



Central Valley Irrigated Lands Regulatory Program: Potential Effects on Irrigation and Nutrient Management in Orchard Crops

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Irrigation and Nutrient Management Workshop for Orchard
Crops

December 5, 2012

Why Topics of Today's Workshop on Irrigation and Nutrient Management are Critical

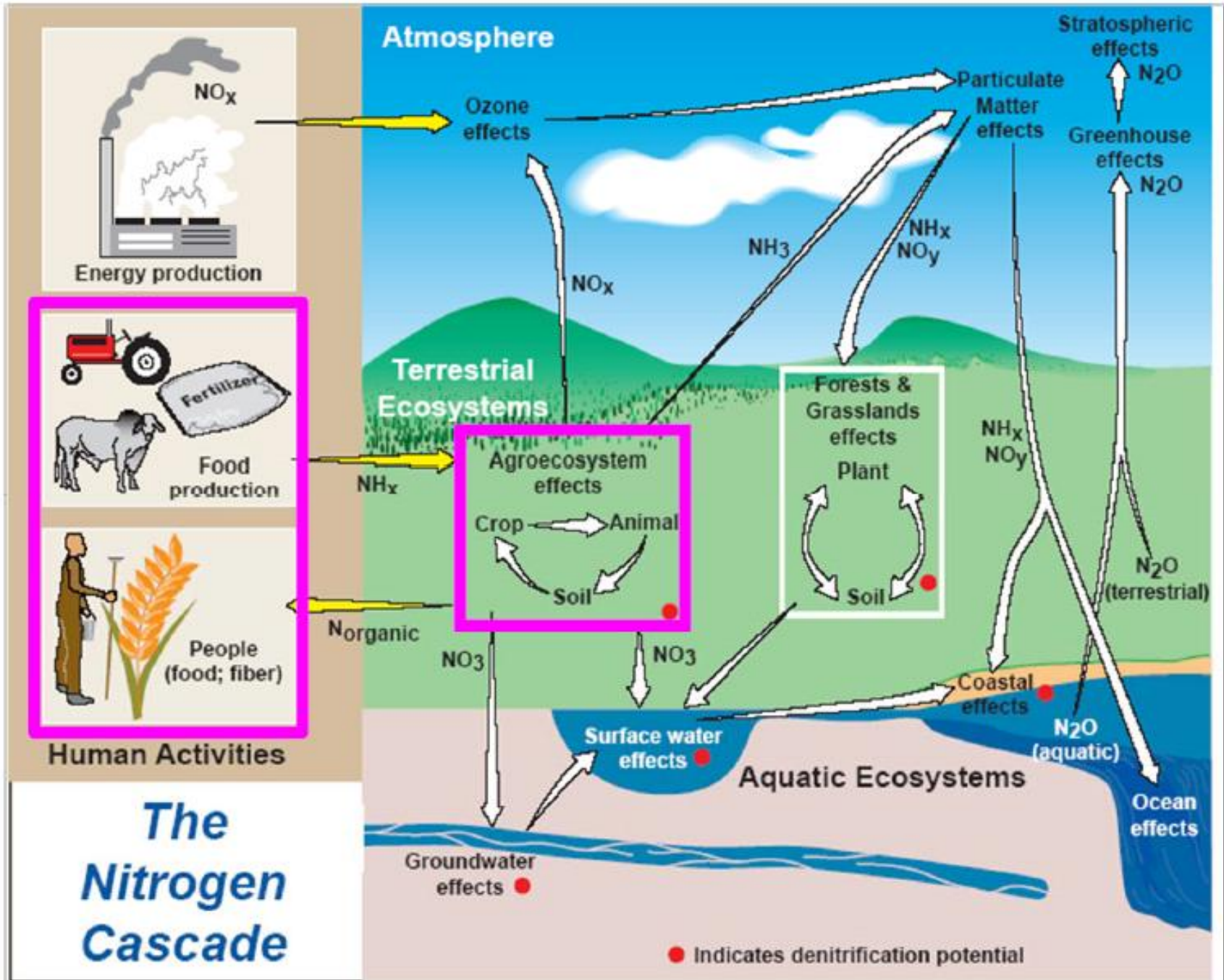
Almost every form of nitrogen is in the regulatory crosshairs:

- Nitrate/Nitrite → ground water
- Ammonia → air quality (PM2.5)
- Nitrous Oxide (N₂O) → green house gas
- Nitrogen Oxides (NO, NO₂, aka NOx) → ozone (smog)
- Organic N (run off) → surface water

More questions are being asked about Water Use and Water quality.

