How California agriculture is the problem and solution to its Colorado River water crisis

The All-American Canal conveys water through the Imperial Sand Dunes of California's Colorado Desert, a few miles north of the U.S.-Mexico border, on September 28, 2022 near Felicity, California. The 80-mile long canal carries water from the Colorado River to supply nine Southern California cities and 500,000 acres of farmland in the Imperial Valley where a few hundred farms draw more water from the Colorado River than the states of Arizona and Nevada combined. (David McNew/Getty Images)

Eighty percent of California's water from the Colorado River is used for agriculture. So, as the river dries up, the first cuts tend to land on farmers.
Agriculture economist Richard Howitt thinks to get out of this water crisis California's farmers must make some major changes.

"It will hurt some sectors," he says. "We can't disguise that we should face up to it. But when I say hurt, I'm talking about changing the size of the sector with compensation."

Today, On Point: Is targeting the country's food supply the best way out of this Colorado River water crisis?

**Guests**

**Tina Shields**, water department manager at the Imperial Irrigation District.

**Richard Howitt**, professor emeritus of Agricultural and Resource Economics at the University of California, Davis.

**Also Featured**

**Mark McBroom**, farmer in Imperial Valley, CA.

**Transcript**

**Part I**

MEGHNACHAKRABARTI: The Western megadrought has plunged Colorado River water down to crisis levels for years.
That forced the federal government last summer to put pressure on the seven Colorado River Basin states to find ways to collectively cut their water use by 15% to 30%. It wasn't easy. The states couldn't agree, and blew past their deadline, with California holding out to preserve its historic water rights.

Well, just a couple of weeks ago, the states found a breakthrough. Arizona, California and Nevada proposed cutting their Colorado River water use by about 13%. In exchange, farmers and other water users expect to receive about $1.2 billion in compensation from the federal government. Felicia Marcus, visiting fellow at Stanford University's Water in the West program, told television station KTVU that the agreed cuts will be in place until 2026.

**FELICIA MARCUS:** It is clearly in a critically important stopgap as we're dealing with a near Armageddon state of affairs. But it is just a stopgap for the next few years, in order to buy us the time for there to be a more thoughtful reassessment of the whole way we manage the river.

**CHAKRABARTI:** In California, 80% of that state's Colorado River water goes to agriculture, in the Imperial Valley, in the very southernmost part of the state. That's where Mark McBroom farms the land.

**MARK McBROOM:** I'm concerned. In my situation, on our
farms, and ... most farmers are this way, do not have enough water now to fully farm what they have.

CHAKRABARTI: McBroom has been in agriculture for about 40 years. He grows alfalfa, wheat, citrus fruits and more on his 6,000 acres. Given the decades-long drought and the ongoing constraints on the Colorado River, he says he's already had to adjust to using less water.

McBROOM: We've had to go from flood irrigation into micro-irrigation. Sprinklers, drip lines and those types of, you know, changes, changes the whole economic model to where the cost per acre to farm, something goes up, you know, thousands of dollars per acre.

CHAKRABARTI: And McBroom says these changes have cost him millions of dollars. He's even had to fallow hundreds of acres, meaning he's had to leave those fields. cropless. And though fallowing saves water, it doesn't necessarily save McBroom time or money.

McBROOM: Well, you still have to pay property taxes on it. You still have to maintain the ground, that when you don't maintain the ground, you actually have a little bit more expenses that go into maintaining your ditches. Plants and weeds, if you will, from regrowing and getting established in the fields. So it's still a maintenance program that, you know, parking a nice car in the garage, you still got to start it up
and keep it washed and lubricated and all that kind of stuff. It's not like putting your winter coat away.

CHAKRABARTI: Given that, McBroom is a little weary about the new water deal. The only way he can save more water would be to fallow more land, he says. And he's worried that what the federal government will likely end up offering in compensation might not be enough to cover the costs of sacrificing more water. And he says it could cause other crises.

McBROOM: You can decide what kind of a crisis you want to have, whether it's a water crisis or a food crisis. It's a difficult choice to make. But it's not the cost of conserving water, after losing the water, goes for how many years and how many businesses that rely on it, not just the farmer. Those are secondary and additional ancillary businesses that all rely on the farmer and the water, for their business as well. Packaging. Labor. Fuels. Chemicals. Fertilizers. You name it.

