



What and Why-  
Practices and Influencers:  
San Joaquin Valley

# About the Agricultural Water Management Council

The Agricultural Water Management Council is a non-profit organization established in 1996 under the guidance of Assembly Bill 3616. The AWMC is dedicated to bringing together all interested parties in agricultural water management with the expressed goal to achieve greater water management efficiency.

The Council's members include agricultural water suppliers, environmental interest groups, academia, private businesses and Federal and State government agencies.



# Survey Scope Overview

## Surveyed Eight Counties:

Fresno, Kern, Kings, Madera, Merced, San Joaquin,  
Stanislaus, Tulare

## Substantial Respondent Participation:

More than 400 farm owners (92.5%) and operators (but not  
owners: 7.5%) participated.

## Data Collection:

Data was collected by an independent survey company  
during early 2010.



# Farming in California & the San Joaquin Valley

- More than 400 different crops are grown in California- the most diverse agricultural production in the nation
- Agricultural production in the San Joaquin Valley is valued at more than \$25.3 billion annually
- Agriculture is the primary industry in the San Joaquin Valley Counties



# Farm Sizes

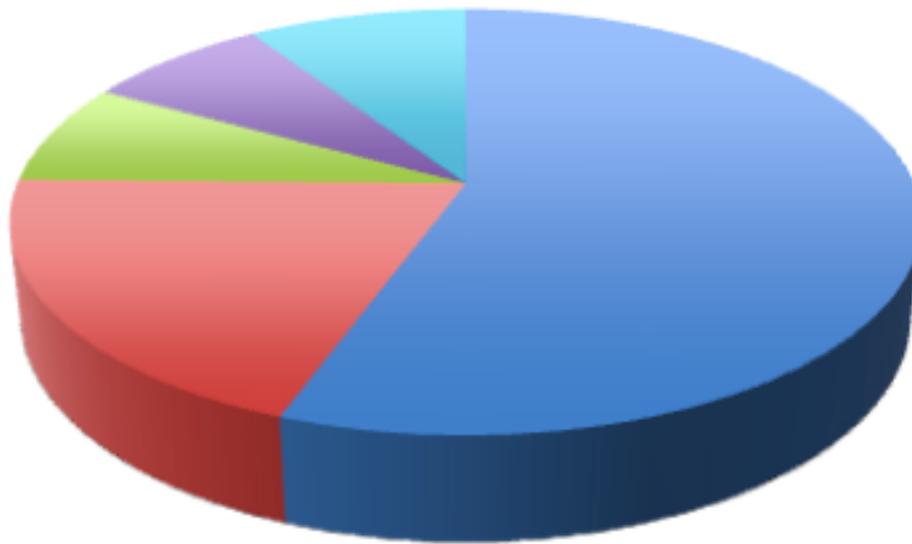
Farms in California tend to be small, those in the San Joaquin Valley aren't an exception.

- The national average farm size is **418** acres.
- California's average farm size is **312** acres.
- The average *irrigated* farm size in CA is about **162** acres.



# Farm Sizes

## Survey Respondent Farm Size



- 55% - <100 acres
- 20% - 100-250 acres
- 8% - 250-500 acres
- 8% - 500-1,000 acres
- 9% - > 1,000 acres



# Crop “Types”

## Permanent Plantings:

Perennial crops, grown over numerous years

e.g. almonds, grapes, pears and pistachios

## Annual Plantings:

Crops are replaced every year.

e.g. melons, cotton, beans and tomatoes



# Crop “Type” Decisions in the Surveyed Farms

What types of crops are grown by the surveyed farmers?

## Permanent Crops

- **82%** of farmers surveyed said that they grew some Permanent Crops on their farm.

## Annual Crops

- Nearly **37%** of farmers surveyed said that they grew some Annual Crops on their farm.



# Crop Type Selection

What considerations do growers make when determining what crops to grow?

## Experience

- **81%** of the farmers surveyed said that their **past experience** with a crop helped determine which crop they would grow.

The average farmer in the San Joaquin Valley has more than **30 years of experience** at their craft.



# Crop Type Selection

What considerations do growers make when determining what crops to grow?

## Soils and Climate

- **72%** of farmers surveyed said that **soils and climate** constraints helped determine which crop they would grow.

Different crops have different biological needs. The varying soil properties and climate lend themselves to meeting these needs.

Most crops grown in the state perform better under very specific conditions. For example- alfalfa performs very well in the conditions found in the Coachella and Imperial Valleys, often providing 50% more yield per acre than in some other areas of the state.



# Crop Type Selection

What considerations do growers make when determining what crops to grow?

## Water Availability

- **64%** of farmers surveyed said that **water availability** constraints helped determine which crop they would grow.

Permanent plantings are multi-year investments, and demand a high degree of stability in water supply.

Annual Plantings provide a certain degree of flexibility for farmers facing water supply uncertainty, as they can be foregone in years where available water supplies are insufficient to meet anticipated needs.



# Crop Type Selection

What considerations do growers make when determining what crops to grow?

## Market Forces

- **60%** of farmers surveyed said that **Market Forces** helped determine which crop they would grow.

Farmers are generally price takers- They lack effective methods to set the prices for the crops they are selling and must accept what the market offers.



# Irrigation Method Selection

What considerations do growers make when determining what irrigation methods to use?

## Crop Type

- **73%** of farmers surveyed said that their intended crop type helped determine which irrigation methods they would use.

Different crops require different amounts of water applied at different times. Carefully matching the needs of various crops to the capabilities of irrigation methods allows farmers to avoid plant health issues.



