

First infrastructure funding headed out in 2022, but some aid could take years

The Biden administration expects to start distributing the first dollars from the new bipartisan infrastructure bill in the first half of 2022, but it's likely to take significantly longer for farmers and rural Americans to see some of the long-sought spending.

The Infrastructure Investment and Jobs Act provides \$550 billion in new funding for such needs as roads, bridges, ports and waterways, rail improvements, rural broadband, clean energy transmission and Western water projects.

The bill, which President Joe Biden is expected to sign into law next week, also extends existing transportation programs to bring the total projected spending over 10 years to \$1.2 trillion.

"When you improve the transportation system, when you improve the roads and bridges and the locks and advance ports, you're assuring that America will retain its competitive edge in being able to get product to market defensively, which helps our exports and helps to preserve our opportunity for export in competitive environments," Agriculture Secretary Tom Vilsack told *Agri-Pulse* in an exclusive interview about the bill.

The bill provides a historic investment of \$65 billion into closing internet service gaps that have plagued rural areas and inhibited the use of precision agriculture.



Ag Secretary Tom Vilsack

In addition to improving access to education and health care, high-speed internet service will “expand the opportunity for farmers to participate in precision agriculture, which I think is going to become even more important as we deal with trying to make sure that the

bottom line of farmers improves, and we see rising input costs. Precision agriculture can be a way of dealing with that challenge,” Vilsack said.

The legislation also is designed to shift Americans into electric vehicles, which could, in turn, reduce demand for biofuels, through the construction of charging stations and the replacement of many existing fossil-fuel-powered buses.

The bill is designed to reach Biden’s goal of having 500,000 EV charging stations installed by 2030. Some 10,000 buses would be switched to electric, according to the Transportation Department.

Vilsack said that the biofuel industry shouldn’t be threatened by the EV funding, arguing that there will be continued demand for biofuels for passenger vehicles and noting that the aviation industry plans to increase its use of biofuels. Demand for biodiesel and renewable diesel to fuel trucks and buses also is expected to continue growing.

“I’m pretty sure in my lifetime and beyond you’re going to continue to have a need for biofuels for cars and trucks,” Vilsack said.

How fast the infrastructure funding gets out the door depends in part on whether it will be distributed through existing programs or whether new programs and regulations have to be written. The latter process could take a year or longer.

One of the first tranches of spending will be for roads and highways through formula-driven grants to states. That money will go out in the next six months, according to the Transportation Department.

DOT will have to add to its staff to handle all of the spending initiatives it will get; the bill will push the department’s annual funding from \$90 billion to \$140 billion a year, Deputy Transportation Secretary Polly Trottenberg told reporters Tuesday.

The bill will fund the repair of 10 major bridges and 15,000 smaller ones, she said.

Also in the legislation is an additional 150 air-mile exemption from hours-of-service regulations for livestock haulers’ destination points. The National Cattlemen’s Beef Association said that will provide needed flexibility.

Here is a look at some other major aspects of the bill:

Waterways: Agricultural shippers could also find out early next year how quickly the Army Corps of Engineers will start work on replacing the Mississippi River locks and dams. The construction was authorized by Congress in 2007 to ensure the flow of barge traffic that is critical to farmers in the Midwest and to U.S. corn and soybean exports.

The bill provides \$2.5 billion for navigation projects, and the first Mississippi River project, the rebuilding of Lock and Dam 25, “is far enough along in the design process to begin construction immediately,” said Deb Calhoun, a spokeswoman for the Waterways Council, which represents shippers.

She said the construction timetable should become clearer in January when the first plan for funding the Mississippi River projects, a program known as the [Navigation and Ecosystem Sustainability Program](#), or NESP, is expected to be released.

Lock and Dam 25 is located near Winfield, Mo., just north of St. Louis.

When the \$2.5 billion is combined with the regular annual appropriations Congress makes to the Corps, two-thirds of the pending navigation projects could potentially be funded to completion, according to the Waterways Council.

Broadband: Most of the bill's broadband funding, \$42.45 billion, will be routed through the Commerce Department to states to decide how to spend.

Commerce Secretary Gina Raimondo told reporters Tuesday that it would take “some number of months” to get the money distributed. Each state will get at least \$100 million, with the rest of the allocation based on the number of underserved households a state has.