CHAKRABARTI: At the same time, McBroom knows that everyone in the Colorado River basin will be living in a future with even less water. He just wants to make sure California's farmers aren't making the largest sacrifices.

McBROOM: The last thing we want to do is to be a challenge out there. We're willing to help, but we're not willing to be taken advantage of and roll over, if you will, because we live
here with everybody else. And it's a community that thrives on agriculture and the water that gets here. So it's got to be worth something.

CHAKRABARTI: That was Mark McBroom, a farmer in the Imperial Valley of Southern California. Now, here's why this matters to everyone, not just California's farmers. California's agriculture industry is two things at the same time. It's by far the state's largest user of Colorado River water. That 80% number we gave you.

And at the same time, it's one of the most important agricultural states in the country. Almost 50% of fresh market vegetables produced in the United States comes from California, according to researchers at Cal Poly's Plant Sciences Program. So is there another way, an out-of-the-box idea that can take into account both of those facts, while also managing Colorado River water usage more sustainably?

That's what we're going to explore today. And we will start in California's Imperial Valley. Tina Shields is the Water Department manager at the Imperial Irrigation District. And she joins us from Brawley, California. Tina, welcome to On Point.

TINA SHIELDS: Hello.
CHAKRABARTI: So, first of all, tell us a little bit more about agriculture in the Imperial Valley. What's grown there and how would you describe its importance, not just to California, but the rest of the country?

SHIELDS: So agriculture is critical, in particular, to Imperial Valley. It is the basis of our regional economy. We farm about a half million acres in this community with water from the Colorado River. We do not have a backup water supply or groundwater resources.

So the Colorado River is extremely critical to our water users. We have a year-round growing season, so we're able to have extremely high yields when compared to other producers. And as you mentioned, in the wintertime, there's some portions of the year that 90% of your winter vegetables come from the Imperial and Yuma counties because of our great soils and weather and water supply condition. So it's a very vital resource to our community. One in every six jobs is directly related to agriculture. And then you have the ripple effect from those third-party businesses as well. So our community is built upon that.

CHAKRABARTI: And so the 90% of winter vegetables, that's 90% of winter vegetables grown in the United States at the time.

SHIELDS: Yeah. Largely, your lettuce crops in the wintertime
and it really just depends on the time of year, the season. That it's super critical to ensuring that we have a wide variety of produce in our grocery store in those winter months.

CHAKRABARTI: Across the country. So, tell us a little bit more. I mean, obviously this is not the first year that there has had to be water reduction, water usage reduction in the California River basin states. How has the Imperial Irrigation District already been adjusting to using less water over the years?

SHIELDS: So we are a very large producer of food supplies, in addition to the small communities and industries that are available in this area. Over 97% of our water use is agriculture. From a water conservation perspective, while that is not our ideal goal, our goal is to deliver water to our community, and take that water off the fields when it's done. For more than 30 years, we have been involved in large scale agricultural to urban water conservation and transfer programs.

Of particular note is in 2003, IID entered into an agreement with other California water users in the federal government called the Quantification Settlement Agreement. And at this point in time, we are conserving and transferring over a half million-acre feet of conserved water to urban Southern California to support water supply resiliency. In exchange for
the use of that water during the term of the contract, those agencies provide funding to the Imperial Irrigation District, which we use to improve our system.

We concrete-line canals, we build infrastructure improvements, reservoirs, we provide additional staffing. We also manage an on-farm conservation program, where we provide funding to growers so that they can take those conservation efforts to a field level. And they've spent the last ten-plus years converting from flood irrigation to drip irrigation and sprinklers. And using high precision irrigation methods in order to increase their ag water use efficiency so that they do use less water, but they continue to farm at the same time.

CHAKRABARTI: Can I just jump in here for a second? So there has been already some move away from flood irrigation, even for alfalfa. Because I understand that alfalfa has been historically irrigated through flood irrigation, which people consider to be a pretty evaporative process.