- State Water Board required to get better data on water usage by agriculture
- Water Quality (surface water, ground water)
- Endangered Species Act
 - Sediment run-off
 - Pesticide movement with water

Thus, grower are being asked to justify what they are doing...
Yet, can't grow Food and Fiber without water and nitrogen!



Galloway & Cowling, 2002; UNEP, 2003

The Irrigated Lands Regulatory Program (ILRP)

The Irrigated Lands Regulatory Program (ILRP) = the general waste discharge permit for irrigated agriculture to emit “waste” into “Waters of the State of California”.

- It is the regulatory program for water quality that growers of irrigated agriculture fall under in California.
- The ILRP describes the requirements growers must follow to ensure maintenance or improvement of water quality
- Legally speaking it gives permission (i.e. “permit”) to discharge waste into the Waters of the State of California
- The Central Valley Regional Water Quality Control Board has jurisdiction
 - Under the State Water Resources Board

ILRP was started in 2004

Note that Agriculture was exempt from to several CA environmental regulations until 2002.

So, what is new about the Irrigated Lands Regulatory Program?

Ground Water was added to the Irrigated Land Regulatory Program Permit several years ago.

Now issuing the regulations for how growers are expected to reduce possible impacts on ground water

Also, the program needs to be renewed so revising the requirements for surface water quality at the same time

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2012-XXXX

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS WITHIN THE EASTERN SAN JOAQUIN RIVER WATERSHED
THAT ARE MEMBERS OF THE THIRD-PARTY GROUP

So what does this mean for you?

New requirements for every grower in the Central Valley to protect ground and surface waters including:

- implement measures on your operation to reduce possible impacts to ground and surface water.
- More reporting requirements,
- More monitoring requirements,
- ➔ More costs for the administration and implementation of water quality measures

First version of the new regulations up for Board vote in Dec 7

- The East San Joaquin Water Quality Coalition

Sacramento Valley Water Quality Coalition done by **December 2013**

- Supposedly requirements will be specific to Sacramento Valley conditions.
- However, likely to follow ESJWQC
- Measures for growers take effect 1-4 years later.

The East San Joaquin Water Quality Coalition Requirements

Each grower will need to develop a “Farm Evaluation” of their operation looking at any possible impacts on ground and surface water quality as well as writing down what will/is being done about it.

Ground Water

- Nitrogen management plan
- If in vulnerable area, N plan needs to be signed by specially trained CCA
 - Growers can be certified
- Collectively assess the value of various grower practices (Representative Ground Water Monitoring)
- Collectively assess trends in ground water quality

Surface Water

- Sediment & erosion control plans required if run-off possible
- Additional pesticide monitoring
 - Sampling to be based on pesticides used in a drainage

The East San Joaquin Water Quality Coalition Requirements

Growers can continue to be “permitted” via a 3rd party, i.e. Coalitions, rather than be individually permitted

- Very expensive to be individually permitted
- Better to be or become a member of the local coalition

The Coalitions will be responsible for:

- Within 1 year providing a complete assessment of current water quality conditions.
- Determine vulnerable and less vulnerable areas
- What water quality data (ground water) is available
- Where to do ground water quality monitoring (long term trends)
- Conducting the surface and ground water quality monitoring
- Collect data from growers, summarize to submit to Water Board