Each state will have to post online a plan for spending the money and there will be “very strict criteria to make sure that we achieve the goals of affordability and access,” Raimondo said. Every state will be asked to produce a plan that “guarantees every single person in your state has access to high-speed, affordable Internet,” and then “we’re going to evaluate that plan, adjust it, provide technical assistance to make sure at the end of the day we hit the goal.”

She said the program was a “massive undertaking” but that the department has been planning for months to implement it.

“Thirty, 40, 50 years from now, we will look back on this as the turning point, as a critical turning point, because now that we're moving even more toward a digital economy and a data economy and a tech economy, nobody can be left behind,” she said.



Shirley Bloomfield, NTCA

Between the rulemaking that the Commerce Department's National Telecommunications and Information Administration will have to do and the state proceedings that will be required, the funding likely won't be distributed to service providers until early 2023, said Shirley Bloomfield, CEO of NTCA — The Rural Broadband Association.

Another \$2 billion will go to USDA Rural Development. Most of that, \$1.96 billion, will go to USDA's existing ReConnect grant and loan program, which was created by Congress in 2018 as a pilot program. The ReConnect funding includes \$5 million for the development of cooperatives to provide broadband. An additional \$74 million is earmarked for USDA's Section 601 broadband loan program.

Vilsack said the argument for distributing money through the states rather than directly from USDA is that state governments know which technology works best for them. The ReConnect program "basically deals with existing facilities that have the need to upgrade their capacity, so that it's meaningful access" to the internet, he said.

Water projects: The bill will provide [\\$8.3 billion to the Bureau of Reclamation for water projects](#) that will benefit farmers in the West who have been struggling through a severe drought this year.

The funding includes \$3.2 billion for aging infrastructure and \$1.15 billion for water storage, groundwater storage, and conveyance.

“I’m not sure of the timetable, yet, but I’m fairly certain it will be a priority for the administration to get these dollars on the ground as soon as possible,” said Dan Keppen, executive director of Family Farm Alliance, which advocates for Western water needs along with [a coalition of over 200 other ag groups](#).

“In general, the legislation allocates dollars for programs that have already been developed.” His group will be meeting with Reclamation officials next week.

The Western water funding also includes \$1 billion for water recycling, including \$450 million for a new grant program; \$1 billion for rural water projects; \$500 million for dam safety, \$300 million for implementation of the Colorado River drought contingency plan; and \$250 million for desalination projects.

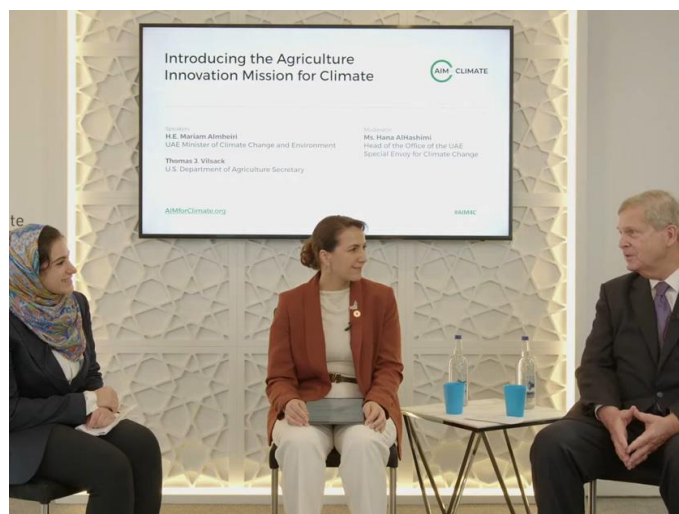
Separately, the bill would provide [\\$918 million over five years for USDA's watershed programs](#). The largest share of that funding, some \$500 million, will go to the [Watershed and Flood Prevention Operations program](#), which is administered through USDA's Natural Resources Conservation Service. Another \$118 million is earmarked for the Watershed Rehabilitation Program, which provides assistance to renovate dams. The program has a backlog of more than \$500 million. Some \$300 million is allocated for wildfire resilience in the Emergency Watershed Protection Program.

Ag takes bigger role at Glasgow climate conference

When A.G. Kawamura, a third-generation California fruit and vegetable grower, was at the UN climate conference in Copenhagen in 2009 as secretary of his state’s Department of Food and Agriculture, “no one was talking about food and agriculture,” he says.

In fact, he and other food and ag types were on the outside looking in as delegates debated how to attack climate change, a problem that has only worsened in the last 12 years.

