California Irrigation

Larry Schwankl  
Irrigation Specialist  
Univ. of CA Cooperative Extension  
559-646-6569  ljschwankl@ucanr.edu
First thing to remember is that it does not rain in CA in the summer.

- Crop water demands must be met by irrigation.
- Irrigation is not “supplemental” in CA. In most areas, it is the sole source of crop water.
Where does the water come from?

• **Groundwater**
  - About 1/3 of water supply. 9 million irrigated acres. 4.3 million acres have GW, 1.9 million acres only have GW.
  - Use varies depending on surface water supplies - more GW use in water-short years.
Groundwater supplies:

Depends on where they are, but there are few restrictions on groundwater use in much of CA.
Where does the water come from?

- Groundwater
- Surface water - rivers, canals, reservoirs
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For surface water supplies:

- Water Suppliers
- Irrigation Growers
- Urban Districts
- Users
At the farm level:

Water is applied using some sort of irrigation system:

• Surface irrigation
• Sprinkler irrigation
• Microirrigation
CA total irrigated acres = 9.0 million

- Surface irrigation = 4.2 million acres
- Sprinkler irrigation = 2.3 million acres
- Microirrigation = 2.5 million acres

Note: very difficult to get good data so you may find other numbers.
Why so many acres of surface irrigation?

- Flat ground in the Central Valley - easily leveled.
- Infrastructure in place for surface irrigation.
- Surface irrigation is suited to many of the crops grown.
- Crop acreages:
  - Alfalfa = 1 million acres
  - Cotton = around 300,000 acres
  - Corn = nearly 1 million acres
  - Total field crops = 4,500,000 acres
  - Almonds = 750,000 acres and growing
  - Walnuts = 190,000 acres
  - Grapes = 850,000 acres
  - Stone Fruit = 150,000 acres
  - Vegetables = 380,000 acres
Types of surface irrigation: Border irrigation
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Types of surface irrigation: Furrow irrigation
Types of surface irrigation: Furrow irrigation
Types of Sprinkler irrigation: Hand-move
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Types of Sprinkler irrigation: Solid-set
Types of Sprinkler irrigation: Solid-set
Types of Sprinkler irrigation: Side roll
Types of Sprinkler irrigation: Center pivot & linear move
Types of Microirrigation: Drip
Types of Microirrigation: Subsurface Drip
Types of Microirrigation: Microsprinklers
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What do we want out of an irrigation system?

- Provides water to achieve crop production and quality aims.
- Efficient irrigation - only put on as much water as the crop needs.
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- Provides water to achieve crop production and quality aims.
- Efficient irrigation - only put on as much water as the crop needs.
- Uniform irrigation - all parts of the field get the same amount of water.
  - You can’t be an efficient irrigator with a non-uniform irrigation system.
Challenges of surface irrigation:

- Often difficult to apply water uniformly (evenly) throughout the field. Often the head of the field gets more water than the tail of the field.
  - This then makes it difficult to be efficient.

- Fields which are long pose a particular problem.

- Often difficult to apply only a small amount of water.
  - This also makes it difficult to be efficient.
Challenges of sprinkler irrigation:

- Design of the sprinkler system is important to achieve a uniform irrigation.
- Wind is a problem in many areas.
- Cost.
Challenges of microirrigation:

- Design of the drip or microsprinkler system is important to achieve a uniform irrigation.
- Maintenance, especially clogging, can be a problem.
- Cost
What determines a grower’s irrigation system?

1. Is it a new or replacement system? Old system?
2. Topography
3. Crops to be grown
4. Cost of system
5. Water costs & availability
6. Benefits to production
7. Labor
8. Water supply - frequency of delivery, etc.
Which is the best irrigation system?

- Surface irrigation can be uniform and efficient but it takes short field lengths and good management.
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- Sprinkler and microirrigation systems use hardware (pipes and hoses) to achieve a uniform irrigation. This adds appreciably to the cost of irrigating.
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- There is no one answer to this question. Factors such as the crop, location, water costs and availability, etc. all must be considered.
What is the trend in irrigation system acreage?

- Microirrigation acreage continues to increase
  - Increase will come as additional acres of trees, vines, and vegetable crops move to microirrigation.
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  - Increase will come as additional acres of trees, vines, and vegetable crops move to microirrigation.
  - As more acreage of permanent crops are planted (economics), water issues during a “drought” are even worse.
High profile irrigation issues?

- **Irrigated Lands Conditional Waiver**
  - Irrigation and stormwater runoff is regulated in CA under the Porter-Cologne Act. Especially in the northern part of the State, this is a major issue.
  - Being expanded into groundwater regulation, particularly of nitrates. Big deal and still trying to figure out how to accomplish this.
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- **A major issue right now is availability of water.** Many irrigation districts are delivering little or no water (growers turning to groundwater). Delta environmental issues makes moving water around CA challenging.
Questions???

Larry Schwankl
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For Powerpoint presentation, go to:
http://ucanr.edu/schwankl
Existing System