

Sustainability and California Agriculture Futures: Global Climate and Global Markets

“Agricultura en un Mundo Cambiante”

August 7, 2019

Santiago, Chile

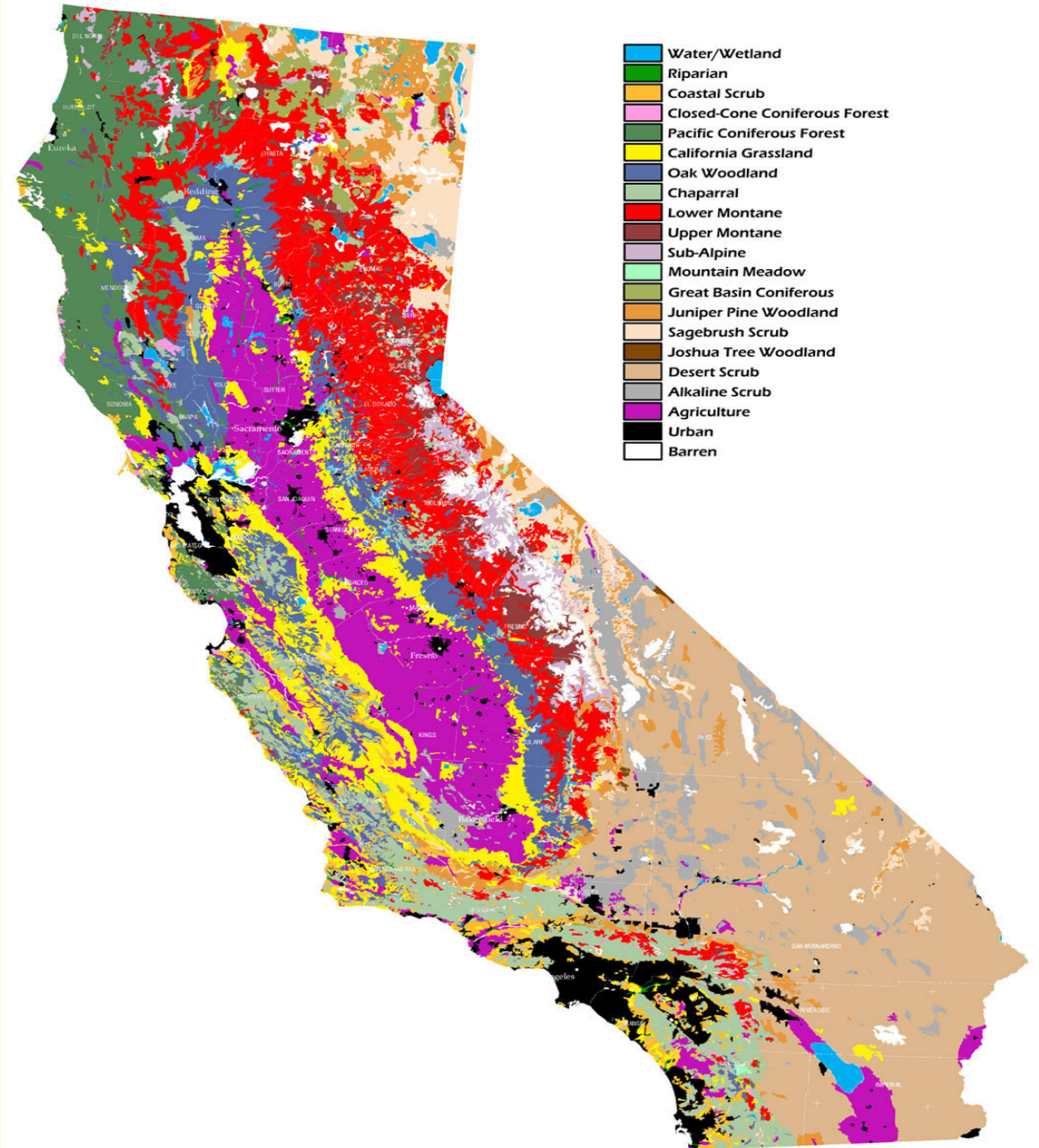
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Plan and Main Points

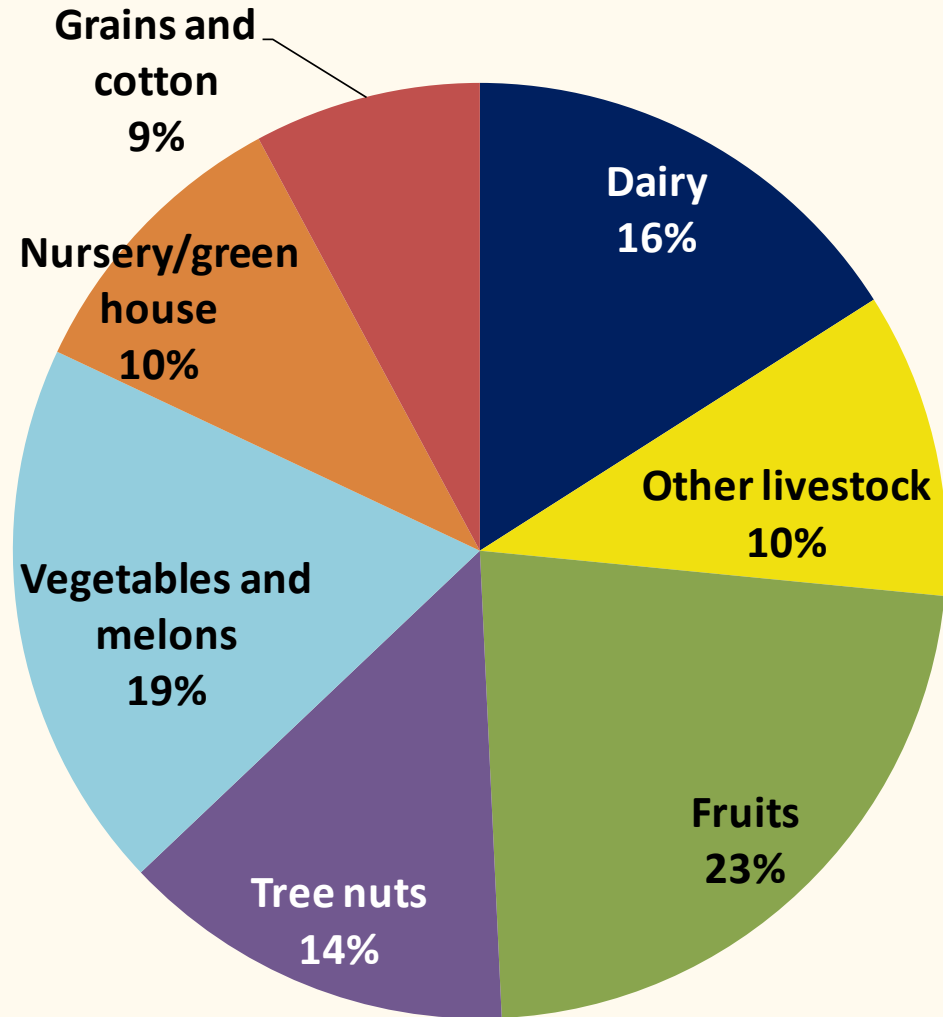
- **Sustainability means looking forward. Consider issues that will drive agriculture in California and globally.**
- **Where will agriculture be in 30 years?**
- **Trade is and has long been central to agriculture globally and in California and turmoil in trade is bad news.**
- **Resources (including climate) and markets drive the future; local and global policy affect both resources and markets.**
- **Climate change is likely to drive irrigation water costs, but so will water regulations.**
- **Farm labor, another perennial, faces reduced supplies, higher wages and shifts to labor saving crops and methods.**

- California has a variety of climate and land zones covering 40 million hectares.
- Natural diversity allows thriving farming diversity.
- A small share (10%) of the total land mass is suitable for irrigated crops, so livestock (cattle pasture) covers much of the total farmland (10 million hectares).
- The cattle industry is important geographically and economically.
- Intensive dairy and irrigated crops are 90% of farm output value.
- Irrigation is key for as is access to hired farm labor.
- Both depend crucially on public policy.

