



The future of California's drought

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- **Measuring the pain and suffering for the drought**
- **"Floods, droughts, and lawsuits test the system"**
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Droughts are what test both Californians and the state's vast engineered water system, Jay Lund, a professor in the Department of Civil and Environmental Engineering at University of California, Davis, told the California State Board of Food and Agriculture last week.

"We just had a test," he said of the drought, noting that no one knows if this winter might see enough rain and snow to finally end three years of drought.

"Floods also test us. Lawsuits also test us. In our book on water management in California, we have a chapter on history called floods, droughts and lawsuits. It is built around the idea that if you look at major changes in California's water system, it all comes from floods, droughts and lawsuits," Mr. Lund told the board. "The construction of reservoirs that we all rely on today came after several droughts. Droughts are necessary to focus our attention. We have a lot of other things in our lives. This drought is very painful, but is also helping to improve our system."

He said that the Sacramento Valley precipitation index showed 2014 was the eighth driest year in 106 years of records. "This was a severe drought but it was not a millennium drought. We have had droughts much, much worse in ancient times," he said. "Thirteen percent of all the dry years are critically dry years. The probability that next year will be a dry year is doubled. And the probability the next year after that will be a dry year will be much higher. But there is a 30 percent chance it could be wet."

He said it would be helpful to look upon the drought as just part of living in California.

"California having droughts is like having earthquakes and fires," Mr. Lund told the board. "We're going to have them. This is part of our climate."

Mr. Lund said the role in California of ground water is immense. "If we didn't have ground water in most of the system, we'd be in much worse shape," he said.

Richard Howitt, UC Davis professor emeritus of agricultural and resource economics, said the events of the summer of 2014 bore out what he and Mr. Lund had predicted in April, in his words:

- We estimated that pumping of ground water would increase by five million-acre feet.
- The net loss would be 1.5 million-acre feet.
- We put the economic damage at \$2.5 billion.
- We said we didn't see more than 5 percent change in prices because we thought farmers would react.

He also said that California's farmers adapted enough – and perhaps pumped enough ground water – to remain competitive.

“Rival market sources were licking their lips ready to grab California's share of the market,” said Mr. Howitt. “But California has been incredibly resilient. Resilience comes from having a supply of ground water.”

Measuring the drought impact by counting food boxes for farm workers

Mr. Howitt said satellites are able to show exactly where the dry areas are. But they don't measure the pain of the drought.

“There are pockets of real pain and suffering,” he said. “We measure this by the number of food boxes taken up by emergency services.”

Question & Answers

Q. From Donald Bransford, agricultural industry member of the board and owner of Bransford Farms, a 1,200-acre ranch in Colusa that grows almonds, prunes and rice.

“Richard, you told us about the resiliency of the produce industry with ground water. With the new legislation that is coming into phase, that is going to impact some areas that rely on ground water and may become limited. Have you looked at what the potential impact will be? It's not sustainable in some areas, so what was there will still be there but they may not have access to it with some of this new legislation.

A. Mr. Howitt, who said he would be addressing 300 farmers in Fresno the next day: “I'm going to tell them that property rights and ground water management — not regulation — is essential for our going ahead with our California high value thing because you can only reinvest in high value crops.

“If you want to see the future of the Central Valley, drive to Orange County. I will show the audience that Orange County has a very simple financial mechanism to measure everything and pump ground water, as it should be used, but you have to put it back — you have to treat ground water the way you would treat a money time account. If you move towards more risky vulnerable investments, you have to balance it in part with T-bills in the other part of your account. So what we need to do is rebalance California's agriculture because we are going to expand and increase its profitability. We've got to have a better risk-cost mechanism than we have now.

Q. Mr. Bransford: Isn't there still an issue with the South for the Delta folks to get a buffer of water over there to manage it? Do you think that is significant?

A. Mr. Howitt: We did a study a few years ago of what it would take to bring the Southern part of the

Valley into balance. There was a bit of fallowing and a lot of extra ground water exports out of the Delta. It has to come from somewhere.

