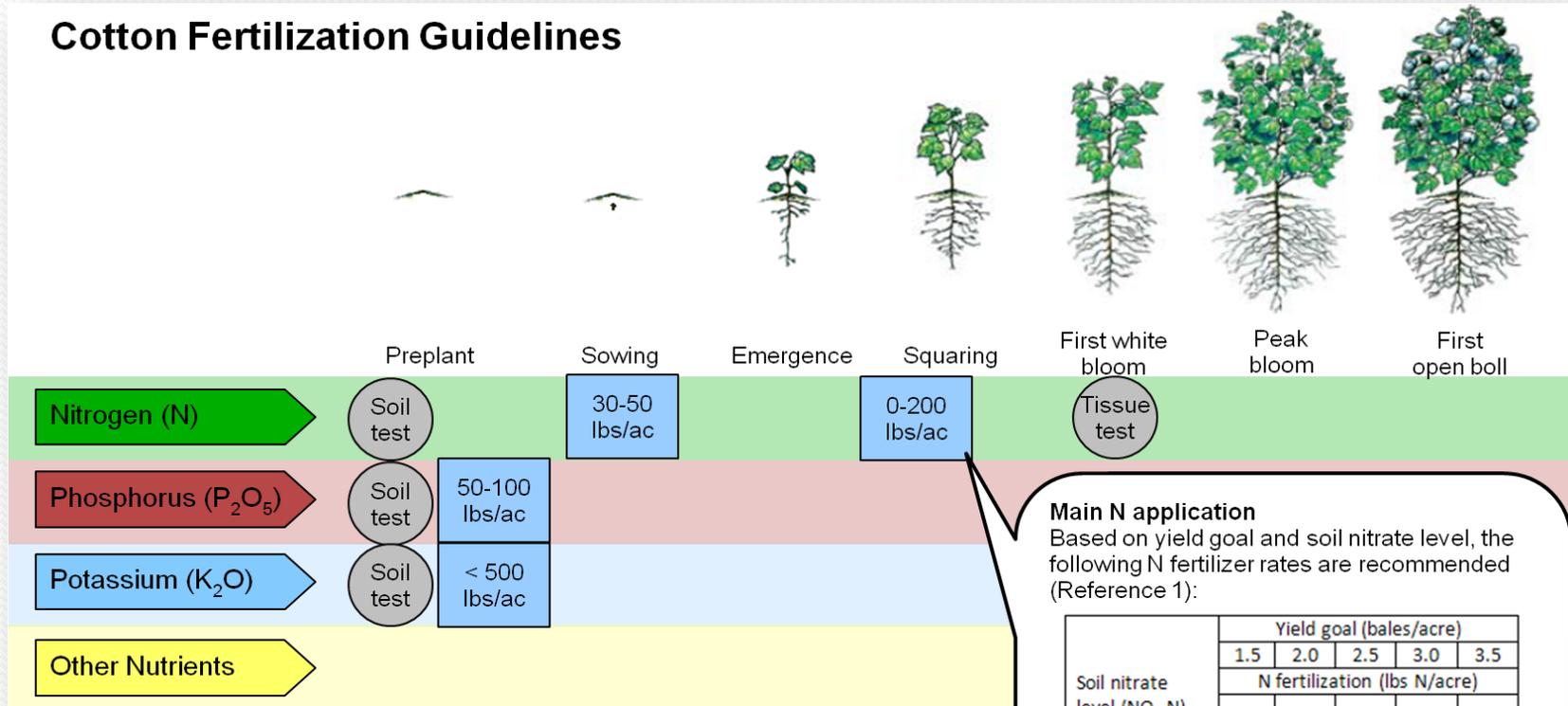
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# Phase 2: Fertilization Guidelines

## Cotton Fertilization Guidelines



### Main N application

Based on yield goal and soil nitrate level, the following N fertilizer rates are recommended (Reference 1):

Soil nitrate level (NO <sub>3</sub> -N)	Yield goal (bales/acre)				
	1.5	2.0	2.5	3.0	3.5
	N fertilization (lbs N/acre)				
50	55	115	170	200	200
100	0	40	115	190	200
150	0	0	25	120	200
200	0	0	0	30	130
250	0	0	0	0	50

### References:

- 1) Weir, B.L., Kerby, T.A., Hake, K.D., Roberts, B.A., Zelinski, L.J., 1996. Cotton fertility. In: HAKE, S.J., KERBY T.A., HAKE, K.D. (Eds.) Cotton Production Manual. University of California, Division of Agriculture and Natural Resources, Publication 3352. p. 210-227.
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### Additional information