That snubbing led to the formation of Solutions from the Land, a farmer-led group that advocates an “all tools in the toolbox” approach to ag production that aligns with



Ag Secretary Tom Vilsack (right) joins United Arab Emirates officials to discuss the Agriculture Innovation Mission for Climate.

Agriculture Secretary Tom Vilsack's approach to climate-smart agriculture. **The idea is not to regulate reductions in the use of fertilizers and synthetic pesticides, as is being tried in the European Union, but to incentivize farmers to adopt more climate-smart practices such as cover crops and no-till or other reduced tillage options.**

At the latest UN climate conference, which started Oct. 31 in Glasgow, Scotland and runs through this Friday, food and ag has been, if not center stage, at least an important part of the discussion.

The schedule at the 26th Conference of the Parties, or COP26, in Glasgow has been peppered with ag and food panels and high-level commitments affecting the industry, including a global methane pledge led by the U.S. and UK to reduce emissions by 30% by 2030 and a promise from 130 countries to tackle the problem of deforestation.

Vilsack seemed to be everywhere during the three days he was there - moderating panels, speaking about the U.S.-United Arab Emirates Aim for Climate initiative, which seeks to boost ag research and development around the world, and chatting with Senate Agriculture Committee Chairwoman Debbie Stabenow, D-Mich., about how the U.S. plans to go about sustainably increasing production using climate-smart agriculture.

But for Kawamura, it's still not enough. In a journal he kept of his four days in Glasgow, he said speeches at the opening ceremony did not reflect the broad range of challenges currently faced by food and ag.

"Missing in most all speeches was any sense of comprehension for how the global agricultural food systems of the world are performing or will be delivering food, feed and fiber to a demanding world under climate-related mitigation regimes," he wrote. There needs, he said, to be "a broader discussion and strategic alliance for the world's entire food system."

But by the time he left a few days later, he wrote "there was a sense of optimism that if we can continue to share our vision for 21st-century agriculture and the accelerating pace of solutions and new thinking, we can begin to develop the kind of momentum that leads to transformative progress and success across a broader wish list of human needs and goals."



A.G. Kawamura

Efforts are being made to step up investments, the most prominent of them likely being the Agriculture Innovation Mission for Climate (AIM4C) officially launched at COP26, which so far has secured membership from more than 30 countries and dozens of nongovernmental groups, private companies and universities.

AIM4C has obtained commitments for \$4 billion in R&D spending from 2021-2025. So far, the biggest investments include \$1 billion each from the UAE and the United States, said Jaime Adams, a senior adviser for international affairs at the office of USDA's chief scientist, who has been working on the project. The rest includes \$194 million for eight "innovation sprints" with

specific goals and contributions from a “handful” of countries, she said.

AIM4C goals include jump-starting research into climate-smart systems and facilitating coordination among ag officials at top levels of their governments.

Those sprints involve a variety of projects with investments from nongovernment partners, including a \$40 million initiative led by the Consultative Group on International Agricultural Research (CGIAR), along with the Foundation for Food & Agriculture Research and the Gates Foundation, to “unlock key climate-resilient traits from CGIAR’s vast global genebank collections.”

Other sprints include one spearheaded by CropLife International “to accelerate access and uptake of climate-smart crop protection innovations for smallholder farmers in Asia, Africa, and Central America,” and a Greener Cattle Initiative also involving FFAR, as well as the Innovation Center for U.S. Dairy and industry partners.

That five-year initiative will award \$5 million in research grants “to support research into tangible, actionable solutions for potentially reducing enteric methane emissions from cattle, a key opportunity to help mitigate climate change,” according to Elanco Animal Health, which is a founding member of the initiative.

Overall, AIM4C seeks to catalyze investment from industry and encourage collaboration at high levels. President Joe Biden has challenged AIM4C organizers to get another \$8 billion committed to research by the next COP in 2022.

The U.S. Agency for International Development announced at COP26 it would be contributing \$215 million to CGIAR “to help 200 million people raise agricultural productivity in South Asia and sub-Saharan Africa by 25 percent by 2030.”

“You have to have high-level political will to motivate the increased investment,” Adams said, noting studies that have said there’s a \$6 billion per year gap between what’s needed for agricultural research versus what’s actually spent.