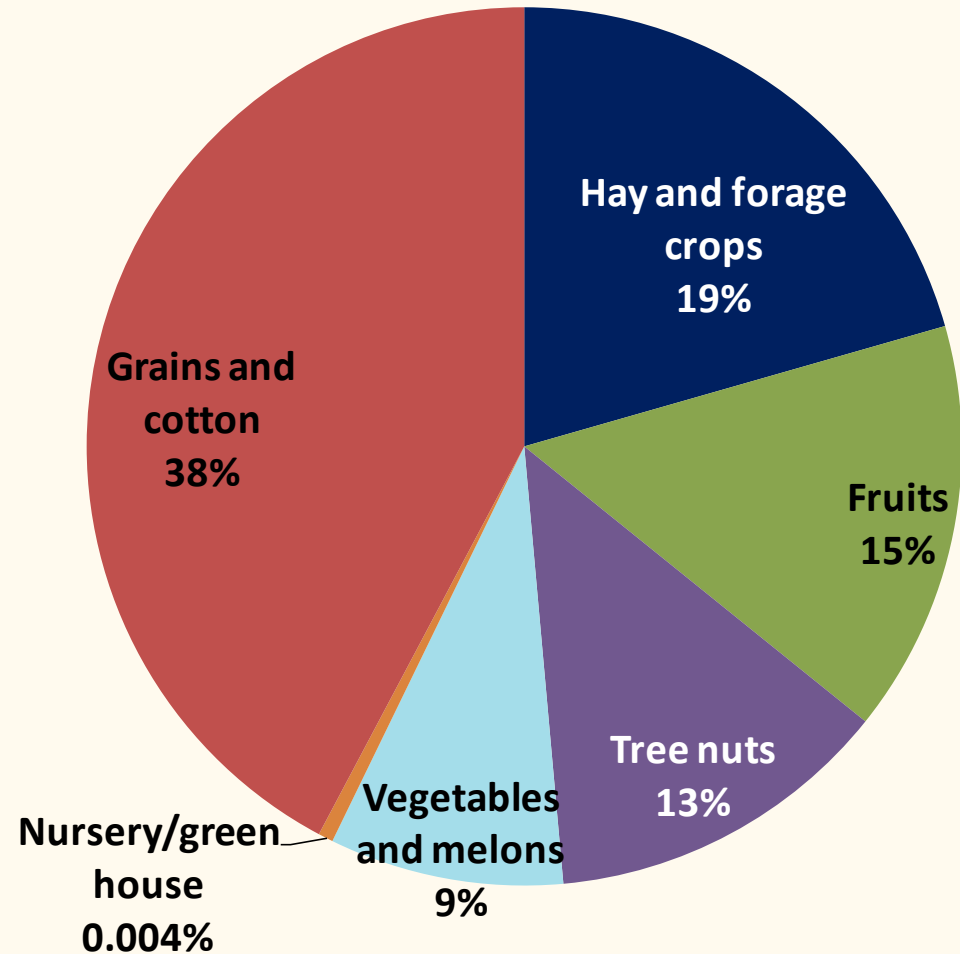


California agriculture is diverse, by receipts and acreage

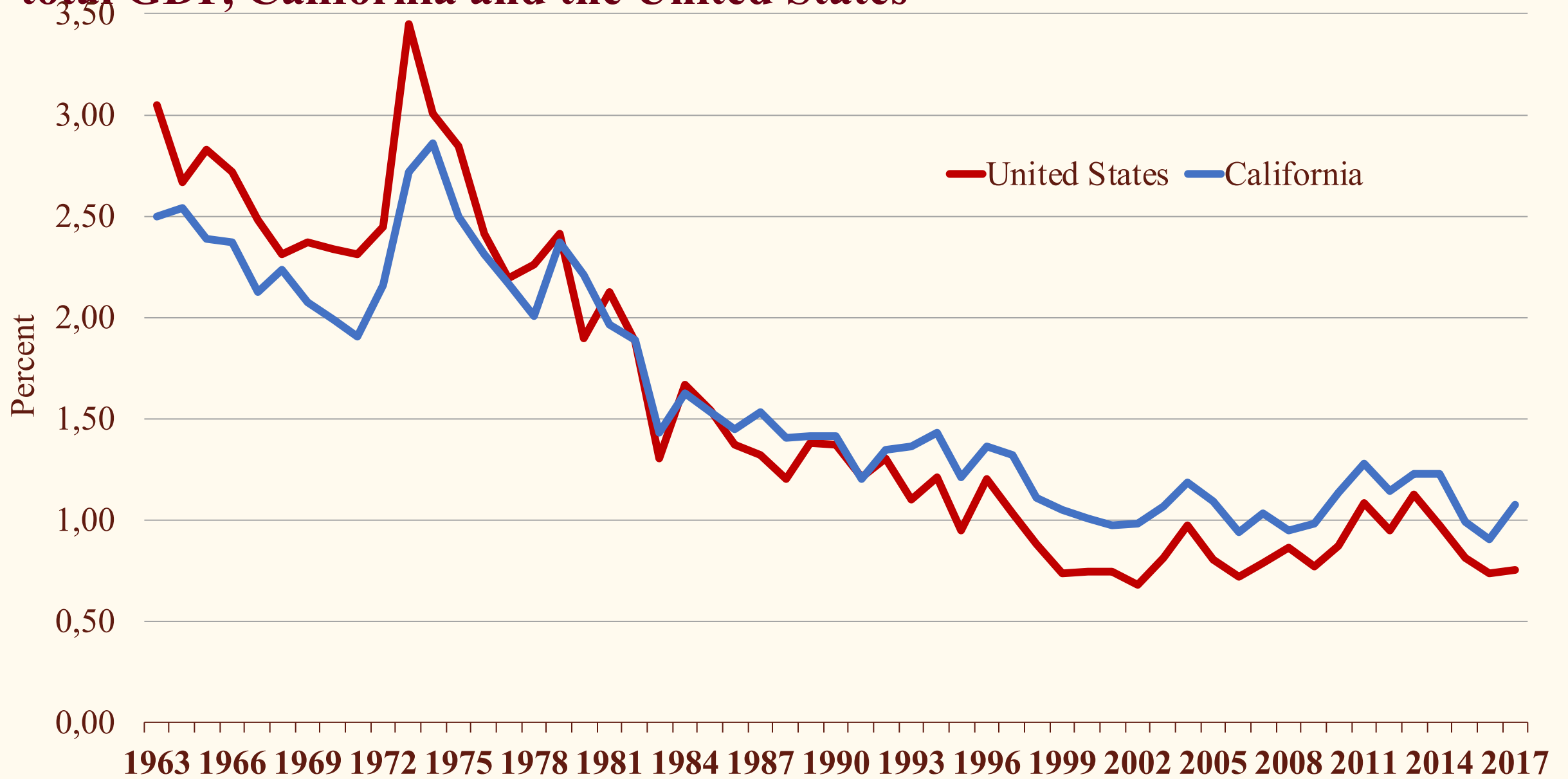
Cash receipts



Crop Acreage



Gross domestic product from crop and animal production as a share of total GDP, California and the United States