SHIELDS: Well, we live in a desert. Certainly about 70% of our crops are forage crops. And it just depends on the farmer and the crop and how they choose to implement their irrigation practices. So, you know, it's a wide variety of growers. Since 2014, we've ran an on-farm conservation program providing supplemental funding. But the cost of implementing those technologies is often expensive. So it's
really what makes business sense to the grower in the crop choice that they have.

CHAKRABARTI: Okay. so just mostly because I'm not a deep expert in agriculture, just to be clear, does that mean that the drip irrigation, the move to drip irrigation that you described is happening with some crops, but not all crops? And I point out alfalfa because it's also like a major cash crop in California, including in the Imperial Valley.

SHIELDS: Yeah, I think it's more difficult. Usually with those types of forged crops, the technologies we see in our on-farm program relates to the field configuration and precision leveling to just adjust the tilt of that field, so the water slows down and has more uniform application. But it really is based on the farmer growing model and their technology that they choose to implement. The last thing we want to do is tell a farmer how to farm. That's their expertise.

CHAKRABARTI: Got it. Okay. We've got about a minute until our first break, Tina. Let me just get a sense from you about your reaction to the agreement that took place a couple of weeks ago. I think it translates to about a 10% water reduction, water usage reduction for the Imperial Valley. What do you think about that?

SHIELDS: So we've been very involved in the discussions and negotiations to put that agreement together for some
time since late last year, in fact. The district's portion of commitment to that proposal is to generate up to another 250,000-acre feet of conservation a year, provided there is appropriate funding and mitigation for this on sea, which is a huge community concern in our area.

So we're very interested in being part of the solution. We know that this is a short term fix, but we need to have the longer, larger term discussions on how to make improvements for the long run. And we certainly don't want to be bogged down between now and 2026 in litigation, which is where things had been heading. So we were lucky enough to have some good hydrology this winter, which has served as a buffer for the reservoir system, and we are looking to ramp up our conservation efforts.

CHAKRABARTI: Okay. Well, Tina Shields, hang on here for just a second because you mentioned a couple of things which might not be familiar to non-Californians. We'll touch upon them when we come back. We're talking about California agriculture and long-term water use and whether there's a better idea than constant conservation and cuts.

Part II

CHAKRABARTI: Today we're talking about agriculture in the state of California, particularly its water use. And Colorado River water use is what we're focusing on. Because in
Southern California, agriculture uses 80% of the water that the Colorado River delivers to the state. So, we're looking for an out-of-the-box idea on how to more sustainably manage a future with less water. I'm joined today by Tina Shields. She's the Water Department manager at the Imperial Irrigation District and she joins us from Brawley, California.

And Tina, before we just get to some of the out-of-the-box ideas that we're going to talk about today, you mentioned a couple of things which I just wanted to clarify for non-Californian listeners. First of all, you talked about the good hydration earlier this year. I presume you meant all the rain that California got in, what, March, that it was the unusually high rain. Is that what you were talking about?

SHIELDS: No, actually, I'm speaking about the incredible snowpack in the Colorado River region.

CHAKRABARTI: Okay. Okay, good. See, that's why I had to ask, because I wanted to be sure that we were getting the right things. Okay. So more snowpack in the Colorado River region as a whole. Then you also mentioned another consideration that's very, very important in the Imperial Valley in terms of how water is used. And it was, you said the Salton Sea. So just take a minute to explain what that is and why it matters.

SHIELDS: So the Salton Sea is the largest inland body of
water within California. It is the lowest point in our geography. So the runoff water from storms and from the agricultural return flows and even the communities discharge goes to the Salton Sea, it's a terminus lake. There is water coming in, but there is no outlet for that water. So over the years it's become hypersaline.

And with the implementation of these conservation programs, due to the reduced inflow from agriculture and the improvement in efficiency, that body of water is shrinking, exposing tens of thousands of acres of playa that used to be underwater, and causing potential for public health issues related to the dust and loss of habitat.

CHAKRABARTI: I see. Okay. So basically, the implication is that the water needs to continually runoff into the Salton Sea to prevent that drying up and dust exposure.