Map of Water Quality Coalitions in the Central Valley

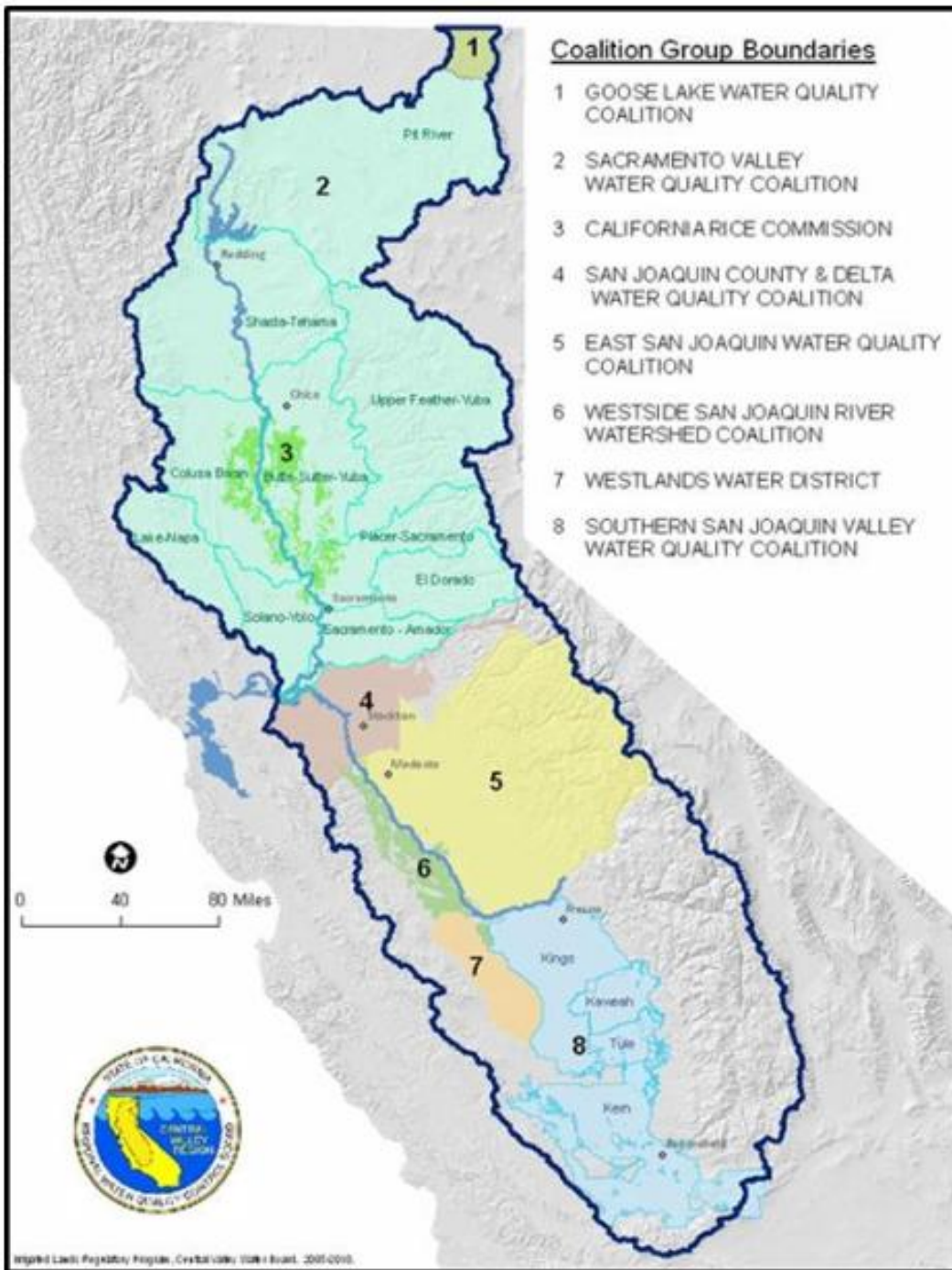
Sacramento Valley Coalition has Several subwatershed coalitions.