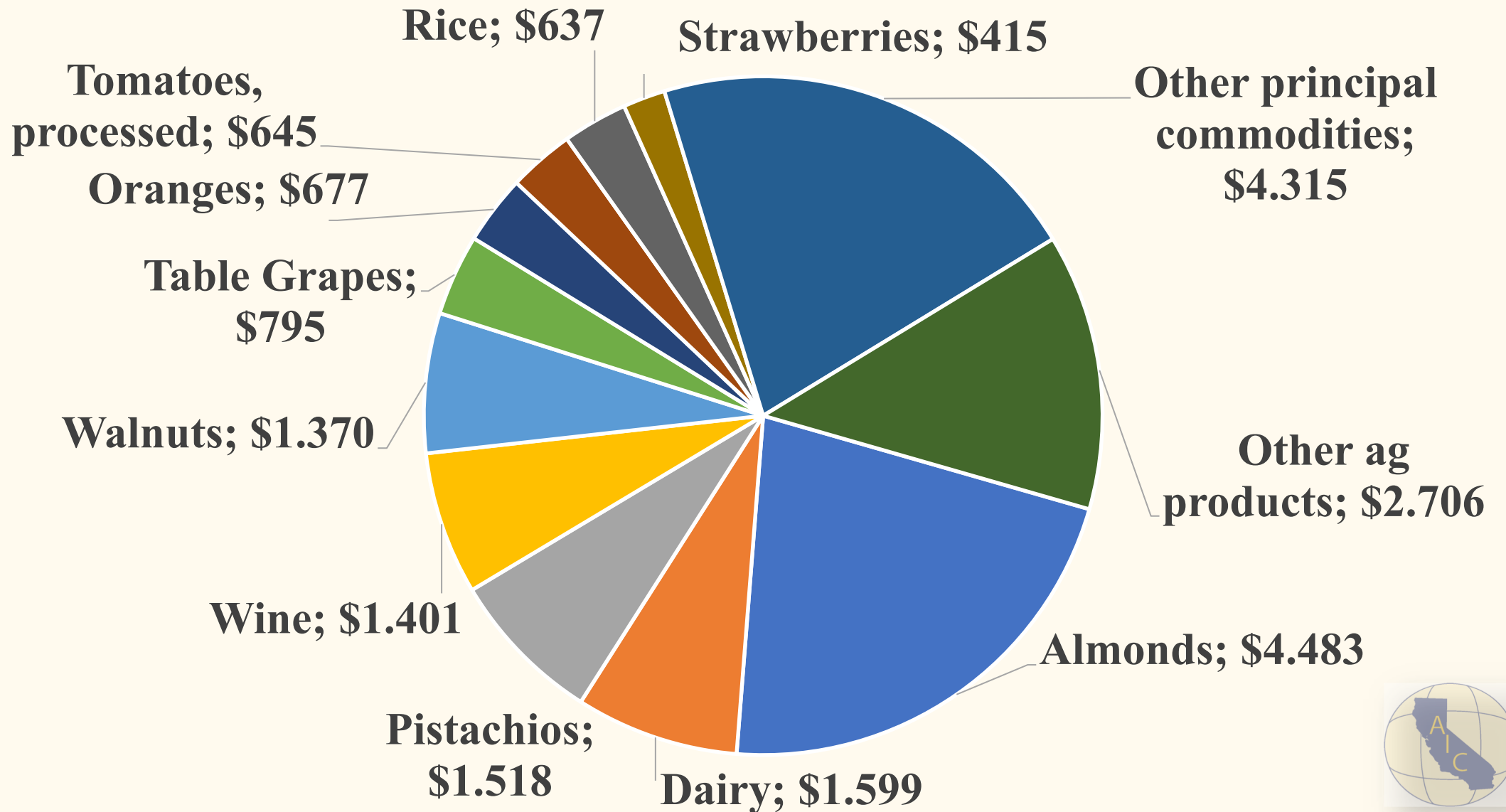
Global markets have allowed growth?

- Trade is just “natural”, everyone (every living thing) trades.
- The “nation state” (geographic political grouping) followed trade by a few hundred thousand (or hundred million) years.
- States and Nations must go to great lengths to interrupt international trade and cannot really stamp it out (though North Korea does a pretty good job). Mostly people trade not “nations” unless nations own the economic activity of people.
- Trade benefits many (not all) of those not a party to the trade
- Of course, those who face lower prices for what they sell or higher prices for what they buy often oppose trades among those who benefit directly
- Imports may be more important than exports and growth impacts of global interactions may be most vital

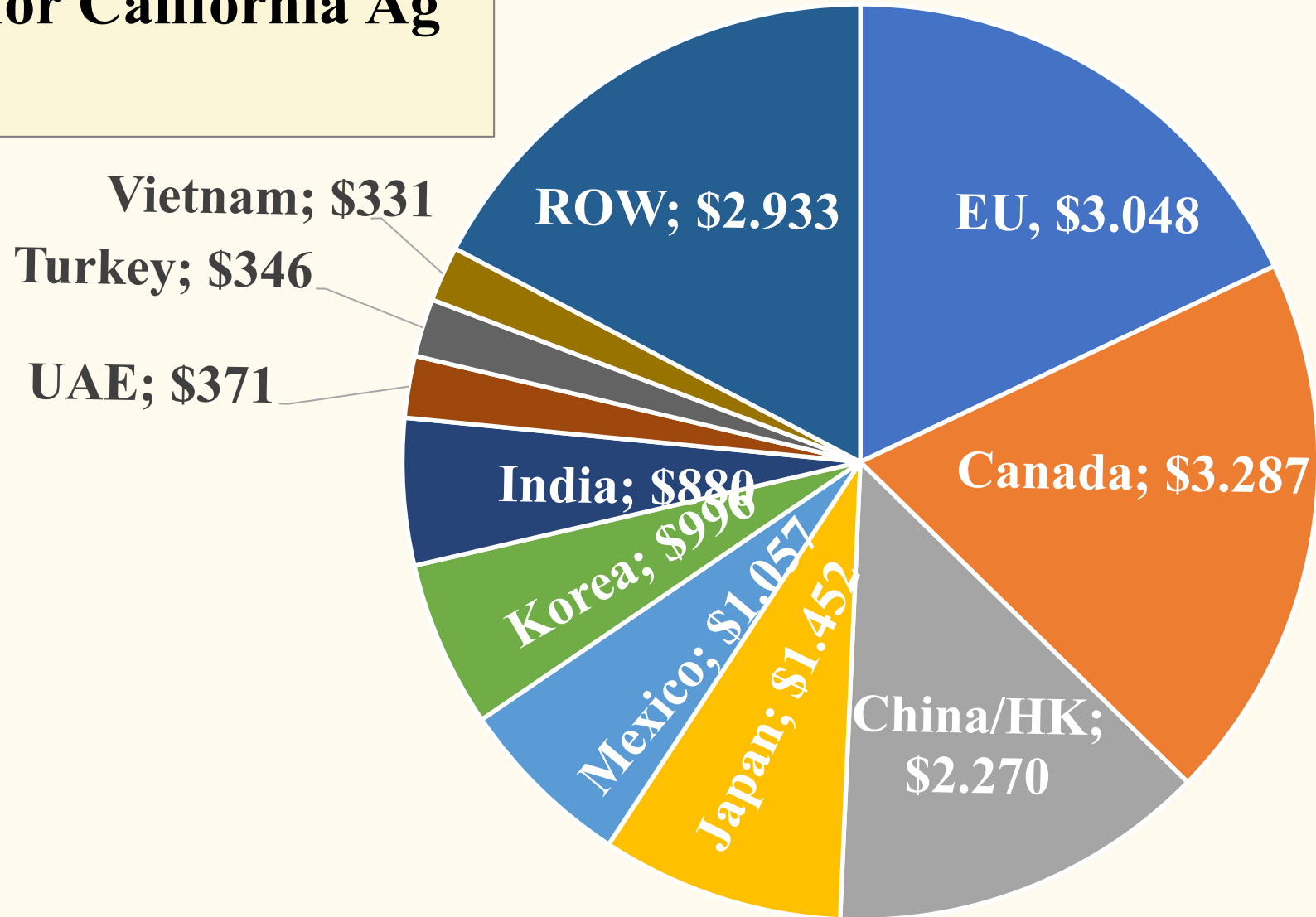
California gains from the world's most effective trade agreement

