California Irrigation

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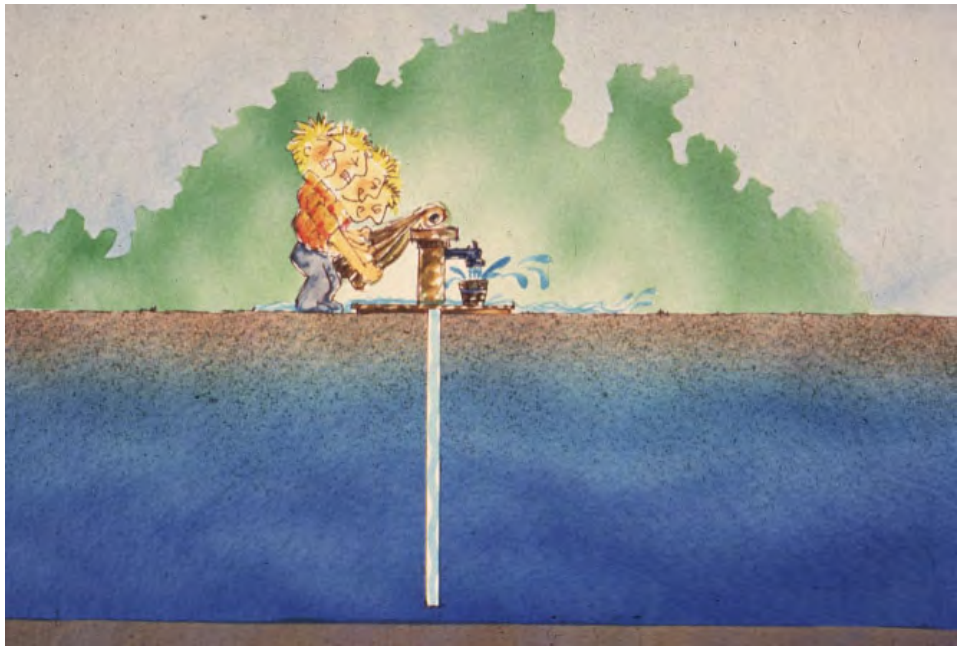
First thing to remember is that it does not rain in CA in the summer.

- 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.**

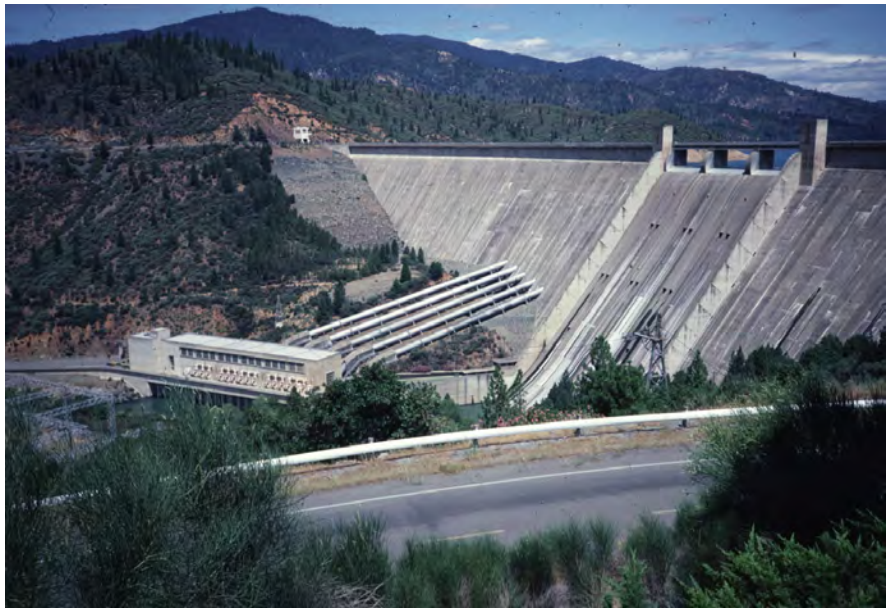


Groundwater supplies:

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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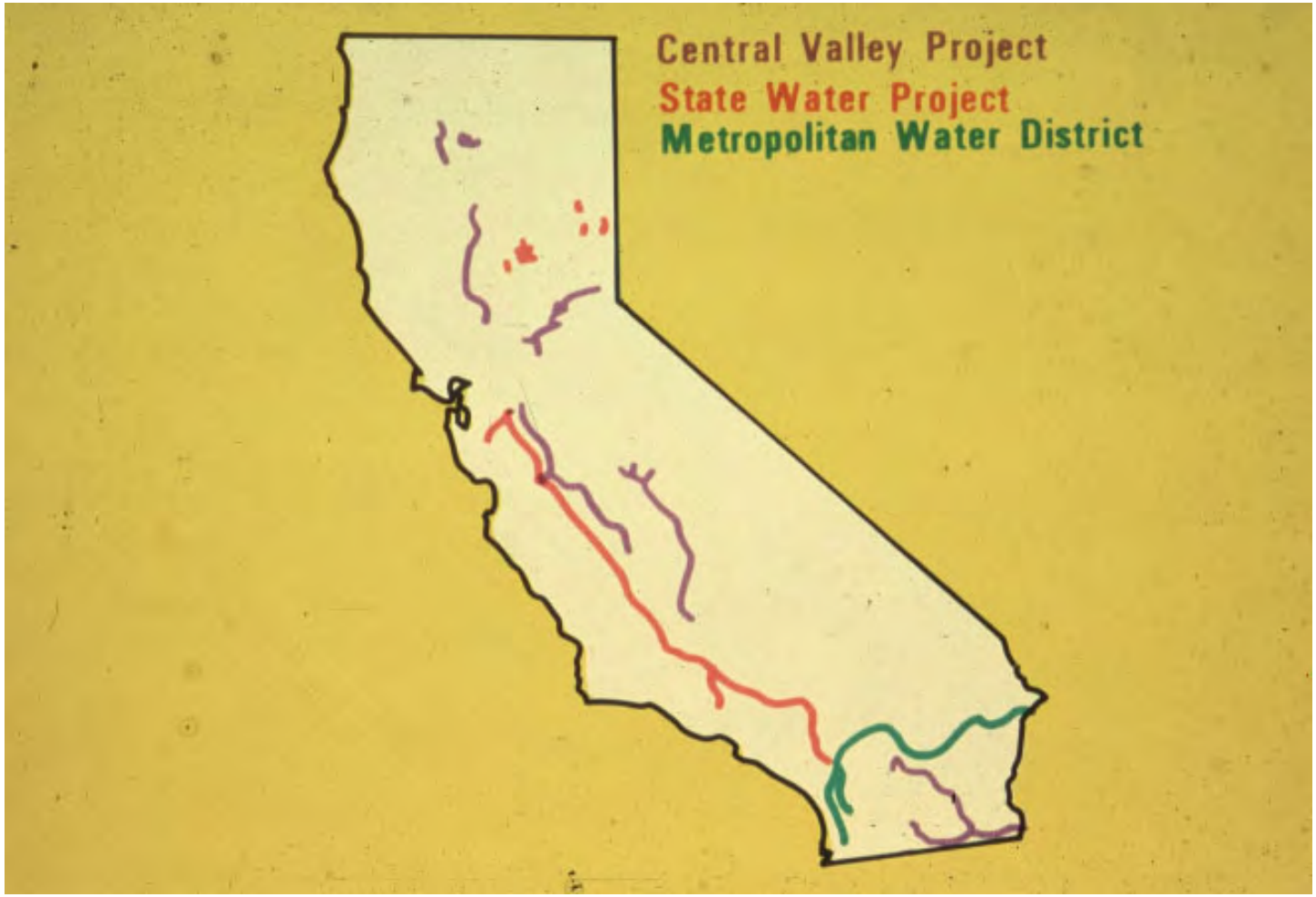

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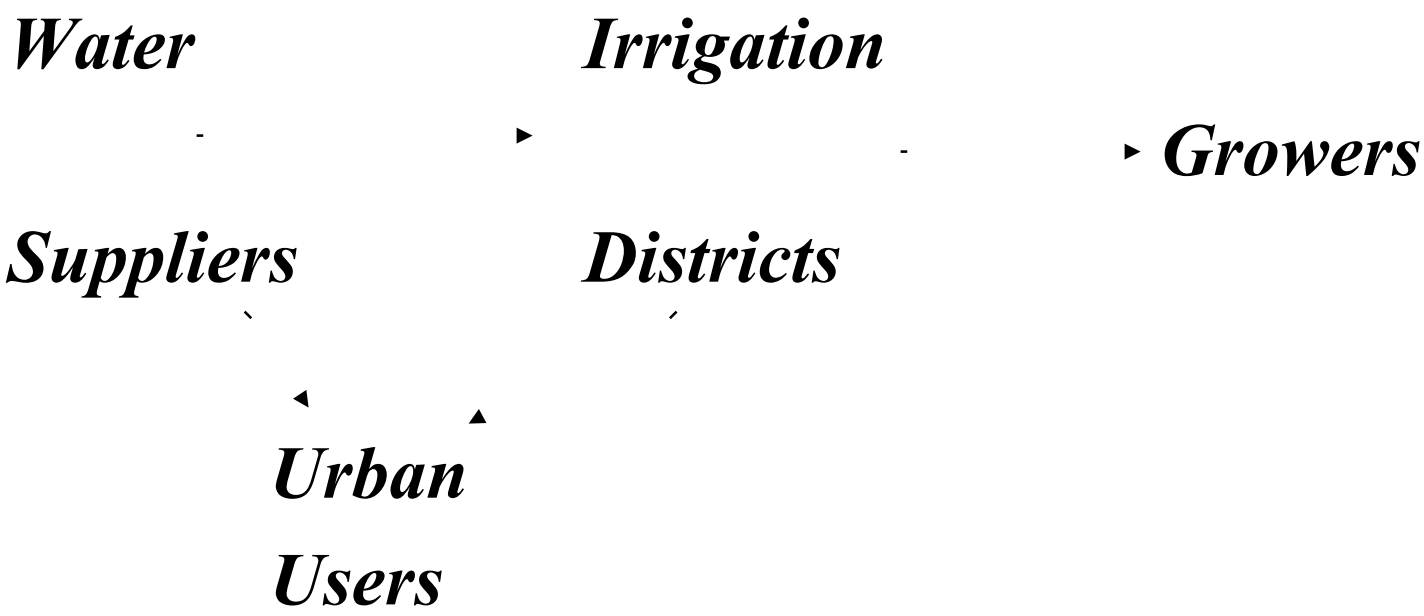
For surface water supplies:



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

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Types of Sprinkler irrigation: Hand-move

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Types of Sprinkler irrigation: Solid-set

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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.**
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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 if 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.**

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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.**

Which is the best irrigation system?

- Surface irrigation can be uniform and efficient but it takes short field lengths and very good management.
- Sprinkler and microirrigation systems use hardware (pipes and hoses) to achieve a uniform irrigation. This adds appreciably to the cost of irrigating.
- **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**
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- **Microirrigation acreage continues to increase**
  - **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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  - Being expanded into groundwater regulation, particularly of nitrates. Big deal and still trying to figure out how to accomplish this.
- **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???

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For Powerpoint presentation, go to:

http://ucanr.edu/schwankl

Existing System