- **Colusa Glenn Subwatershed Program**
(530) 934-8036

cgsubwatershed@sbcglobal.net

- **Shasta-Tehama Water Education Coalition (SWTEC),**
Mike Marvier: (530)-527-3013 ext. 116,
email: mike@tehamacountyrcd.org

- **Butte-Sutter-Yuba Subwatershed.**
butteag@buttecounty.net
Phone: (530) 538-7381 and
<http://www.co.sutter.ca.us/doc/government/depts/ag/aghome>
or Phone (530) 822-7500



More Details What These Requirements Entail

Nitrogen Management Plan

- Details still under discussion
- Show how the amount of N needed for your crop is calculated
 - Yield potential
 - Leaf sampling
 - Soil sampling
 - N in irrigation water
- How much N applied
 - Hotly contested
- How much N removed with crop
- ➔ Coalitions to collate and report on N usage by crop on a township basis
- ➔ Water Board wants to know that growers are being careful with using N
- ➔ Others want to calculate how much N is leaching to sue

Farm Evaluation Plans

Assess whole operation for potential impacts on ground and surface water

Still sorting out when it needs to be provided to Coalitions

- Detailing locations of waterways, wells,
- Measures to prevent contamination from abandoned wells
- Surface water discharge points
- Potential for run-off
- List all measures to protect ground and surface water
- Farm size, crops, location

Representative Monitoring/ Vulnerability

The Water Board wants a way to assess whether grower practices are protective of ground water.

→ Representative Monitoring

- Initially modeled on Dairy Waste Discharge Order which requires monitoring wells in selected dairies. (very expensive!)
- Now working to make it a program to assess the value of different grower practices in terms of ground water protection.
 - Research on efficacy of various measures
- Requires reporting on measures being used to work

Is your farmland “vulnerable”?

If vulnerable then have more requirements as land is more prone to leaching or run-off, e.g.

- Need CCA sign off N mgmt plan.

Considered vulnerable:

- If in DPR ground water protection zone
- If in State Water Board vulnerable zone
- additional criteria have been proposed
- Each coalition has to evaluate

Changes to Surface Water Program

If have storm water run-off or irrigation run-off then will need a

Sediment/Erosion Management Plan

- Write down the measures implemented to prevent sediment/erosion run-off from reaching surface waters
- May need sign off or advice from outside specialists.
- Plans need to be submitted to Coalitions

Pesticide, metals, etc. monitoring in surface waters

- Current program requires monitoring for a specific set of pesticides (e.g. organophosphates, pyrethroids) at specified intervals
 - Generally seen improvements where issues were found
- Now Coalitions are to assess top pesticides used in a drainage
- Assess which might have impact on water quality
- Set up monitoring program specific for that use pattern.

Costs to Growers

Membership in Coalitions harder to avoid

Cost of membership will increase

- a) The State Legislature forced the Water Board to pass the cost of implementing the IRLP directly to growers as of 1/1/2012
- b) The cost of dealing with all the data the Coalitions are required to obtain and collate on behalf of growers
- c) The cost of the additional monitoring for the expansion of the program to Ground Water and likely more samples of Surface Water

➔ Another additional cost to growers is more paperwork, more documentation. Down the line possibly more direct regulation of N use