A. Mr. Lund: If you look at the long period back to 1922, you'll see that we now have a larger percentage of the snow pack runoff now occurring in the winter than used to occur in spring. It's not entirely catastrophic, but it really directly affects agriculture if it becomes drier in the future.

Q. From Eric Holst, public member for environment and Senior Director for working lands at the Environmental Defense Fund: Can we draw any conclusions about current storage capacities of whether it is adequate to the challenge in precipitation?

A. Mr. Lund: "My specialty is reservoir operations. I could tell you with a lot of certainty as a reservoir operator I would always rather have more storage capacity — if it is free. But I think the state needs to look at this as an investment. If we have more storage capacity it will give us a little more water. Is that a good investment of the money relative to the other things that we can do in the portfolio? Just like in all of your businesses, you have different kinds of investments you can make."

Q. From Bryce Lundberg, board member and vice president, Lundberg Family Farms, Richvale, a third and fourth generation family farm that has been producing rice products for 75 years:

"Uncle Homer always reminds me that the Sacramento River and its tributaries flow more water than the Colorado River and its tributaries. The Colorado River has six times the storage capacity than that of the Sacramento River. That gets them through multiple years of drought when they get one year of significant rain and gets them through many more years than our system.

"My Uncle Homer showed me this report and said, 'Averages are just averages.' But from drought to drought is five times. This indicates we have to be prepared to capture that flood because the low comes as often as the flood and we don't get average. We believe in inventory management and don't order what we don't need."

Then Mr. Lundberg showed a chart to everyone, and said "On this chart we can see these storms. We've had two good ones last year. They are somewhat predictable. Do you think as we get better at that, the regulatory process that moves water from North to South can catch up with the predictability of these storms so that, if we predict one is coming, and the rivers will be in high flow, that the regulatory process can kick in weeks before or 10 days before the storm?"

A. Mr. Lund: "We currently have forecasts that are pretty good for three to five days. To get forecasts for particular events more than six to 10 days, it is really difficult. Some improvements are being made that will be helpful. I would like to see over time the regulatory agencies become more responsive — not only to take advantage of the weather forecasts, which I think the state board is trying to do now when storms are coming in.

"The other part of the prediction that I think will be very interesting is moving the fish. If we can also see the pulse of fish coming through we can get the most water with the least loss of fish. Between those three things:

- Better regulatory coordination
- Better weather forecasting

- Better fish forecasting.

Hopefully we can do better in providing more water.”

Q. California Department of Food and Agriculture Secretary Karen Ross: “Water markets and the pricing of water is a question I have frequently. Of course, when we have 2,000 public agencies and other private water agencies, it is not as easy as it sounds to say ‘Price water differently.’ But I know Richard in particular has some strong feelings on what we could do to improve water markets and I think it is important to hear more from him on that.”

A. Mr. Howitt: “It’s like when you want to buy a new car. You look at Carfax and the price, where the cars are, and the margins. It is much easier than 30 years ago. Farmers this year were flying blind in terms of water markets. Some of them got blind-sided, which I think is inexcusable. I’m completely in favor of free markets and not fixing the prices. What we are short of is information. The market can only operate correctly if you make the correct bids for water. Without that information, you get some tragic incidences. What farmers thought was a sure fire bid because they absolutely needed the water, then be told, ‘Sorry, you missed out’ so their orchards had to die.

“This is the one thing we can do right away to have some form of clearing house that would not fix prices or regulate trades. It would just inform the people what the going price is and where the water is for sale and who is buying. This would be a significant step forward and one to be very interesting to hear from the water traders and farmers to talk about to get no regulations — just information.”

Q. Mr. Lundberg: “I can appreciate that in a short term situation but my part of the Valley doesn’t like the idea of being the ‘solution.’ California needs Prop. 1 and things like it to develop water so that we aren’t perpetually looking at having to be water traders because other parts of the state need it.

“Isn’t that suppose to be just short-term or is that the long term solution—that we will be water traders? And some communities are going to be shorted water that they need for jobs and programs in the North state because we have to trade water to the south state?”

