Drought, Delta Agriculture, and Managing Salinity

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Drought and the Delta Briefing
October 25, 2016

Why is salinity an important consideration in (Delta) agriculture?

Salt problems occur on approximately one-third of all irrigated land in the world.

- In general,
  - Parent material weathers to form salts.
  - Some soil amendments may contain salt.
  - Salts are carried in irrigation water.
  - Influenced by shallow, saline groundwater.
- In the Delta,
  - Many soils have low permeability and are difficult to leach.
  - Surface water used for irrigation, and quality may be degraded when it reaches the Delta.
  - Below sea level.

Effects of Salinity on Plant Growth

- Osmotic stress

  (*most common means by which salt impairs plant growth*)
- Specific ion toxicities
- Degraded soil conditions that limit plant water availability

How do management practices during a drought impact salinity?

- Fallowing land – no water applied
- Deficit irrigation – less water applied
- Drip irrigation – water applied efficiently
- Crop choice – crops that require less water or are more salinity tolerant often have lower returns

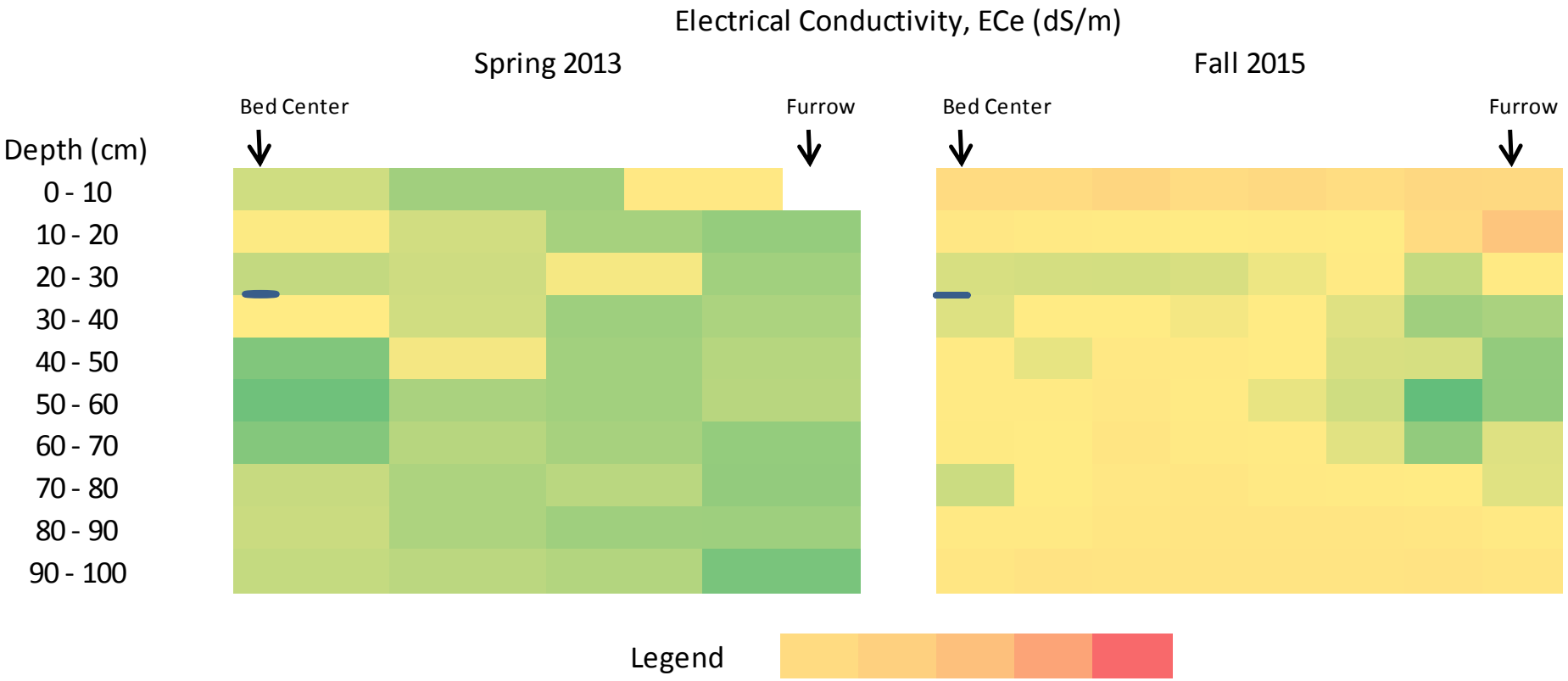
(Photo courtesy Kyaw Tha Paw U, Eric Kent, and Jenae' Clay, UC Davis)

How do management practices during a drought impact salinity?