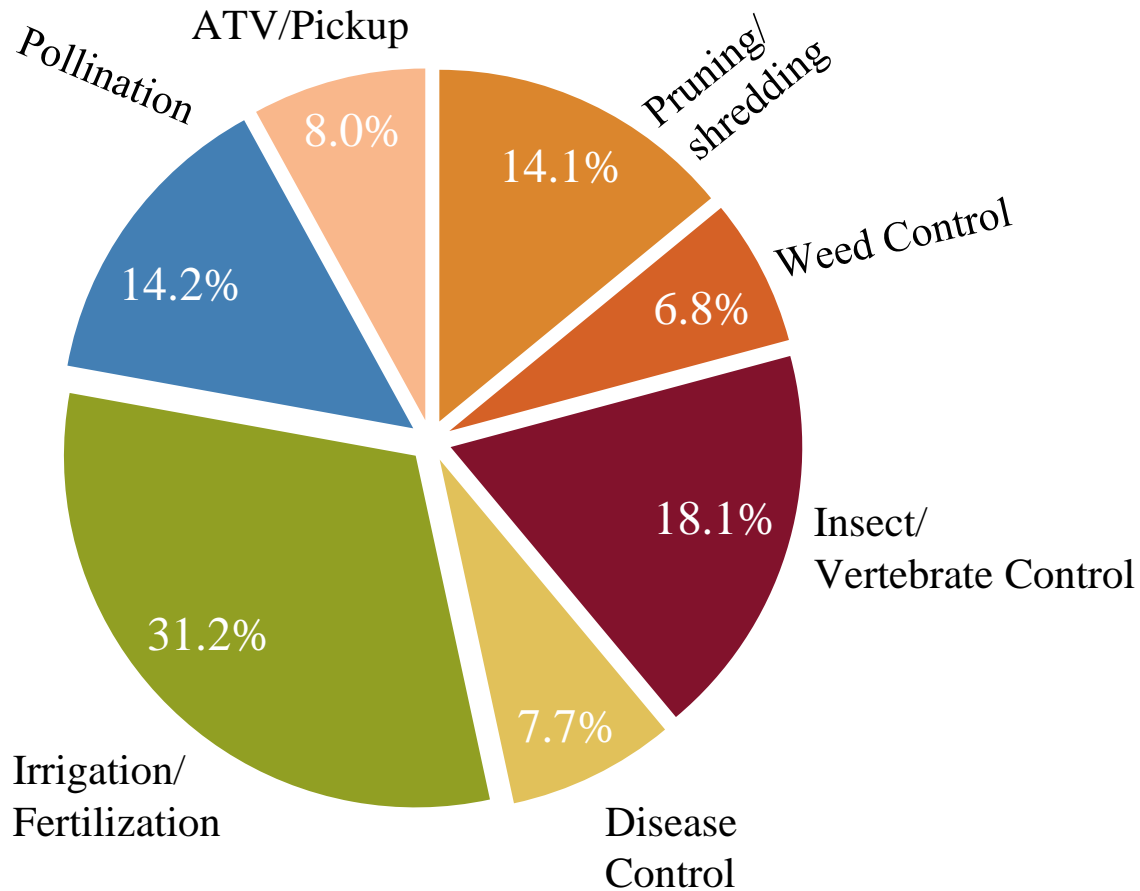
Note if currently not a member of the Sacramento Valley Water Quality Coalition, there will be an amnesty period to sign up (likely from Feb 6 – June 6, 2014)

Contact your subwatershed coalition for details.

- The CV Water Board will get a list of non-members and require individual discharge permits from non-members.

Other Reasons to Improve Efficiency of N and Water Use

Water and fertilization are still the largest annual production cost to almond growers.



**Cultural costs
San Joaquin
Valley (2011)
\$1,978 per acre
(w/o harvest,
overhead, taxes,
etc)**

Energy Used in Almond Production

Lifecycle Analysis for almond production

- Most Energy used for irrigation and for fertilizer
- Most Greenhouse Gas emissions associated with fertilizer inputs.