An example of how difficult it can be to invest in agriculture, however, is the reduction in ag research and development funding in the Build Back Better reconciliation bill from \$7.75 billion to \$2 billion. Half the remaining total will go toward building and facility improvements at Historically Black Colleges and Universities and other minority-serving institutions.



Doug Steele, APLU

Doug Steele, vice president for food, agriculture and natural resources at the Association of Public and Land-grant Universities, said APLU is “thrilled” about the \$1 billion, but would like to see money for the traditional land grants, known as 1862 institutions.

The previous BBB text had included \$3.65 billion for the Research Facilities Act, including the \$12 billion for minority institutions. APLU and its member land-grants are seeking \$11.5 billion over five years “to address the agricultural research infrastructure issues at colleges and schools

of agriculture.” A 2015 report identified about \$8.4 billion in infrastructure and deferred maintenance needs at more than 90 institutions.

The latest BBB package also axed \$250 million in funding for the Agricultural Research Service. “ARS’ Long-Term Agroecosystem Trial Network is one of the most important avenues for climate and soil health research,” ag consultant Ferd Hoefner said.

Hoefner, however, was pleased to still see \$120 million for the Sustainable Agriculture Research and Education program, \$60 million for Organic Agriculture Research and Extension, and “depending on where they invest the money,” \$210 million for the Agriculture and Food Research Initiative at the National Institute of Food and Agriculture.

US meat looks for new advantages on global market

In an increasingly global market where U.S. beef, pork and poultry producers can no longer thrive without access to foreign markets, the ag sector is clamoring for new advantages over foreign competitors, better access to foreign buyers and new free trade agreements.

While the National Pork Board (NPB) is leading the charge to overhaul the way pork is marketed to foreign buyers, a new analysis from CoBank stresses the need for the U.S. to begin sitting down at negotiating tables across the globe to get new tariff-slashing free trade agreements.

U.S. pork exports to China surged to record levels during the height of the country’s battle with African swine fever, but that trade has been falling and NPB is sounding the alarm about the need to diversify and build up the U.S. presence in countries where demand is growing. China is rebuilding its swine herd, negating much of its need for imports, and that means U.S. producers are looking elsewhere in a more competitive environment.

“While U.S. pork exports to China are down 21% year-to-date, total U.S. pork exports are up 1% compared to 2020,” says NPB. U.S. pork exports to Mexico this year are up 27%, and shipments to the Philippines are up 114%. Other established and growing markets include Japan and Colombia.

Working together with groups like the U.S. Meat Export Federation and the National Pork Producers Council, NPB says there are growth opportunities for exports to many foreign markets, and U.S. pork needs to “differentiate itself beyond being a low-cost supplier to continue to grow its market share.”

A key way to do that, says Missouri pork producer and NPB past president David Newman, is to show the world the strides that the U.S. industry has made in becoming more sustainable.

“Sustainability is becoming increasingly talked about with our consumers and not just domestically, but internationally,” Newman told *Agri-Pulse* ahead of the release of an NPB report, “Diversifying and Differentiating U.S. Pork in the Global Market,” which is being published Wednesday. “Being able to address



David Newman

(sustainability) ahead of the curve rather than behind the curve — that’s where we want to stand as U.S. producers.”

The primary selling point for U.S. pork exports is still price, but that’s expected to change in the coming years. Foreign buyers are already telling groups like NPB that they are going to need products that are demonstrably more sustainable, says Rupert Claxton, a director for the French consulting company Gira.

“The world is going to get more competitive over the next five years,” he said. “The market is clearly asking us to demonstrate that we’re doing better than we’ve done before.”

As to how the pork industry will do that, the NPB is laying out a plan, a key part of which is asking America’s pork producers to fill out an “On-Farm Sustainability Report” to “help measure and document producers’ continuous improvement efforts.”

Hundreds of thousands of pigs across the country are already being reported on and once NPB, together with NPPC and USMEF, believe they have enough coverage, they will begin presenting that aggregate data to international customers.

“We’re not going to run from sustainability,” Newman said. “We’re going to hit it head-on.”

That, together with the ability to prove those gains in sustainability to international buyers, will be paramount, said NPB spokeswoman Claire Masker-King.

“The world is going to get more competitive over the next five years,” said Claxton. And that is also the reason lawmakers and leaders in the U.S. ag sector are urging the Biden administration to begin negotiating trade pacts. Other world players like China, the UK and the European Union are moving to establish free trade agreements, and [a new report from CoBank highlights the importance of foreign market access for U.S. beef, pork and poultry](#), while stressing the need for new free trade agreements.