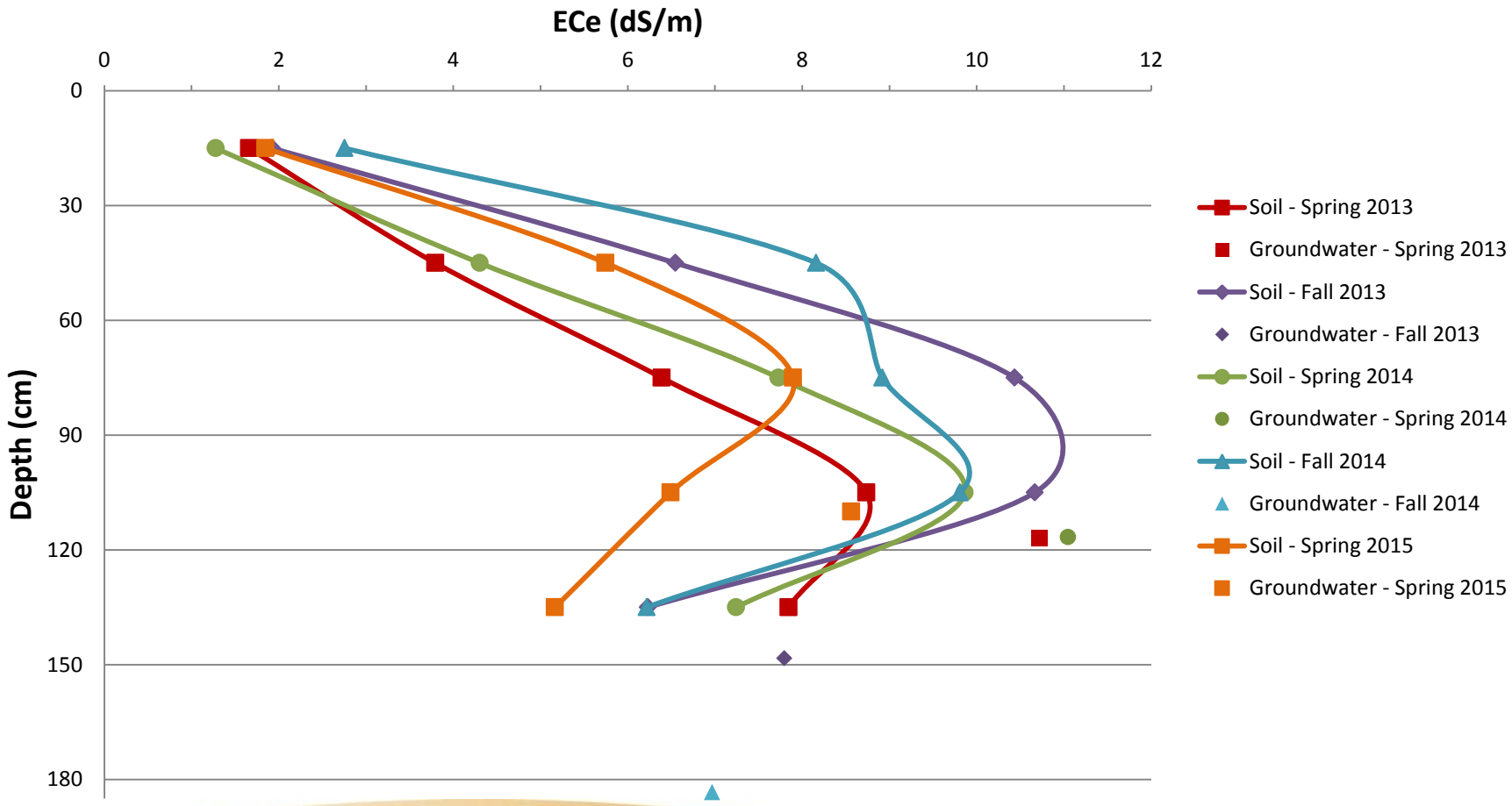
Bottom line:

Limited water supplies exacerbate soil salinity, particularly when there is insufficient water to meet crop evapotranspiration (ET) and leaching.

Delta Research
Drip-irrigated tomato



Delta Research – Alfalfa



Salinity Management by Leaching

- The primary management strategy for combating salinity is leaching, and leaching must be practiced when soil salinity has the potential to impact yield.
- Leaching occurs when water is applied in excess of soil moisture depletion due to evapotranspiration (ET).
- Leaching may occur during the rainy season or whenever an irrigation event occurs.
- Using soil and applied water salinity data, we can calculate the amount of leaching that is required to maintain crop yields.

Conclusions

- Soil salinity conditions are made worse when water is limited.
- Salinity is a problem in the Delta because soils have low permeability, surface irrigation water may be degraded, saline groundwater is shallow, and elevation is below sea level.
- Crops experience stress under conditions of salinity, and research data illustrate that salts are building up in the soil to levels that have the potential to reduce crop yields.
- The Delta's unique growing conditions and best management practices put constraints on growers' ability to leach salts.
- Salinity will continue to impact Delta agriculture, especially under conditions of limited water supplies or higher surface water salinity.

Thank you!

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http://ucanr.edu/sites/deltacrops/