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### Links



# Initiative 2: NMPs Certification Program

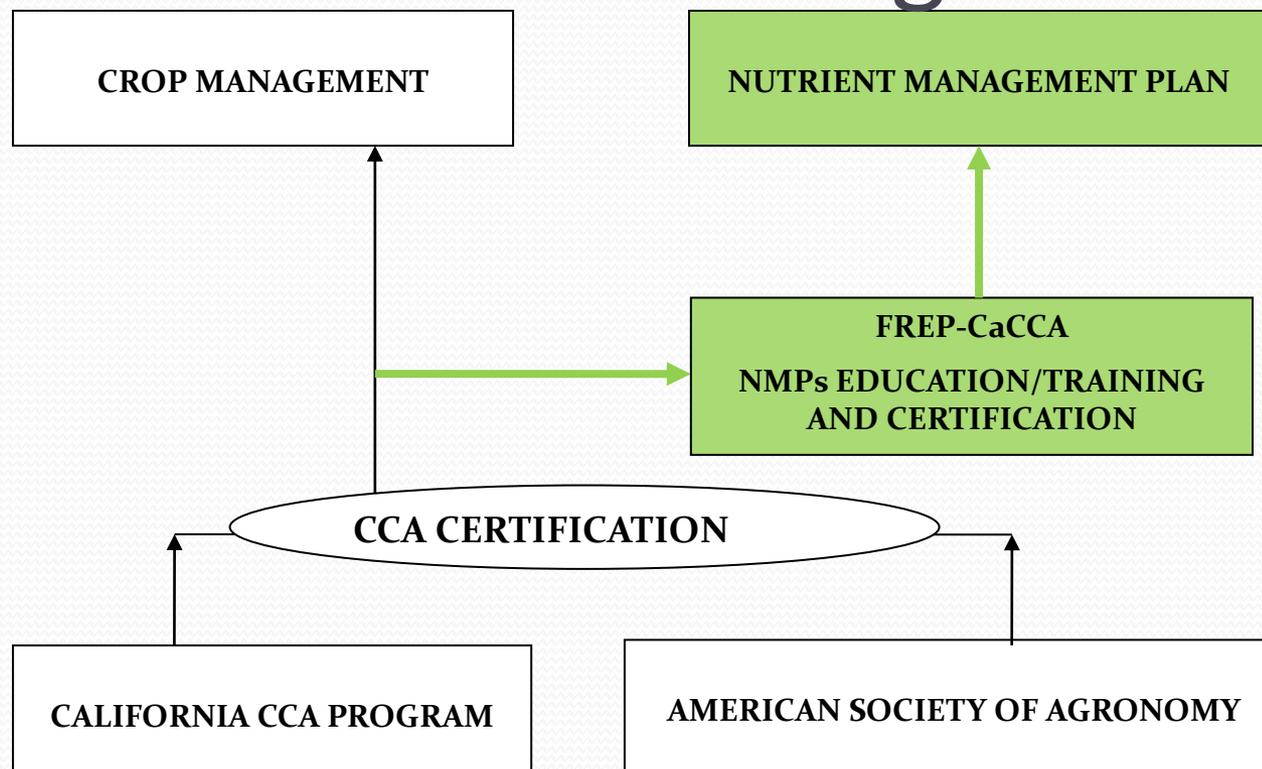


# NMPs Certification Program

FREP is working with California Certified Crop Advisors (CCA) Board of Directors to implement NMPs Training and Certification Program

- CCAs have been identified as a primary resource to help growers implement NMPs
- Already certified through the CaCCA program and American Society of Agronomy
- Qualified to make nutrient recommendations
- However...would need training specific to NMPs

# NMPs Certification Program



**FREP** was established in 1990 when California Food and Agricultural Code Section 14611(b) authorized a mill assessment on the sale of fertilizing materials, “to provide funding for research and **education regarding the use and handling of fertilizing material**, including, but not limited to, any environmental effects.”



# NMPs Certification Program

- FREP and CaCCA are developing training modules
- Stakeholders advisory group will be formed to seek feedback on the training modules
- FREP will issue a certificate to CCAs who have successfully completed NMPs training and education
- CCAs will be required to have CEU (Continuous Education Units) to maintain NMPs certification
- Implementation target date: December 2012



# Initiative 3: From Research to the Field



# Research Transfer

- FREP has applied for USDA-NRCS-CIG grant (Conservation Innovation Grants)
- A collaborative one million dollar project:
  - \$500,000 CIG grant;
  - \$250,000 in kind, and \$250,000 in cash contribution from FREP
- In collaboration with Central Coast Water Quality Coalition
- Objective is to apply FREP research at the field/farm level
- 4 crops at 3 or 4 locations in the Salinas Valley
- Organize field days
- Final decision on application is expected by July 20, 2012



Through these initiatives, FREPP is striving to manage nitrogen and enhance environmental performance in agriculture.



*Thank You*