While the NPB is looking to producers’ sustainability efforts to provide U.S. packers and exporters with the edge they need over competitors, CoBank says trade deals are also essential. The problem is the Biden administration has shown no urgency in sitting down at negotiating tables to get tariff-slashing deals while other world players are moving relatively fast.

“Trade policy is crucial to building consistent export markets, and the U.S. needs to be at the negotiating table,” said Brian Earnest, author of the new report, “U.S. Animal Protein Needs Trade Negotiators Back at the Table.”

“In the past two decades, U.S. animal protein exports have grown from \$7.4 billion to \$20.7 billion, driven by industry marketing and government trade negotiations,” the report said. **“Today, trade accounts for 10%-30% of U.S. animal protein production, depending on industry segment.”**

A particular focus of the report is the Comprehensive and Progressive Trans-Pacific Partnership, an 11-country trade pact among Pacific Rim nations that the U.S. pulled out of in 2018.

The Chinese promise under the “phase one” deal to buy U.S. ag commodities ends on Dec. 31, making it more important than ever that the U.S. retake its CPTPP seat, according to the report.

“Continued diversification of markets and products is critical for a vibrant U.S. protein export trade,” said [Brian Earnest](#), lead animal protein economist with CoBank. “The successes the U.S. meat industry has enjoyed during the ‘phase one’ agreement with China are not assured in 2022 and beyond. And the lack of U.S. participation in evolving global trade partnerships in recent years has put export success at risk.”

The UK, Taiwan and China are looking to join the CPTPP, but the Biden administration appears to be in no hurry. U.S. Trade Representative Katherine Tai, when asked recently if the U.S. would consider rejoining, stressed that the original TPP was a bad deal for some segments of the U.S.

What does Maine's 'right to food' amendment mean for agriculture in the state? That's up to the courts to decide.

Maine voters chose to enshrine a [right to food](#) in their Constitution last Tuesday, becoming the first U.S. state to add such an amendment. The measure may not change much, if anything, about the state’s laws surrounding the production of food. Or it could entirely reshape them.

But, for now, nobody knows for sure.

It will be up to the state’s judges to define the boundaries of the amendment, which was approved by about 60% of the state's voters after clearing the legislature in May. But they can’t do that until issues implicating the amendment make their way into the courts. At this point, it’s impossible to know how it will be interpreted.

“We are the first state in the country to constitutionalize this right,” Scott Bloomberg, an associate professor of law at the University of Maine School of Law, told *Agri-Pulse*. “No court has taken a look at this language or any language similar to this before, and so the contours of the right are going to be worked out by judicial review.”

It isn’t typical for Maine to hold the national spotlight when it comes to agricultural issues. According to the [USDA Census of Agriculture](#), the state only had 7,600 farms in 2017 and, that year ranked 43rd in the nation in terms of the market value of agricultural products sold. But recently, it has been at the forefront of a movement emphasizing local agriculture and self-sufficiency, and what happens in the wake of this amendment’s passage could

Maine's 'right to food' amendment

All individuals have a natural, inherent and unalienable right to food, including the right to save and exchange seeds and the right to grow, raise, harvest, produce and consume the food of their own choosing for their own nourishment, sustenance, bodily health and well-being, as long as an individual does not commit trespassing, theft, poaching or other abuses of private property rights, public lands or natural resources in the harvesting, production or acquisition of food.

— Maine Constitution, Article 1, §25

serve as an example to states like West Virginia where similar provisions are being considered.

Several of the local groups which publicly opposed passage of the amendment — including the Maine Farm Bureau, the Maine Potato Board, the Maine Grocers and Food Producers Association, the Maine Veterinary Medical Association and the Maine Municipal Association — [voiced concerns](#) about the vagueness of the amendment and its potential to completely upend all state and municipal laws involving agriculture. But its supporters, like state representative Billy Bob Faulkingham and the Maine Organic Farmers and Gardeners Association, say it will neither constrain other rights nor force the government to give people free food, but instead protect an individual's right to “feed themselves in dignity.”

The division springs from concerns over how the amendment's wording could be interpreted. State constitutions are the ultimate source of authority for government at the state and local levels and, while Maine's constitution has no power over federal laws and regulations, it does define and shape many of the laws that the state's inhabitants interact with on a day-to-day basis.