SHIELDS: Well, it's a Hobson's choice. As you become more efficient in your water supply uses, you have less runoff to the sea. So it's one of these unfortunate consequences to using your water supplies more efficiently.

CHAKRABARTI: Got it. Okay. So, Tina, hang on for just a second. Because I want to move now towards, you know, are there ideas that we're not even thinking about that could be a part of a long-term solution regarding water usage in agriculture in Southern California?
So, I'd like to bring Richard Howitt into the conversation now. He's professor emeritus of agricultural and resource economics at the University of California, Davis, and he joins us from Davis, California. Professor Howitt, welcome.

RICHARD HOWITT: Hello.

CHAKRABARTI: So, first of all, tell me if you think that not just farmers and the agriculture industry, but, you know, people in the West as a whole who rely on Colorado River water, if they have truly come to terms with the fact that it seems as if the water level trajectory is going in one direction in the region.

HOWITT: I don't think they have yet. There is a lot of talk about it and acknowledgment. But the hard facts that you laid out, the 20% cuts or more, which are absolutely required, at least the hydrologists tell us that. Have yet to bite home. And as Ms. Marcus said, this latest agreement is a stopgap agreement. What we should be looking for is something which is more sustainable and permanent. And I would argue, self-financing.

CHAKRABARTI: Okay. Let me just get Tina Shields response to that. I mean, Tina, you also described changes and cuts and modifications that farmers have already had to make over the past several years in the Imperial Valley. I mean, what do you think when Richard Howitt says the truth of the
SHIELDS: Well, I think it's going to be a challenge for all water users. We have a system and communities that have been built on water supplies, but not just Imperial Valley. You have large scale urban developments that have occurred in areas that don't have the resources, they've been permitted and allowed to grow, relying off water supplies that aren't going to be there in the future. So there's some very challenging issues that have to be addressed moving forward.

CHAKRABARTI: Okay. So, Professor Howitt. Now's your time to lay out briefly what this out-of-the-box solution that could take into account these other factors might be. You, and actually some others, have proposed creating a water market to deal with the megadrought. Describe what this water market would be.

HOWITT: Correct. My colleagues at ERA Economics and I were interested in this. And so we built a small economic model and said, just supposing, essentially, it's simply this. Who has the money and who has the water? And in a nutshell, the agricultural uses have the water rights, and the urban users have the money.

And so what we are trying to do is to put together a framework, at least explore a framework, where a voluntary
going back to what Mr. McBroom said, he wants to be properly compensated. And so the question is, could we bring the river into balance, say, with cuts of up to 2-million-acre feet, using market mechanisms to compensate those people who have to cut back? And lower the overall cost to society of these cuts, which have to be made for hydrologic reasons.

CHAKRABARTI: So essentially, to put it bluntly, you're proposing a water market in which farmers would sell water that they're receiving by virtue of their rights, to cities and towns.

HOWITT: Correct.

CHAKRABARTI: And how would that then end up, how would that lead to conservation of water? Or overall reduction of water use? When again, this isn't exclusively an economic problem, right? It's a climatological one. So explain that to me.

HOWITT: It's a climatological one. And as Tina Shields explained, the farmers, for instance, I don't want to pick solely on the Imperial Valley. Because there's several other areas, particularly the Central Arizona project, which have to face this even more so than we do. But, to go back to what Ms. Shields was saying, the farmers in the Imperial Valley have already done some very effective and cost-efficient
conservation methods. What nobody wants to talk about and what we're talking about is the fallowing.

And when you've done a whole lot of conservation, there is only one way to net reduce water. You have to reduce the total amount of water applied and the total amount of crops grown. How do you do this at the least cost to both the urban sector and the agricultural sector?

CHAKRABARTI: Okay. So, I'd like to, like, put some concrete examples on this. This is all still theoretical, right? This is an idea. So, you're free to correct me if my example is inadequate. But, okay. Say what we're talking about is, would a farmer who's growing a thousand acres of alfalfa and still using flood irrigation, which we've talked about as being a sort of an inefficient use of water, instead opt to sell that water to San Diego? Let me just put it that way. The price would have to be right. The price would have to be greater than what the farmer was receiving in selling that alfalfa to China.