- **For about 230 years the US constitution has allowed something close to free trade among the US states.**
- **The commerce clause blocked tariffs and most other trade barriers in a market with more than 300 million people and a large share of global income.**
- **This trade agreement has a long established dispute resolution process in the Supreme Court, which has broadly maintained the limits on what states can do reduce access on goods from other states.**
- **The results has been a path of growth.**
- **China and India have some similar growth advantages with large internal markets, but obviously a large market cannot guarantee growth**

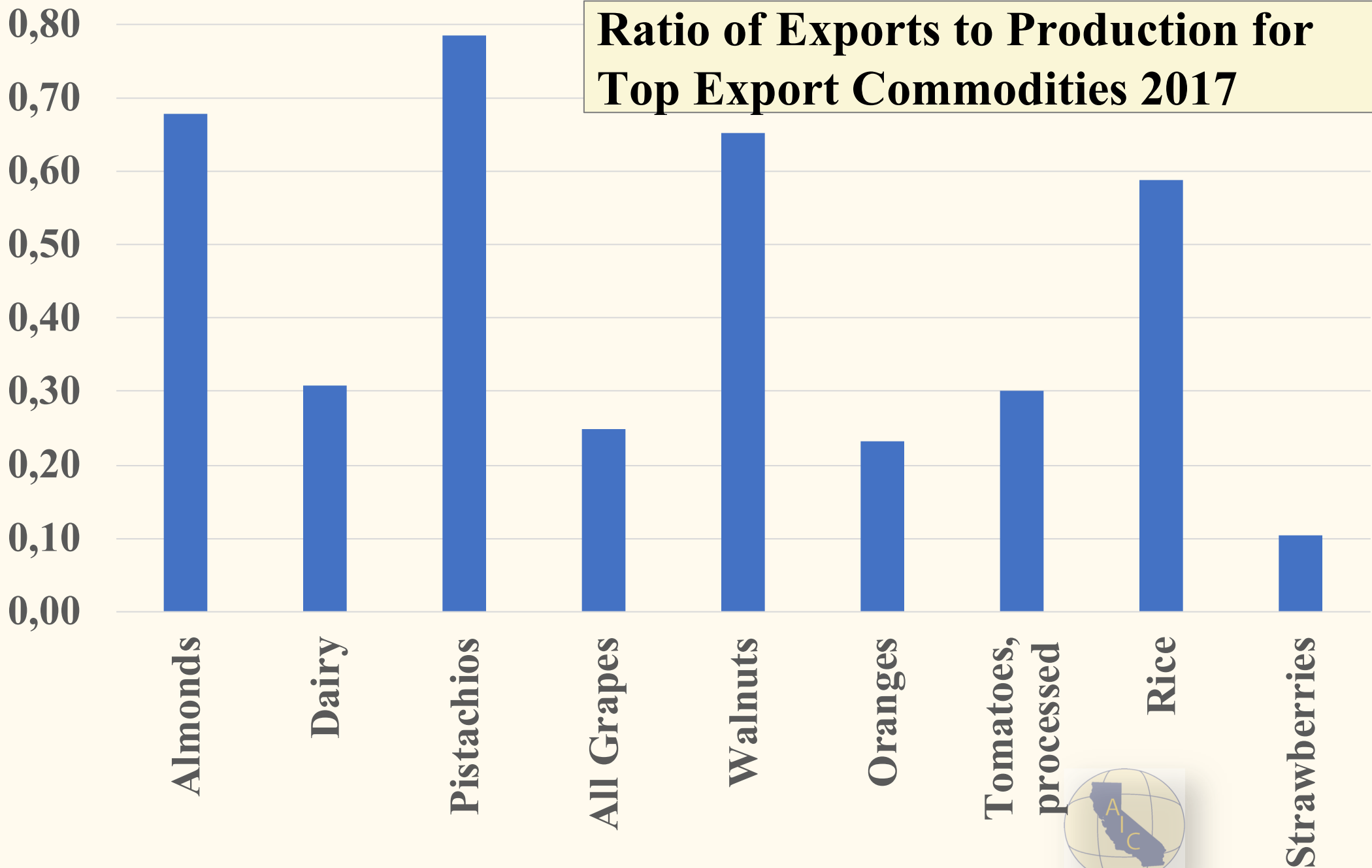
Top California Ag Export Commodities, 2017 (in \$million)



Top Destinations for California Ag Exports in 2017



Ratio of Exports to Production for Top Export Commodities 2017



Trade policy and trade patterns have experienced turbulence in recent months, but this is likely to be just short term interruption as nations allow people more scope for natural urge to trade

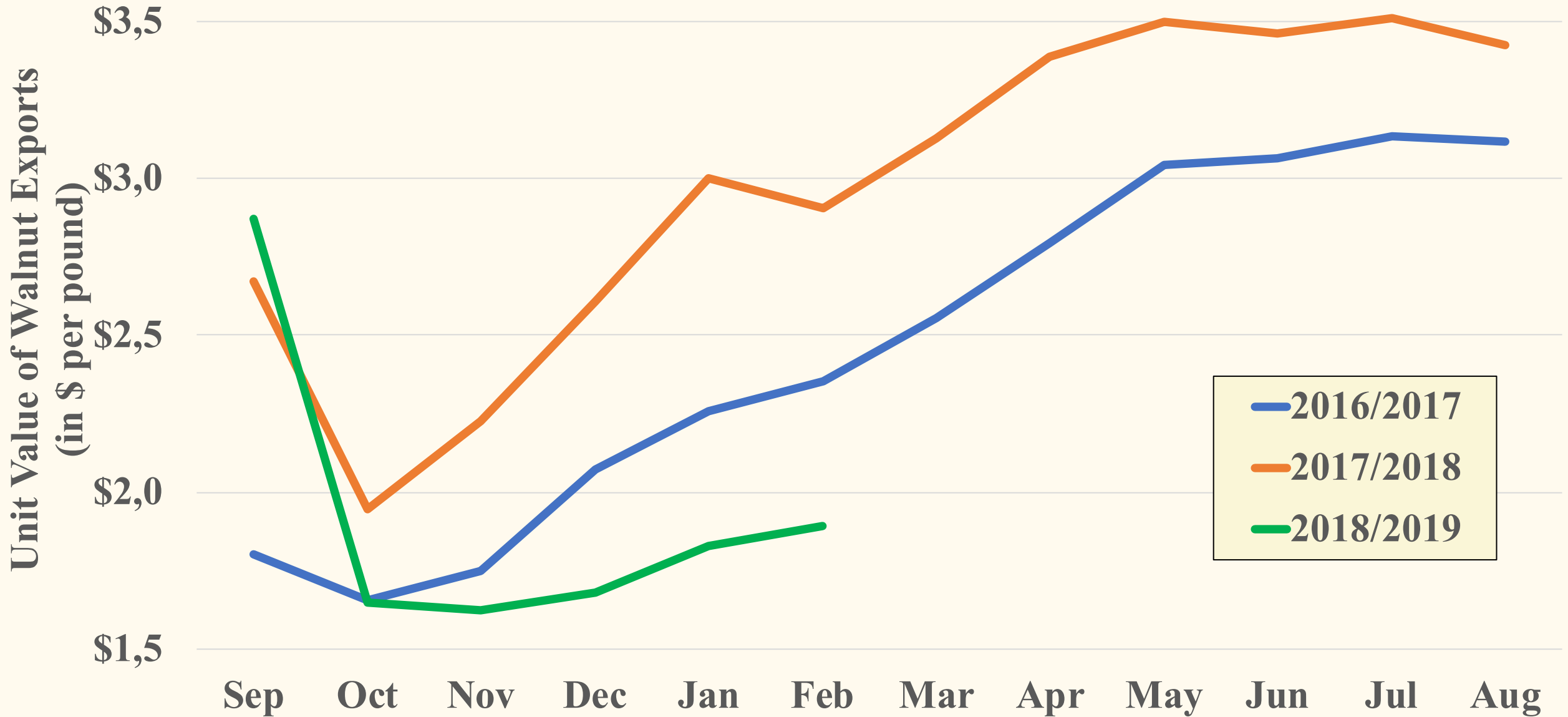
- Trade has long been restricted by many rules and by national policies that undermined property rights.
- WTO and other agreements provide ways to resolve such concerns
- Recent U.S. trade actions and provocative statements caused reactions from several trade partners, especially but not only China.
- Farm goods have been targets of new tariffs and other barriers.
- Californian farm products have been in the center of this turmoil, with Chilean products a potential winner.
- But Chile too is harmed by slower global growth