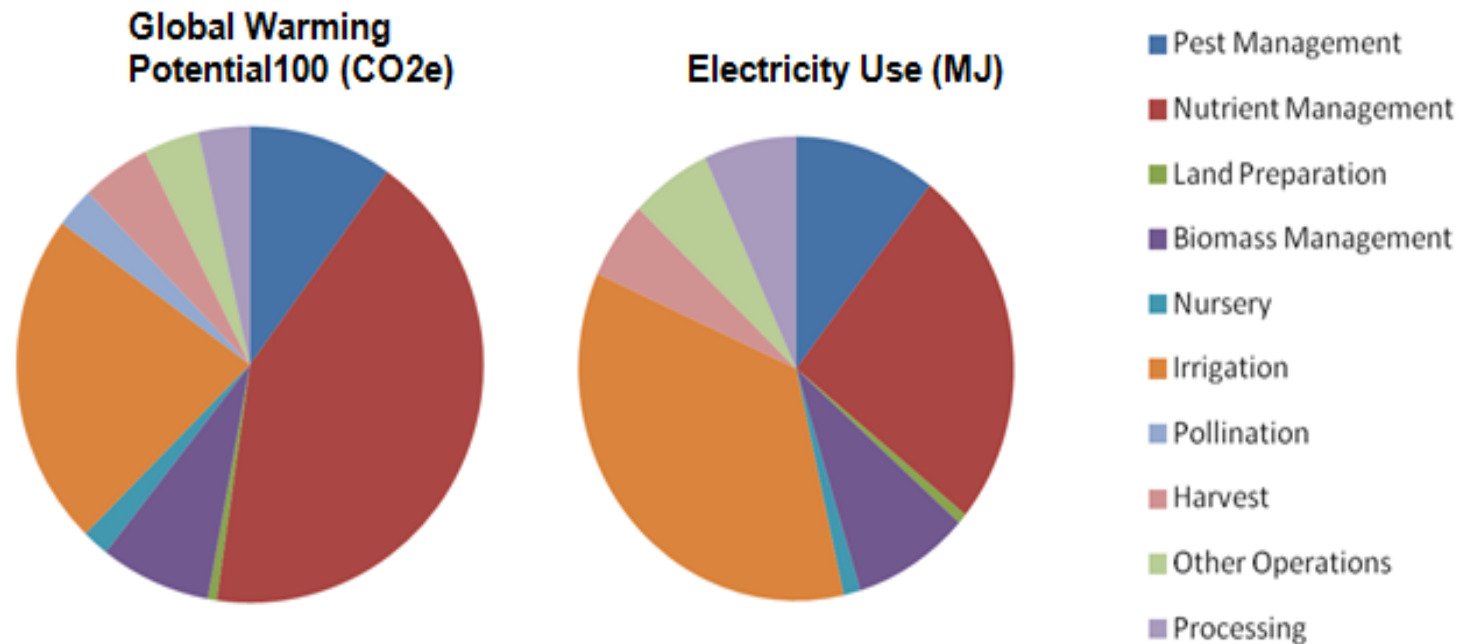


Figure 2. Breakdown of Energy and GHG Emissions by Operation

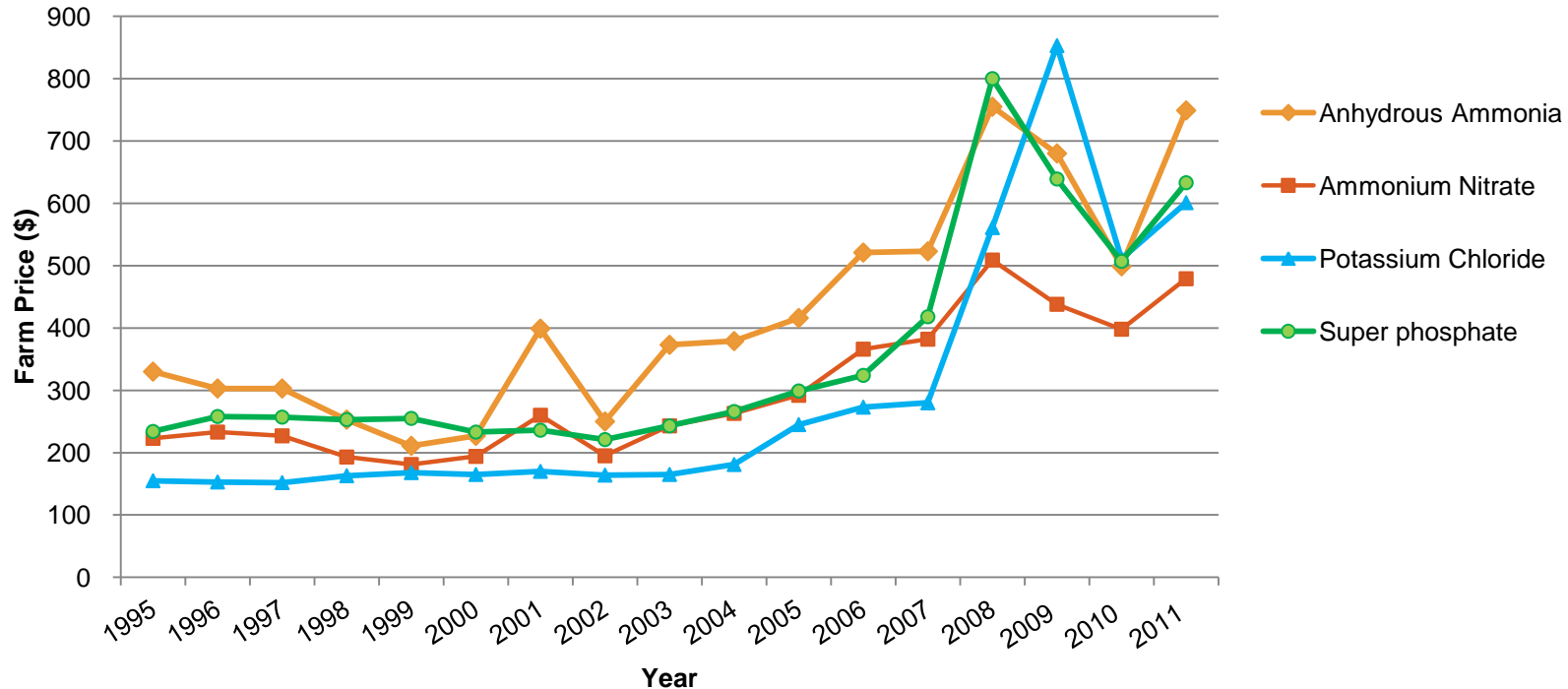
Kendall et al (2012) ABC Annual Report

Trends in Cost of N, P & K Fertilizers

N, P, K fertilizer costs have more than doubled the last 10 years.

- N cost tied to natural gas prices
- P & K prices tied to international market demand

Cost of Fertilizer



Source: <http://www.ers.usda.gov/Data/FertilizerUse/>

Irrigation and Nutrient Focused Research Funded by ABC

12.PREC2.Brown	Brown *	Dev. Of Nutrient Budget Approach to Fertilizer Mgt in Almond
12.PREC4.Hopmans	Hopmans *	Optimization of Water and Nitrate Use Efficiencies for Almonds Under Micro-Irrigation
12.PREC5.Brown	Brown *	Root Distribution and N Uptake
12.AIR2.Smart	Smart/Sanden/Brown	Mitigation of Reactive N Mobilization (N ₂ & NO ₃) Using Injected, High Frequency, Low Nitrogen Fertigation (HFLN)
12.HORT11A.Sanden/Shackel	Sanden/Shackel	Fertigation: Interaction of Water and Nutrient Management in Almonds (Sanden)
12.PREC2A.Viveros	Viveros	Execution and Extension of Info for Nutrient budget Approach Project 11-PREC2-Brown
12.HORT13.Lampinen	Lampinen	Mobile Platform to Measure Canopy Light Interception and Water Stress
12.HORT8.Shackel	Shackel	Drought Survival Strategies for Established Almond Orchards
12.HORT17.Sanden/Fulton/Doll/Shackel	Sanden/Fulton/Doll/Shackel	Defining a Central Valley Almond ET/Yield Production Function for Almonds
12.WATER1.Stoltz	Stoltz	Deposition Testing and Pattern for Aerial Spray Swath Analysis
12.WATER2.Klassen	Klassen	Linking Almond Board of CA to Central Valley Watershed
12.WATER3.Giles/Markle/Niederholzer	Giles/Markle/Niederholzer	Improving Spray Deposition and Reducing Drift in Almond Orchards