HOWITT: Indeed. Yes. And that's exactly it. You've got to get the price right. What's the right price? The right price is the price that two parties can agree on. And the good news is that the water cuts initially will fall on the cities. That's not good news for them. But they have the money and therefore they can adjust by paying the farmers. This is a voluntary market. If the farmers don't want to participate, they don't. It
will be run through the agency. Because, again, picking on Imperial, the irrigation district is the one that manages the water rights for the farmers.

And in a nutshell, the lowest price a farmer would even consider, on the back of our initial calculations, is somewhere about $400. Yet the cities would be looking at a potential purchase price of $800. Rather than go to their forms of conservation. So what we've got is we've got a lump sum of several hundred dollars between the minimum price a farmer would even think about and the lowest price that an urban area would go, which is significant savings for them. Because without additional water from AG, the urbans will be looking at incremental costs of around $1,200.

CHAKRABARTI: Tina, I'm going to come to you in just a second, because I want to hear your response to this. But, Professor Howitt, maybe, I'm just having sort of a Friday brain moment here, but I still am not entirely clear on how this would end up conserving more water. Can you tell me, walk me through that in a little bit more detail.

HOWITT: It depends on your definition of conserving. For me, conserving is growing the crop with less water. What I'm talking about is fallowing. That is saying, Sorry, guys, we are just not going to grow this same number of acres of alfalfa, for example. And if you don't grow, then you really save a lot of water. Save in parentheses.
CHAKRABARTI: Save in parentheses. But with your model, if I understand correctly, the water would still be going to usage in cities, right?

HOWITT: Less. We have to take 2-million-acre feet. Hydrologists tell us we got to take, on the average, 2-million-acre feet or more than 20% of the water use out of the system. It's got to stop. And that's Mother Nature. We can't do anything about that. The question is, what is the cheapest way? Given we've got urban use, and agricultural uses and recreational uses, not forgetting the Salton Sea. What is the cheapest way of handling this required cutback? And the answer is, let's cut water where it has the lowest social cost. But compensate those people, from the people who would have a higher cost if they didn't buy the water from them.

CHAKRABARTI: I see. Okay. So what you're saying is, and sorry if I'm so slow today, Professor Howitt. But ... it's a new idea that is taking my head a moment to get around here. But what you're saying is that because of the price differential in willingness to pay, right. That cities might have that several hundred dollars that you talked about.

HOWITT: Yes.

CHAKRABARTI: They would be willing to pay more for a certain amount of water than the farmers would have typically used in land that they would then fallow. While
selling the water to the city, so the farmers would make the money that they need. But overall, less water would be used by the cities, correct?

HOWITT: Right. Think about cheese in the supermarket. If you have to cut back on the total quantity of cheese sold. What would you cut back on? Would you cut back on the blue cheese and brie? Well, that sells for three or four times the price of a standard lump of yellow cheddar. And so what the economics says, if I have to cut back just on cheese, I'm not going to cut back on the high-priced cheese. If I'm a supermarket, I'm going to cut back on the low-priced cheese. But I have to compensate the person who makes low price cheese from the high-priced cheese. Water is the same as cheese.

CHAKRABARTI: Okay.

HOWITT: It's a commodity, by the way.

CHAKRABARTI: Well, I was just going to say. Right, so that is actually quite an intellectual and even emotional difference in how we think about water. We will come back to that in just a second. But Tina, thank you for listening patiently here. As the water department manager for the Imperial Irrigation District, what do you think about the idea of creating bigger, larger water markets that might transfer water for a price from farmers to cities?
SHIELDS: Well, IID's already involved in large scale actors and conservation and transfer programs. 60% of our water supply is already going to these other areas. But frankly, I find it a little offensive that we're talking about societal impacts and going cheap. And frankly, I've never had my community compared to cheddar cheese. I appreciate the analogy, but I don't think it's fair that you go target disadvantaged communities and attempt to get the cheapest deal for the rich people in their cities in order that they can continue to have their brie, and their swimming pools and their lawns. Frankly, it's rather offensive from that point.