Price Implications of Trade turmoil

Considerations that drive impacts:

1. For tree and vine crops U.S. production hard to adjusted.
2. More than just higher tariffs: other less “official” actions discourage imports from the U.S.
3. Losses depend on the share of production affected and ability to reshuffle supplies.

Unit Value of California Walnut Exports by Month, September 2016/2017-March 2018/2019



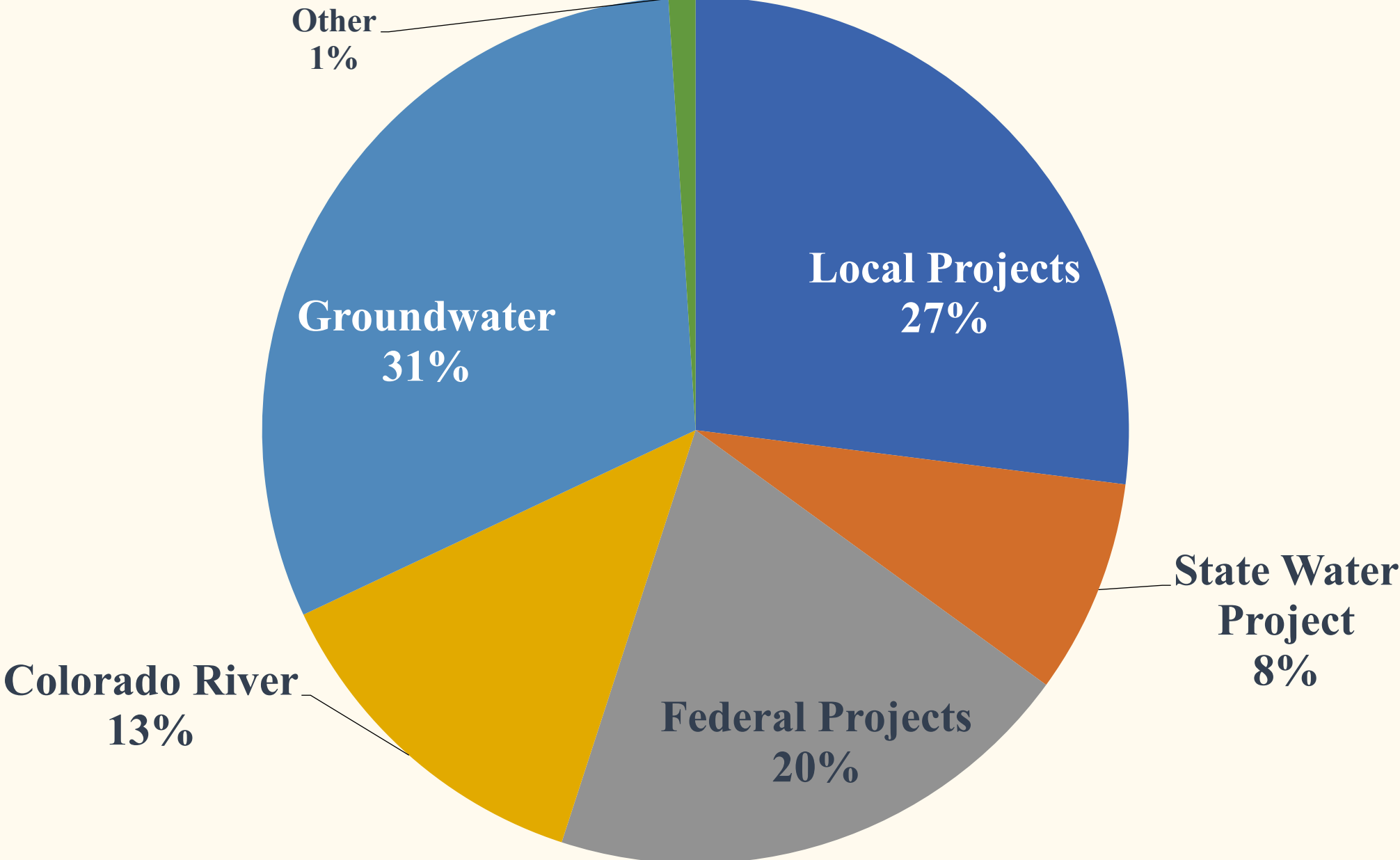
Basic Climate Policy Facts and Reminders

- 1. California has had substantial warming of winter lows, not summer highs**
- 2. No obvious change in amount of precipitation, but form shifts to rain from snow, we return to this next**
- 3. Concerns about chill hours from some varieties of fruits and nuts**
- 4. Climate policy places immediate impacts for the large and central dairy industry**
- 5. Methane reduction policy now requires severe cuts in emissions from dairy manure. Herds are 2,000+ cows and many are nearby, so scale economies of joint processing reduces costs, but investments are large**
- 6. Alternatives are costly. The current approaches fit only with direct subsidy or subsidy on the resultant fuels. Risky to invest based on transient policy. Turn manure into methane for vehicle fuels only if big subsidy continue.**
- 7. Finally, cost of energy and caps and trade of GHG raises food processing costs**