The most watchers can do at this point is analyze the amendment and look at the potential ways the judicial system could interpret it. Bloomberg sees its language as pertaining almost exclusively to the production of food for personal use, as in private gardens.

He said it might not have a large impact on current laws surrounding commercial agriculture in the state.

“I think some people may have seen this amendment and feared that, or maybe hoped that it would strike down food, health and safety rules on commercial production and exchange of food and agricultural products,” Bloomberg said. **“I don't think it does that, because it seems that the language seems to be all geared at personal production and consumption of food.”**

But Rebekah Graham — a legislative advocate for the Maine Municipal Association, which opposed the amendment's passage — thinks it could have a much greater impact on existing laws surrounding agriculture in the state. **She said the amendment takes the democratic process away from communities and instead moves it to the courts.**

As the judges weigh the cases brought to them, Graham says they will be able to reshape how laws interact with food in potentially every aspect of the system at the state and municipal levels: Food safety requirements; Animal welfare laws; School lunch programs; Food operations in jails; Water laws; Pesticide ordinances; Hunting restrictions; and City animal ordinances. She says all could be subject to rulings if they are brought to court.

Even future areas of law that the state or municipalities could explore, like requiring certain farming practices to increase carbon sequestration or reduce fertilizer runoff, could be impacted.

“The only way in which a constitutional right is established is through litigation and by the court deciding the parameters of that based upon a case,” Graham said. **“So, there's a lot of talk about what folks think the amendment does, but in truth, nobody can say what it does because the court is the only one that's going to make that decision.”**

One of the primary concerns for Julie Ann Smith, Maine Farm Bureau's executive director, is that the right will override food safety regulations put in place by the state.

Her fear harkens back to June of 2017 when the Maine legislature [passed a law](#) giving municipal governments the power to regulate food grown, produced or processed and sold directly to consumers in their municipality — even if those regulations did not align with state ones. **The bill drew the attention of the USDA, which threatened to take away the state’s authority to inspect small meat processing facilities because the law did not stipulate that these processors also needed to follow federal guidelines.**

In that situation, the legislature avoided USDA interference by amending that law to require food products to comply with applicable state and federal food safety regulations. But now that the constitution has been amended, Smith believes this problem could emerge again and, this time around, be a lot more difficult to fix.

Smith said on Nov. 4, she spoke to USDA officials who warned her the agency would take away the state’s meat inspection program if it found people were not following federal standards. The USDA was unable to respond to questions from *Agri-Pulse* before publication.

In Maine, the state constitution can only be amended two ways: through a constitutional convention called by the state legislature or by being put on the election ballot by a two-thirds majority in the legislature and then voted on by citizens. A constitutional convention has never been called since the constitution was first adopted in 1820 and getting an amendment on the ballot can be a slow process.

Smith said the USDA representatives she spoke to indicated they will continue to allow the state-inspected program for now. But if it were to go away, any producers who do not process their meat in a USDA-inspected facility, would not be able to sell it in the state's grocery stores. Their only option would be to sell it directly on their farm.

“Either we're going to become a wild west of food where there just aren't regulations in Maine anymore or we're going to stop having farms because the farmers are going to be competing with their next-door neighbors who don't have to follow those same regulations,” she said.

Concerns also exist for other products, like potatoes. Smith says the state currently has a program requiring that all seed potatoes be tested to identify potential diseases and pests. It’s an issue that both the Maine Potato Board and the American Seed Trade Association have expressed concern about.

Plus, Smith said intellectual property laws surrounding seeds could also be impacted. If the right is defined to allow citizens to save and exchange patented seeds, she said companies with seed patents could decide to stop selling in the state.

But state legislator Billy Bob Faulkingham, a proponent of the amendment, told *Agri-Pulse* it is an individual right and does not apply to commercial production.

In a [public comment](#) before the election, Faulkingham wrote that “seed patents are secured.” Later, when speaking to *Agri-Pulse*, he said he also doesn’t foresee it impacting state food inspection programs.

“Food inspection isn’t going anywhere,” Faulkingham said. “People that want to buy ... food from the grocery stores, nothing’s going to change in that food supply. What this is doing is this is protecting people’s right to produce their own food and the food of their own choosing.”

Faulkingham said he thinks the amendment could help make Maine, which currently imports more than 90% of its food supply, more self-sufficient. He called the amendment’s passage a “critical victory” for protecting people’s farming, hunting and fishing rights.