We're trying to be good partners on the river. We're trying to protect our community, because it's our only water supply. But we have people that live down here and farm down here for generations, built on senior water rights. And yet large-scale urban areas can go with poor planning and build subdivisions and entice industries to benefit their communities. But they want to go cheap. As far as how paying for that, I mean, it's offensive to us.

We want to be partners; we want to be good stewards. We want people to eat all of that alfalfa goes to create the cheese, and the ice cream and the steaks and the commodities. So there's this misnomer out there that 80% of the water is used for AG. But who eats the food that our
growers provide? Fallowing is not popular in our community. It's strictly prohibited by our transfer agreements as it stands, and we understand in the near term that might be necessary, but we're not going to sit back and roll over for what's cheap for the rest of folks.

CHAKRABARTI: Hmm. Well, Professor Howitt, go ahead and respond.

HOWITT: This is a misnomer, because we have to cut. And the question is we are not looking. This is a voluntary market. It's a voluntary market which will transfer compensation of wealth from those urban areas that can and will afford it, to the areas which cannot afford it. And the question is, can we compensate adequately both the farmers, the community members and some of the environmental aspects?

So we have to look at somebody who can pay the bill. And that's why I, as the economist, I've tried to be a realist. Nobody likes the concept of fallowing. And we all recognize that we got an interdependent, highly productive AG system, which, of course has value, tremendous value of fodder crops for the livestock industry. We recognize all that. But the hydrologic realities are such that someone has to cut. And so the question is, will a voluntary market system distribute these cuts with the least costs to the community?

CHAKRABARTI: Well, you know what? I'm going to take
another quick break here. Because there's a lot of details and debate even over this really interesting idea that we'll have when we come back. So Richard Howitt and Tina Shields. Hang on for just a moment. As I mentioned, we are looking for out-of-the-box ideas on how to more sustainably manage Colorado River water. Specifically, today, we're looking at when it comes to agriculture in the state of California.

Part III

CHAKRABARTI: Today, we are talking about water usage, Colorado River water usage, specifically. And specifically agricultural use in the state of California. And whether there are bigger, out-of-the-box ideas out there that we might consider in order to more sustainably manage water use. I'm joined today by Richard Howitt. He's professor emeritus of agricultural and resource economics at the University of California, Davis. And he's bringing to the table the idea of establishing water markets where farmers could sell water to cities and towns. Tina Shields is also with us. She's the Water Department manager at the Imperial Irrigation District.

Now, Tina, you're exactly right. Earlier in the show, you said in detail that the Imperial Irrigation District has already conserved about a half million-acre feet, or transferred a half million-acre feet, for urban water usage in exchange for, as you described, funding to improve water infrastructure and
conservation efforts within the Imperial Irrigation District. So that's already a kind of, literally an exchange of water, for funds. Could you imagine a larger water market that isn't necessarily selling water at the lowest price?

Farmers wouldn't be asked to sell it at the lowest price, but rather a price that they would want to sell, and cities would want to buy. Because, Professor Howitt did say a little earlier that the price at which cities would want to buy water is maybe twice as high as what farmers might want to sell it at. So could that potentially be a positive market for farmers?

SHIELDS: Well, I think it's a complicated process, and I think that that's one of the options on the table. And whatever solution we come up with will end up being a hybrid solution. And I'm sure that's one of the pieces. That being said, you mentioned earlier, our conservation total, that 500,000-acre feet is an annual amount. Since we started implementing these programs in 2003, we've conserved over 7.2-million-acre feet of water, largely through on-farm efficiency, conservation measures and infrastructure improvements. But at a certain point it becomes tougher to get those incremental conservation values and it does become more of a societal choice.

I don't necessarily agree that you should be getting things because they're cheaper. I think the cities and urban areas need to develop their desal plants and their water recycling
and conjunctive groundwater programs. Because those are longer term, larger scale reliability issues they need to address. And we have to make sure that the food supply doesn't become the secondary problem, as Mr. McBroom mentioned earlier.

So I think it really is a matter of finding what makes communities whole. The Imperial Irrigation District is very unique in that the farmers don't hold individual water rights. The district holds them in trust for the benefit of our landowners, which includes farmers and our community members. And so when our board makes those decisions about what programs to implement, it's not just a narrow, "What is the price and is that good enough?" It's thinking about the repercussions and the ripple effects to our community, as well. So they're very, very discretionary in how they make those decisions. And making sure that it is a balance of the needs to be a part of the solution, but not at the expense of our community, for the benefit of somebody else.