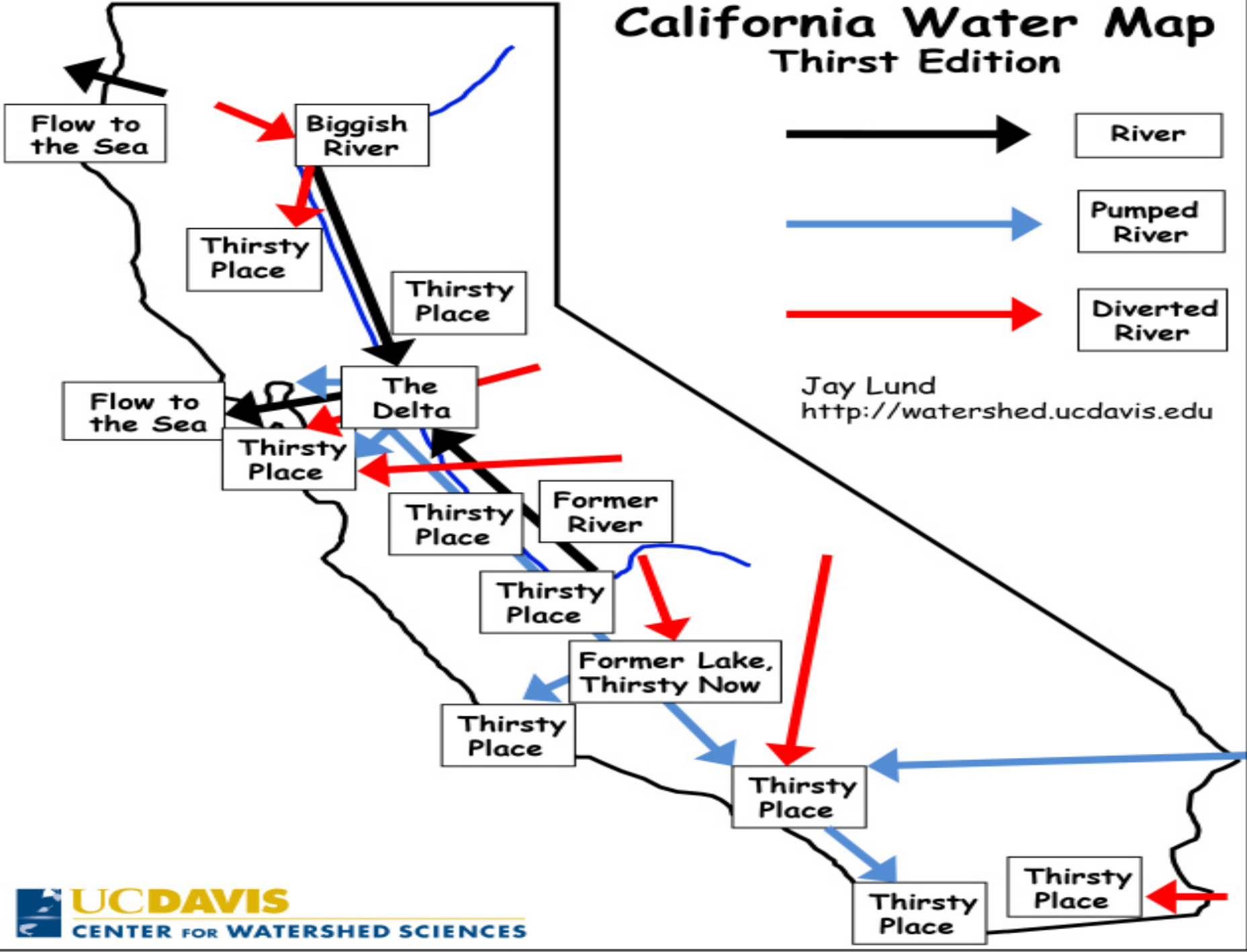
Seven Basic Water Facts and Reminders

1. California has the most variable precipitation in the United States
2. Often abundant nearby snowfall .
3. Surface water (shipped from the Mountains) became the base irrigation supply for the Central Valley
4. Groundwater became the bank we have drawn from in dry years.
5. Then: More environmental use, more urban use, more perennial crops, more total farm demand and use of drip technology have all led to less recharge.
6. A sustainable system of recharge with mountain snow in “normal” years and draw down only in dry years became drawdown almost every year.
7. The **Sustainable Groundwater Management Act** was the response.

California's Water Sources (Typical)



California Water Map Thirst Edition



California water essentials that keeps the details in perspective.

Prepared by a hydrologist engineer not a water lawyer!

Mostly a Central Valley story almost ignoring the coast

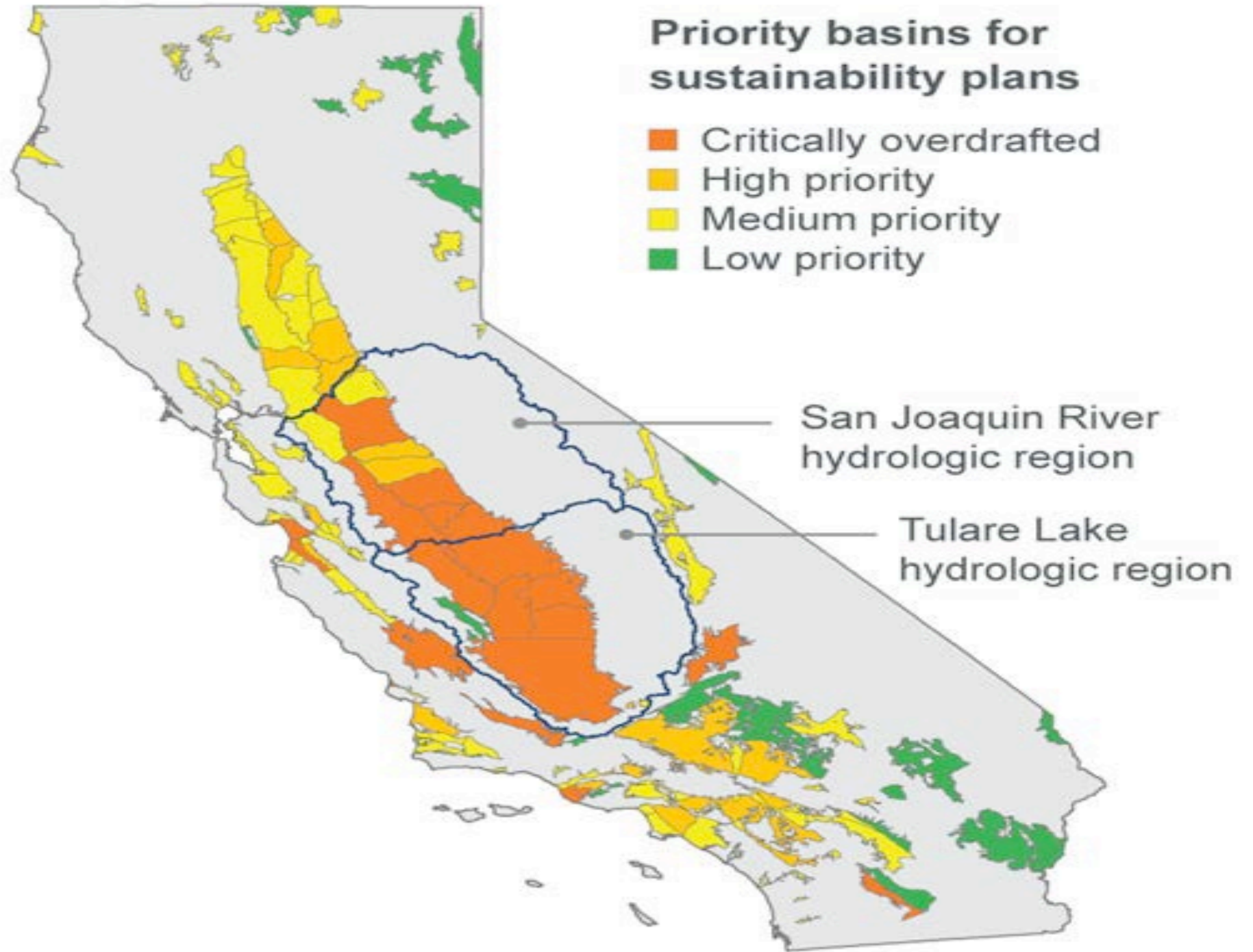
Ownership and Trading of California Groundwater

- **When we have secure property rights in groundwater, then:**
 - **Those with suitable land can recharge in the winter when there is little evaporation loss and delivery costs are low.**
 - **To “own” this water underground requires that it be measured, monitored so it can be marketed.**
 - **Effective property rights in water means owners can sell or use and can save for high prices in the future**

The bulk of “critically over-drafted land and crop productivity is in the San Joaquin Valley

High crop value pockets on the coast and in Southern California.