# Irrigation Method Selection

What considerations do growers make when determining what irrigation methods to use?

## Water Conservation

- **69%** of farmers surveyed said that **water conservation** was a driving factor in determining which irrigation methods they would use.



# Irrigation Method Selection

What considerations do growers make when determining what irrigation methods to use?

## Improved Distribution Uniformity (DU)

- **69%** of farmers surveyed said that **improved DU** was an important factor in determining which irrigation methods they would use.

Distribution Uniformity is how evenly water is placed across a field (usually represented as a percent). Growers seek to manage their DU to meet the requirements of the crop and field soil properties.



# Irrigation Method Selection

What considerations do growers make when determining what irrigation methods to use?

## **Water Supply Reliability**

- **61%** of farmers surveyed said that concerns regarding water supply reliability was an important factor in determining which irrigation methods they would use.



# Irrigation Scheduling

How do growers determine when to apply water?

## **Limiting Factors:**

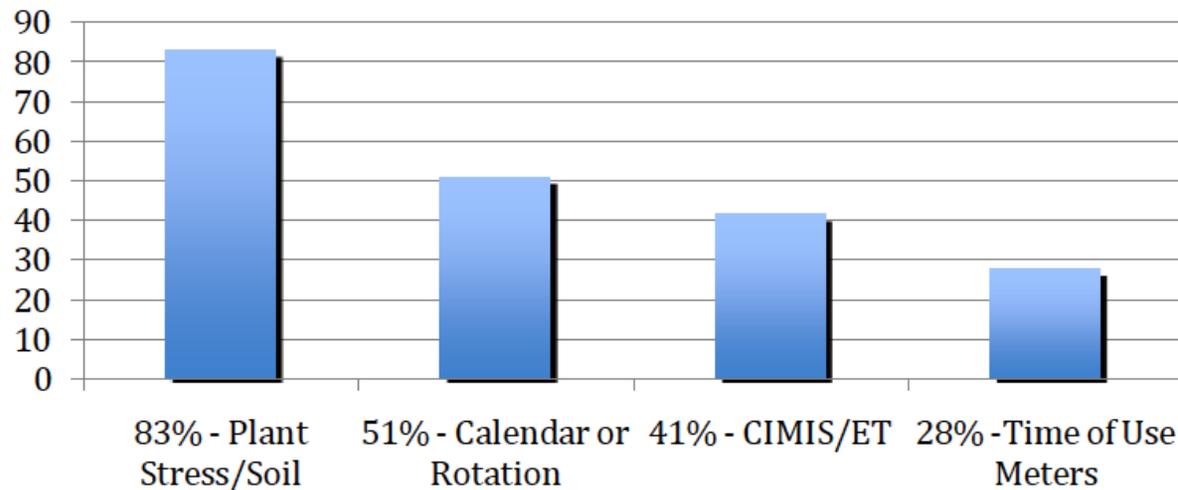
- Water Availability
- Infrastructural limitations
- Energy costs



# Irrigation Scheduling

How do growers determine when to apply water?

- **83%** of Farmers use a method of **Direct Observation- monitoring for signs of Plant Stress/ Soil needs**
- **51%** of farmers reported using a **Calendar or Rotation system to determine when to irrigate.**



# Irrigation Scheduling

How do growers determine when to apply water?

- **41%** of farmers use CIMIS or published ET Data

**Growers not using CIMIS were asked why they weren't using it-**

- **57%** of respondents indicated costs to successfully implement the technology
- **43%** indicated a need for additional training/lack of familiarity
- **40%** also indicated that CIMIS and published ET data was of questionable value to their operation



# Soil Moisture Monitoring

How do growers determine how much water to apply?

- **Nearly 78% of farmers reported using direct observation of the soil- relying on physical inspection of soils to determine water need.**
- **73% of farmers reported that observation of plant stress indicators informed their decisions on how much water to apply**



# Soil Moisture Monitoring

How do growers determine how much water to apply?

## **Scientific (Device-Based) Moisture Monitoring Methods:**

- **Nearly 18% of farmers reported using tensiometers**
- **15% of farmers informed us that they use electrical resistance blocks/data loggers**
- **Nearly 12% of farmers reported the use of neutron bomb**



# Soil Moisture Monitoring

How do growers determine how much water to apply?

## **32% Percent of Respondents indicated that they don't monitor soil moisture- WHY NOT?**

- **55%- Cost of practice implementation**
- **38%- Lack of familiarity with potential approaches to practice**
- **38%- Don't believe the practice has value for their operation**
- **28%- Practice too time intensive for their operation**



# Grower Self-Evaluation

Has irrigation efficiency improved during the previous 5 years?

**55% Percent of Respondents say YES.**

How do they measure improvement?

- 49% report growing the **same amount with the same amount of water.**
- 35% of farmers indicated growing the **same amount with less water**
- 29% report growing **more with the same** amount of water



# Grower Self-Evaluation

What are the barriers to future improvement in irrigation efficiency?

- 64% indicated **cost** to be a prime limiting factor
- 61% of farmers noted that they had already optimized irrigation efficiency efforts in their operation
- 27% reported **technical feasibility** to be an obstacle to future improvement
- 21% indicated that future improvement in irrigation efficiency will need to overcome a lack of training.



# Conclusion

What can we learn?

- Agriculture in California is as diverse as the state.
- The combinations of decision-affecting variables are complex.
- Farmers in the San Joaquin Valley prefer to choose from a robust selection of tools.
- Large operations are more likely to incorporate technology-based irrigation, soil moisture and scheduling technologies.