CHAKRABARTI: So, Professor Howitt, let me turn back to you. Because Tina's making a good point. There's no market that exists in pure isolation. Right? And a water market would not exist in isolation, because if we just allow ourselves to unspool our imaginations as to what might happen, you were talking explicitly about fallowing. Like farmers would choose
to fallow their land in exchange for selling their water at a higher price.

But as Tina points out, A, nobody likes fallowing that you're essentially that's farmers being asked to not farmland, not do what they were born to do. And secondly, fallow land is not growing things, whether it's winter vegetables for winter consumption in the United States. Or, you know, even if it's alfalfa that grow, that goes to feed livestock, which then, yes, helps make the cheese, and the ice cream and the beef that Americans still continue to demand. There would be some impact, would there not, on the food supply, Professor, Howitt?

HOWITT: There would, definitely, because it's an interlinked system. And I agree with everything that Ms. Shields has said. But the reality comes down to there's nothing as sincere as a dollar bill. And if you ask somebody to do something at a cost, you have to pay that cost. Now, what would the cost be for the urban users to do more desalinization, for example?

That method starts in the best areas at somewhere around $1,400 per acre foot of water generated. And that's assuming that you can get rid of the highly saline byproduct that comes out of desal. So the cities have a major incentive to look for cheaper way. So they're already doing conservation, as is imperial. And so what we have to have is
we have to recognize that water is now become a commodity, not a right. That you have and you pay the cost of delivery. It's a commodity whose price is based on its value in use. It's like gasoline. And, as such, we have to say what system can enable us to adjust to these cuts that we have to take because of Mother Nature, at a least cost and the most voluntary system. And so that's what we're proposing.

CHAKRABARTI: Okay.

HOWITT: And the good news is that it seems that it could possibly work, because of this difference in value.

CHAKRABARTI: Okay, Tina, I'm going to come to you in a second. But Professor Howitt, I'm glad you brought up this word again, because I did want to explore it a little further. Offer me more analysis and proof that we should be seeing water as a commodity. Because, I mean, in truth, water is the essential compound for the survival of life on this planet. And I'm not sure we should be seeing something like that as a commodity.

HOWITT: All of our commodities, whether they're energy or food or water or freedom, are fundamental. And so there's a fundamental right to clean water for domestic and end use and security. That's a fundamental right, no question. Shouldn't be a market product. But the vast majority, as you
pointed out in the beginning, the vast majority of water is used on urban lawns, urban houses or agricultural production. And in this case, there's an awful lot used in agricultural production.

You pointed out that 80% of the Colorado River water was used by agriculture, and this is used in an economic process, a highly efficient and effective one to generate food. And so we will get cutbacks, we will get impacts. But we've seen these before in different aspects. For instance, the energy crisis. And we've used the market system to adjust to it and send signals to people, "Well, is it worth conserving?" And, "I'm going to make it worth your while to conserve or fallow."

CHAKRABARTI: Okay. Tina Shields. You know, Professor Howitt there is challenging a series of laws. And which have turned into, you know, ways of life in a cultural belief about water in the West. You know, he said that we should no longer be looking at water in the West as sort of a historical right in terms of like senior and junior rights even. But as a commodity, I'm just wondering how that lands with you?

SHIELDS: Well, I don't think he's completely saying that. You can't just pretend that laws don't exist, and rights don't exist. I think what he's saying is you have to work within that structure in order to facilitate the movement of water from the higher priority water users to the lower priority. And it's actually even more complicated than that, because you have
states' rights, and you have obstacles in many cases between interstate water transfers.

Things work a lot better when you're dealing with interstate issues and interstate issues on the Colorado River. But those are all complexities that have to be addressed. I think my concern is that it's not all about the dollar in some cases. And we've had a lot of pressure, both political and monetary pressure in our community to enter into these agreements. But there's other issues that we have to be concerned about. We have a very small community, and it is entirely based on agriculture. And if the water goes away, we have to move. That's our backup plan. So there are limitations to the conservation you can do. And I think we all are looking for solutions that are win-wins.