Almond Annual Conference Dec 11-13

Tuesday afternoon Dec 11 workshops:

- Economic Update Workshop
- Spray Coverage: The Missing Link in IPM
- CA Almond Sustainability Program Workshop
- Honey Bee Colony Assessment
- 5:30 – 7:00 p.m. Opening Reception

Wednesday Dec 12

- California Almond Supply – Ensuring its Future .
- Designing and Developing a New Almond Orchard
- USDA Secretary of Agriculture: Tom Vilsack
- What's New in Nitrogen Management
- Research Updates

Thursday Dec 13

- Pest Management Update: Insect, Disease, Weed, Vertebrates
- Luncheon: Workshops (see Tuesday)
- Pollination: Partnership and Policy
- Research Updates
- Gala Dinner (Penn & Teller)

Opportunities for CCA and PCA credits

www.AlmondBoard.com/Conference



The Almond Conference 2012

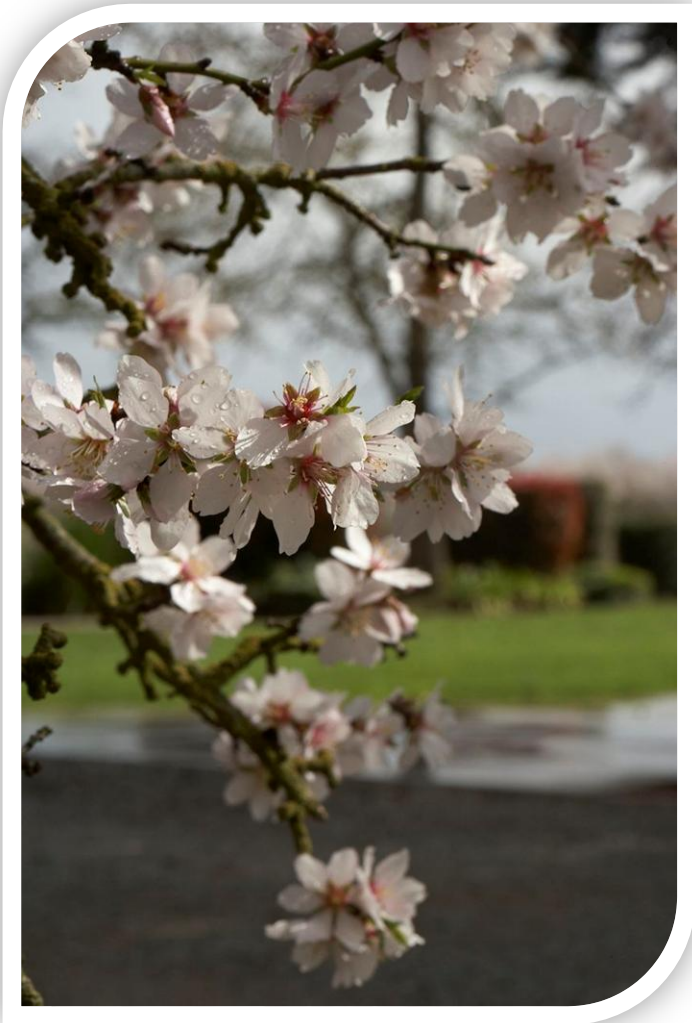
We need more room and Sacramento has more to offer, making this year's Almond Conference a must-attend event for all almond professionals.

Here are five reasons why YOU should attend:

- **More exhibits**—the trade show is growing by 33%, with everything from nursery companies to food-quality and safety services.
- **More rooms**—many parking and hotel options in close proximity to the Sacramento Convention Center.
- **More tailored presentations**—symposiums range from "What's New in Fertility Management" to "Marketing Around the World."
- **More face time with researchers**—dedicated time to meet and greet your friendly California Almond researchers to continue to improve productivity.
- **More socializing**—social hour each afternoon to network with industry members and suppliers.

Mark your calendar for December 11–13 and register today! at AlmondBoard.com/Conference.





Thank You!