“Long term, our responsibility is to develop enough water that we’re not having to trade water around the state at these high prices to try to get growers in one area to let go of a resource in their community that folks need.”

A. Mr. Howitt: “In any system where there is uncertainty, trade is the most equitable, efficient way of balancing out the uncertainties and assurance. We do it with every other one of our natural resources. Most of the time California is short in trades. There are option trades so people will know they will have that trade in advance when things happen. To make this work, we have to change our regulatory requirements. We have what I call a problematic environment instead of a simple environmental impact statement saying, if you want to trade east to west in the San Joaquin, here are the criteria to move it, the temperatures, etc. That could be assessed in advance like a building permit. Then the regulatory system would have to be changed but could have no legal challenges in the year in which the trade took place. The trade would take place if it meets the requirements. This would give you the pink slip to your ‘car’. When I sell a car, I have to make sure it assesses the environmental standards before I can do it. Once I do that no one can tell me when to do it or what price to charge.”

Comment from Mr. Bransford: “I would argue what you just said should also have to be able to occur

in the west side of the Valley where you don't have one entity that controls the system. For us we're dealing with the Bureau of Reclamation. If water can be rescheduled to meet those needs, it would create much more flexibility. The problem we have now is whenever we negotiate a transfer with south of the Delta folks, they want to make that decision as late as possible. We want them to make it as early as possible, because if they are not going to buy it, then we'll want to farm our ground. If this can be done early under certain conditions, then I think it will be much more viable because that date is always the trigger. We always want April and they want mid-May. It just doesn't work."

Q. Martha Montoyo, board member and president of Loskitos Produce and Loskitos Comics: "Is there anywhere in the world that has a similar model like you're talking about for trading?"

A. Mr. Howitt: "There are various places in the U.S. in Colorado and Utah. The best example is in Australia. I have a link on my iPhone where I can tell you today the prices of water in Australia. So yes, it can be done."

Q. Ashley Boren, public board member representing environment and Executive Director of Sustainable Conservation, a nonprofit organization "dedicated to partnering with business, agriculture and government to find practical ways that the private sector can protect clean air, clean water and healthy ecosystems": "Has there been any kind of comprehensive study to compare how much storage you can get or will there be a replay of dams versus other strategies?"

A. Mr. Lund: "A few studies have been done. As I said before, more storage is always helpful. It's just a matter of where it is most efficient and how much it costs and whether it is worth the cost. There are also some ideas for some small, localized storage — particularly in southern California. For the northern part of the state, the larger reservoirs will be more economical.

Q. Mr. Lundberg: How large of reduction in supply of foods and vegetables would there need to be to see an impact much more significant than what we saw this year? I'm a rice grower and we had about a 20-25 percent reduction in supply this year, which seemed to move the price from \$16-\$17 to \$27-\$30 — much more significant than the numbers you are referencing as the percentage. But that's just one community. If California agriculture has much more significant reduction in the 20-25 percent range, how big of a reduction would you expect if supplies started to drop off and this price curve would elevate?"

A. Mr. Howitt: "We have significant studies on this over the past five years in California. The answer is a relatively small drop — 10-15 percent would have a dramatic impact in prices — particularly markets where California has a high share. We might well have a second year impact on nut trees like almonds. Then we'll see a significant jump in price paid."

Q. Mr. Bransford: "We relied heavily on ground water this year, which softened the blow for the increase in prices to consumers. We had a record crop this year of tomatoes. But don't you think a lot of that was from a shift of traditional vegetable areas? There had to be crops that suffered acreage loss with the higher dollar crops taking their place and moving either to the east side or to northern California. So what caused loss this year?"

A. Mr. Howitt: "Crops that lost this year were the grain field crops linked with dairies like hay and grain pasture crops. We do not see any evidence form price shifts that we had shortage in supply. That

actually surprised me, because we know the consumer is quite sensitive on small changes in quantity and big changes in price.