Most crop production in area that now require much regulation.

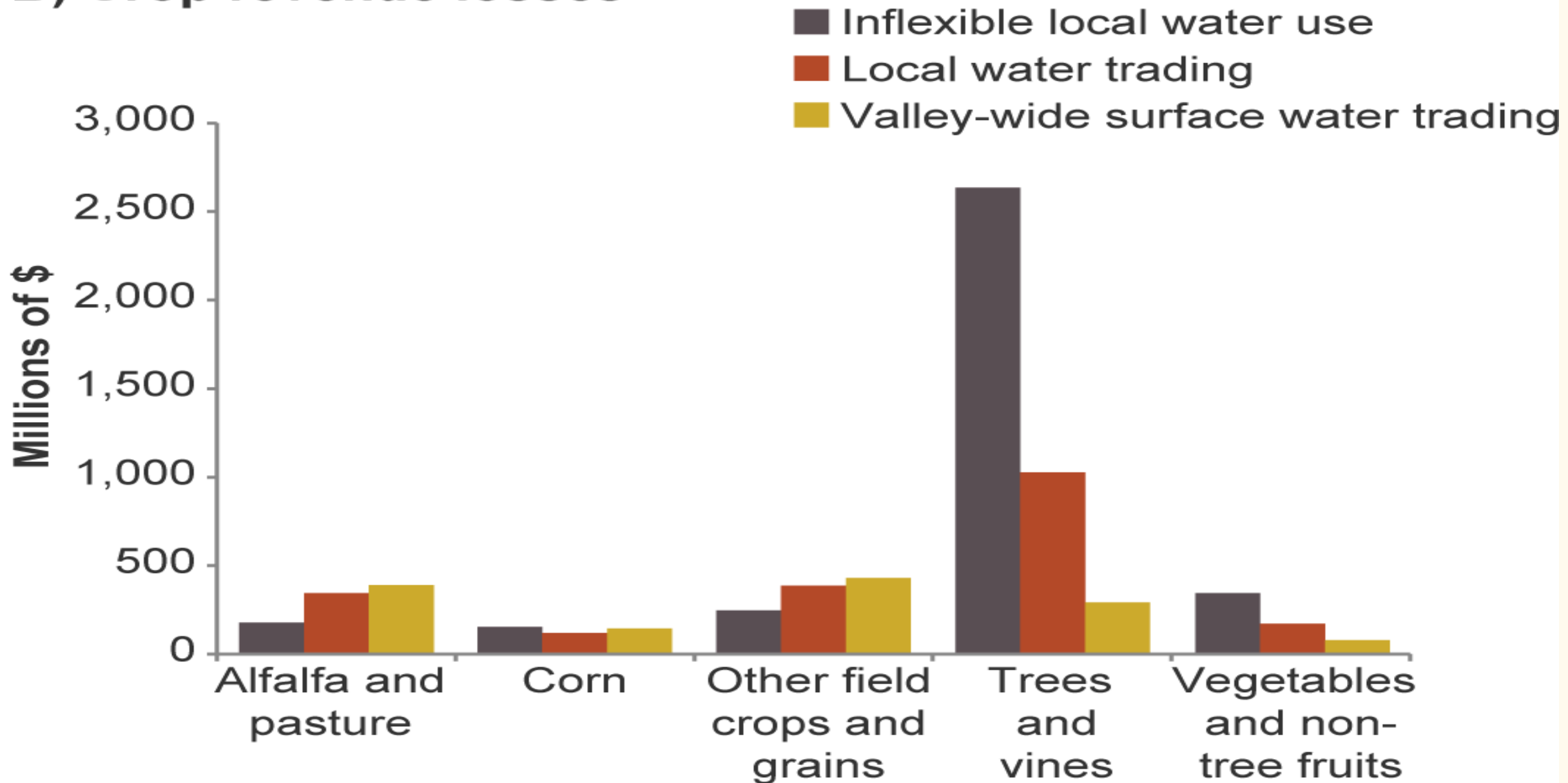


Hydrology and Plant Physiology of Groundwater Recharge

- **Efforts to recharge are complicated. Research is underway on:**
 - **Where to focus recharge efforts? Where does the soil make it easy? How do crops react, especially trees, vines and alfalfa? How interconnected are the aquifers?**
 - **Helen Dahlke is a key researcher in this area and has several plant science coauthors.**
 - **For example, Dahlke and Dan Putnam have explored the use of alfalfa fields as places for groundwater recharge.**