Though they may be a little challenging these days, but we certainly have to have a balancing effect. And to the extent that there's laws and parameters, we have to work within those water rights, and we have to find solutions that aren't to benefit one area at the detriment of another. We have enough challenges in our community with our socioeconomic conditions and our mitigation concerns about the Salton Sea and public health. My family shouldn't get sick, so somebody else should have a swimming pool. And those are the balancing decisions that have to be made on the equity and the fairness issue.
CHAKRABARTI: Yeah, Professor Howitt. I believe this water market idea, while innovative for the United States, is not necessarily unknown elsewhere. Australia, for example, they have a form of a water market. Is that correct?

HOWITT: Yes, they do. And it operates. Every day I get a little email from an outfit called Waterfind, and I can tell you what the price of certain stretches on the Murray-Darling River are this morning.

CHAKRABARTI: And so how well is that water market functioning in terms of meeting the goals that Australia has, which I presume are somewhat similar to what we're facing here in the United States?

HOWITT: The physical situation is very similar. The laws in Australia are much more open and therefore it was easier to adopt the market, which has worked relatively well with the exception of some environmental problems. The concept of taking into account the return flows from irrigation was not fully thought through in Australia.

But overall, the market has been running now for over ten years and has taken them through two droughts with some significant adjustments. And fundamentally it has worked. Now we can't just pick up the Australian water laws and put them on because, as Ms. Shields says, my thoughts are that the existing property rights stay as they are. And therefore,
of course, an early diverter such as Imperial Irrigation District or Palos Verdes has the senior rights. And so the market concept works within the existing rights. It does not take any rights away from anybody, because unfortunately that would be the alternative.

CHAKRABARTI: You know, I'm thinking about, you mentioned energy markets beforehand, Professor Howitt. And the energy markets are a perfect example about how the functioning of a market is all, the devil is all in the details, right? Because there are some states in the United States that have very highly regulated energy markets and others that do not. Thinking about the, you know, the terrible crises that happened in Texas, not that long ago.

So, I mean, it seems to me that, again, this is all theoretical at the moment, but that for this water market idea to work, it would probably have to be pretty highly regulated. Because we don't necessarily want to have like a Texas style energy crisis happen to a water market in the western United States.

HOWITT: I agree. We certainly don't. Rather, it will be regulated, for instance. Again, picking on poor Imperial Valley again. The Imperial Irrigation District is the key player in this. As Ms. Shields has pointed out, and they would control. But I think the important thing about markets is that they be transparent, open and public so people know exactly what's going on. And you don't have the situation where a wealthy
user can corner some aspect of the market or discourage other people from taking part of it.

CHAKRABARTI: Hmm. Well, we've just got about a minute and a half left. Tina Shields, I wanted to give you a chance to have a last thought here. I have heard you say multiple times that this all can't fall on farmers, and that you're looking to urban areas to, you know, increase their conservation.

I will say, we've had city water managers from various Western states on this show saying that they have been also doing a lot for increasing their conservation measures. I just wonder what you think the future's going to hold for California farmers, no matter what. It does seem as if more changes are inevitable and will be on the way, and maybe a market is a better way to do that rather than the federal government just ultimately making decisions about how much usage is just going to have to be cut, which is, you know, could happen in the future.

SHIELDS: Yes. And I'm not disputing the benefits of a market. We have those in a de facto manner already and have been implementing these urban partnerships and large-scale transfer programs since 1989. So they definitely work. I think the issue that the Imperial Irrigation District has is on the valuation where there isn't efficient regard put on our community and what the real cost of the loss of that water is to our community.
What we tend to see is urban areas doing ag as their reservoir because it's cheap and easy. And there's larger investments that need to be made in agriculture, and there's larger investments that need to be made in urban areas for the longer-term concerns that we have. Certainly, the cities have done a great job with population growth and their demands declining, but there's always more and there's no way I can ask a farmer to fallow a field that grows food, and employs his family and his friends and his staff when you see these lines that are just sucking water and have no functional benefit.

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