Q. Mr. McNamara: "As you both look into your crystal ball, what would your overdraft predictions be for 2015?"

A. Mr. Lund: "It depends on how wet it is. If it is as dry as 2014, some of the estimates we've cooked up go two to five percent higher in some regions, lower in others. The water elevations will be lower, so the pumping costs will be higher. It will cost more to get the same amount of water out of the ground. It will particularly hit the small, rural community households that don't have the shallow wells and the smaller communities that don't have deep wells."

Q. Ben Drake, agricultural industry board member and president, Drake Enterprises in Temecula since 1980 — consultants for those who grow vineyards and avocados: "What about the water quality when you drill wells deeper?"

A. Mr. Lund: You will have more arsenic in some parts of the state."

Mr. Drake: "We see it in a lot of our wells. But I'm wondering if you're seeing more copper barium (which can cause an increase in blood pressure), salinity issues in deeper wells? We see salinity as a huge issue in production wells."

A. Mr. Lund: "It would depend on which part of the state you are in."

Mr. Drake: "When you're looking at wells going deeper, you're looking at issues where people don't have sanitary systems because of the water going that low."

"I have two other questions:

- How come you can deliver water to Southern California where I am and you can have lawns and do all these other things, and you can have a huge water district that has certain revenue goals that they have to meet to cover their costs? How come we can't interrupt that? I am on a water district. We have tiered rate structures, which puts a penalty on people. We have to hit people in the pocketbook. When your water gets more than your phone or your TV bills, you're going to start paying attention."*
- "Why can't we get more pressure on that so we don't put so much demand on water going to the south or east? How do you know you're cutting back 20% if you don't have a water heater?"*

To those questions, Mr. Drake got an answer from one of the highest sources in the state: Gov. Edmund Brown Jr.'s senior advisor on water policy — his deputy secretary for water policy at the California Natural Resources Agency, Karla Nemeth, who previously was the Bay Delta Conservation Plan project manager since 2009 before she recently got this \$150,000 a year job.

"I could not agree more," she said to Mr. Drake. "This year we are going to see much more strict water rationing in some areas, particularly if it continues to be dry. We will see mandatory water use restrictions that will be substantial in rural and urban areas in the Central Valley.

"In 1991 they hadn't done as much with recycled water and efficiencies. This year they were very eager to demonstrate to their water rate payers, who had seen their rates go up the past several decades, that we actually do have new, reliable supplies. But I've heard from some of the water managers in southern

California that this was one of the craziest years on record. They are looking at their systems and trying to understand where they potentially have in service shortages. People across the state are re-examining their portfolio and determining where to make future investments. We also want to facilitate water markets where we have water users determine what some of the appropriate prices are and provide some stability so we know that water can get to where it needs to go.”

Q. Daniel Dooley: “In some areas zero allocations to projects means that there is no water in the facilities to enable transfers or exchanges. So as you reflect on the past year, I would hope that you would take a look at those areas if there is a way to enable at least enough water in the facilities where even local transfers and exchanges can occur. In some ways markets won’t work very well at all if there isn’t any water in your facilities. How do you optimize the system so you have as much flexibility to move water around as much as possible?”

A. Ms. Nemeth: “That’s an excellent point. Even a five percent allocation frees up movement of water in ways that are really critical.”

Q. Mr. Bransford: “You have not talked about enforcement. The reason I’m asking is there are some real issues. On the Upper Sacramento from Glen/Colusa to Knights Landing there is 1,000 cubic feet per second of water that is disappearing. There are some questions about whose water is whose in the Delta? Those have huge impacts on storage because if any of these illegal diversions take water away from regulatory requirements... there is confusion in my part of the world as to what can I do? Education is one thing but are there plans for enforcement?”

A. Ms. Nemeth: “We probably underestimated depletion that was occurring. The state and federal water projects have requested that the Board look more fully into water that has been transferred or available on paper and never materialized. That will be part of the enforcement discussion at the State Water Control Resources Board. It’s kind of a learning curve to the State Board at really getting at some of the users in the Sacramento Valley in particular.”

One board member thanked Ms. Nemeth for the state’s better adapting and improvements in operating the system.

“The door is always open,” said Ms. Nemeth. “I’ve been talking to Secretary Ross quite a bit.”