Water Trading Impacts for Crops

B) Crop revenue losses

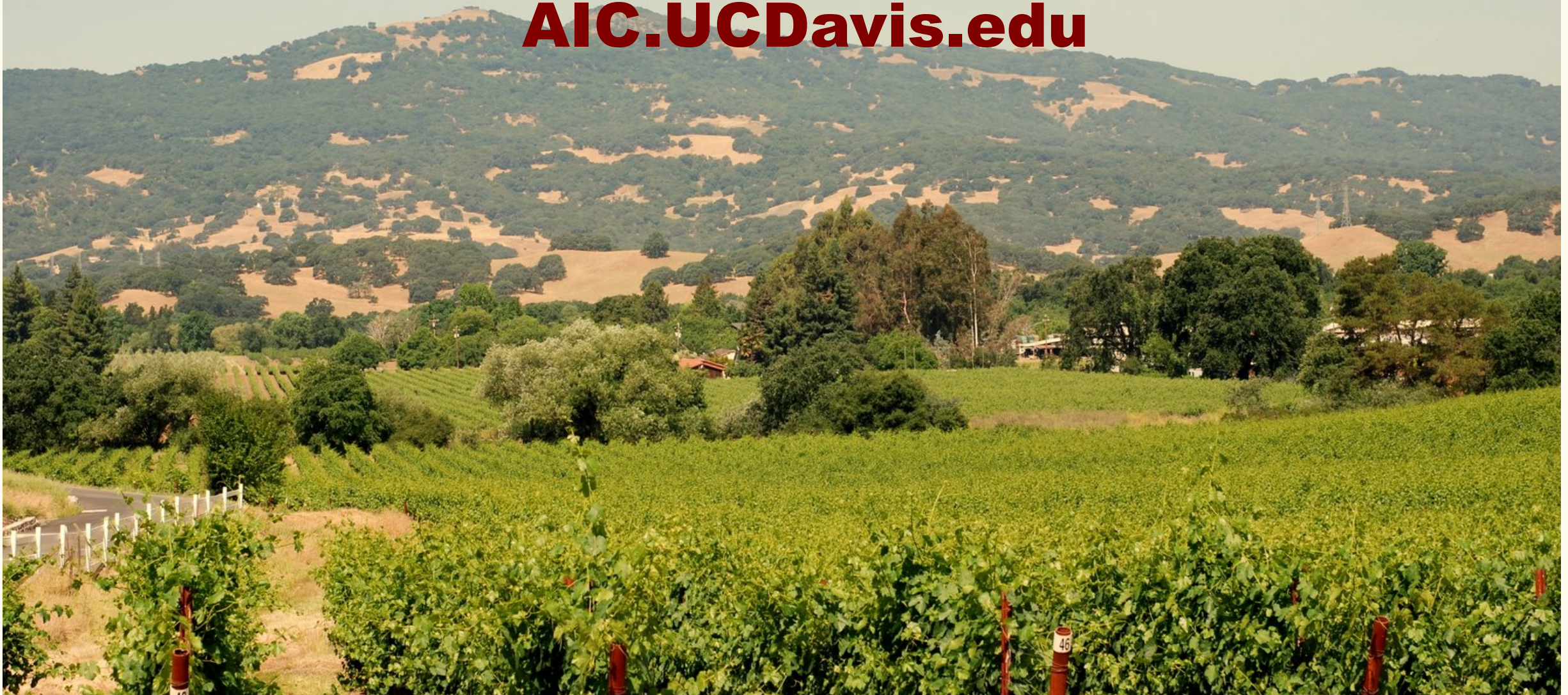


Ownership of California Groundwater

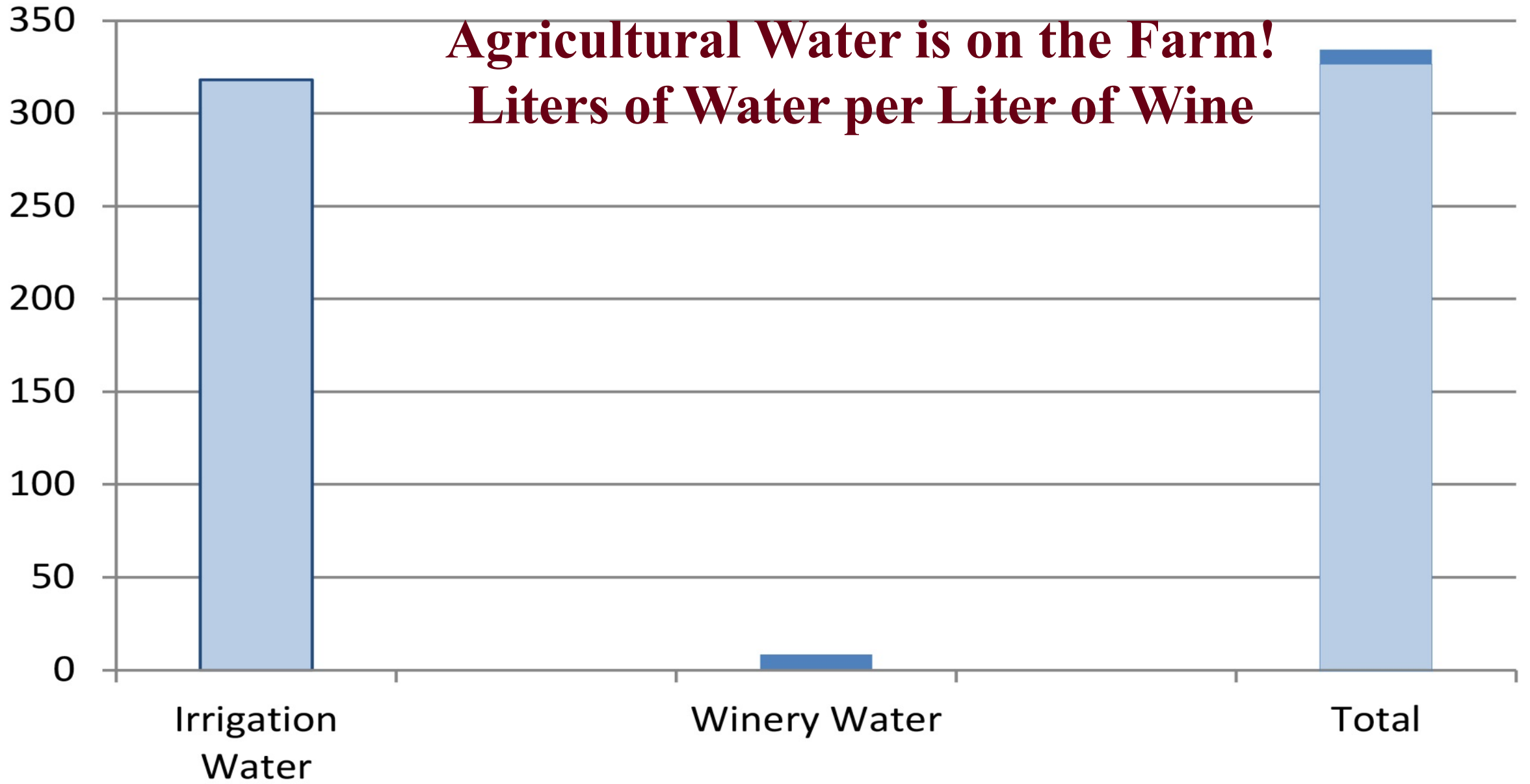
- **Trust in the secure ownership of an asset is crucial for any reasonable economic decisions.**
- **Ownership means rights to buy and sell and save and invest.**
- **Land with efficient recharge potential could become valuable even if it is not a cheap place to pump nor good for high value crops**
- **Markets drive innovation: maybe the hydrologists and water lawyers are too pessimistic.**

**Thank you
Questions and Discussion?**

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**Agricultural Water is on the Farm!
Liters of Water per Liter of Wine**



Labor costs are vital for farm cost estimates

The AIC team works with extension advisors. we are updating studies now trying to incorporate the new labor cost environment.

Don Steward and Jeremy Murdock work with county farm advisors, specialists and others to assess where the labor market is going.

One big challenge is getting the labor component of custom operations such as fresh plum packing costs.

SAMPLE COSTS TO ESTABLISH AND PRODUCE PLUMS



SAN JOAQUIN VALLEY – SOUTH 2016

Basic Farm Labor Facts and Reminders

- 1. Labor demand-side trends: More demand for labor intensive crops. California regulatory costs are high. Some regions face high cost of living for workers.**
- 2. Labor use is up not down. 10% in a decade... berries grew; for others, more mechanized or acreage down**
- 3. Hired Labor is a big share of costs and a limiting resource for some industries, tree fruit, table grapes, etc.**
- 4. Farm workers are immigrants (often undocumented), immigration has slowed**
- 5. Labor force is aging, inelastic supply of entrants.**
- 6. Continuing use of farm labor contractors**

More Farm Labor Reminders

- 1. Increased demand and limited supply has meant gradually higher wages as labor market outside farming improves, more rapid wage jumps recently**
- 2. Farm jobs must compete with non-farm opportunities**
- 3. Farms had an advantage during unemployment and slow growth in the great recession.**
- 4. New immigration restrictions not the major threat.**
- 5. Minimum wage increase to \$15 by 2022...unlikely to be binding, (not a Napa issue)**
- 6. Market pressures are raising wages more than legal minimums**

Farm Labor “Sustainability” Compliance

- **Sustainability compliance and certification continues to attract talk**
- **Hired labor is a growing part of the social dimension sustainability certification. Not clear if rules improve wages or working conditions**
- **Some buyers impose their own standards, or get third party certifiers**
- **Little evidence of “consumer” willingness to pay, unlike for food safety (front and center for consumers) and organic (which is seen as safety But, retailers and others still are moving this agenda**
- **Private rules may lead regulations for large growers and large buyers**
- **Worker issues may be wrapped into other compliance issues.**
- **Measurement and impact of standards are not well understood**