“I think what it does is it slams the door in the face of people that would seek to get between us and our food,” he said.

But, for now, it’s not clear what sort of impact the amendment will have. Nobody — not academics, not agricultural groups, not Maine’s citizens, not even its legislators — can agree on the future. Whatever happens next is up to the courts to decide.

Sophisticated plant breeding offers more ways to combat drought, climate change

The rainy season is kicking off with enough moisture to ease some Californians’ water worries, but the long-term outlook for agriculture remains one that calls upon farmers to maximize “crop per drop.” In the case of almonds, one of the state’s most profitable crops, it could take decades to transition from existing trees to others that can achieve similar yields with less water.

Many of the improvements will come on the input side — from irrigation strategies to nutrient management, but plant breeders and geneticists are also working to improve the trees themselves.

Devinder Sandhu, a research geneticist with USDA’s Agricultural Research Service at the Salinity Lab in Riverside, California, said drought has become a “driving force” behind his research and tolerance for salinity in the soil is one thing that can help a tree survive in lower water conditions.

“In coming years, salinity is going to become a lot more important because of drought,” he said, “because of climate change.”

During drought, salt that previously was pushed deep into the soil by rainwater is able to creep back toward the surface, he said.

“Our role here is to find some almond genotypes which can take more salt,” Sandhu said. In addition to less reliable rain, growers are planting almond trees out to the far edges of where they have historically been grown in California. That, too, can mean marginal soils and less water. Plus, Sandhu said there is an increasing desire to use treated wastewater or other recycled water for crops, which can sometimes be high in salt.

In a recent study, Sandhu and colleagues evaluated how a variety of different rootstocks reacted to different salt stressors. One of their discoveries, published in the journal *Scientific Reports*, [found a specific amino acid called proline turned out to be a surprisingly good marker for identifying saline tolerance](#). The research, which also identified the top rootstock types to use

in drier, more saline soils, didn't delve into the genetic mechanism that accounts for salt tolerance. But that type of work is increasingly happening in various plants as the ability to sequence whole genomes has become more widespread and affordable.

That's how a collaboration between New York University computational biologists and field ecologists from the Pontificia Universidad Católica in Chile led to discoveries about the relationship between plants that have evolved to survive in the Atacama desert and some of the world's important crop plants. [The decade-long investigation collected genetic information from all the plants in a specific study area of the desert and matched as many of those as they could with genetic "relatives" that are important crop plants](#) — grasses, for example. Even tomatoes. One goal of the project, said Gloria Coruzzi, a senior author on the paper and a professor at New York University, is that eventually this basic research could be translated into breeding programs for biofuels, for example. The US Department of Energy helped fund the project.

"They want to improve the growth of biofuel crops on marginal soils," she said, so the most fertile soil can be reserved for edible crops.

Rodrigo Gutiérrez of Pontificia Universidad Católica designed the project and oversaw the field research. He said the families of genes that have been identified in both the desert plants and domesticated crops could provide geneticists with markers to use in a breeding program. Other researchers could "try to modify some of these genes in crops and see if they generate a more resilient crop," he said.



The Atacama desert has provided genetic clues for plant breeders to exploit in creating more resilient crops. (Photo: Melissa Aguilar)

That's what Coruzzi's lab has done on an experimental level, crossing some of the genetic material from the desert plants into samples of crop plants. "When we torture these (modified) plants," she said, they do better than their unadulterated counterparts. If someone were looking to develop a more resilient crop, they could take just some of the most important genes for drought tolerance, for example, and breed those into an already acceptable crop variety. The idea would be to maintain all the desirable traits in the existing crop while also enhancing a specific survival strategy. And torturing plants, so to speak, is one way to find out whether they will survive in the future conditions that are predicted.

The Atacama desert study is not directly connected to plant breeding in California, but it's contributing to the body of scientific literature that will inform future experiments.

"Can the plant adapt to a changing climate?" asks Tom Gradziel, a plant breeder and professor at UC Davis. "Inherently, almond has the capacity to deal with low water," he adds, but the yields that California growers have come to expect won't necessarily continue with the current trees in low water years. That's why the rootstock research at the Salinity Lab is important. Most commercial almond trees are grafted onto rootstock from peach or apricot or even sometimes plum trees. The ability to "mix and match" rootstocks provides myriad options, Gradziel said.

But one of the hurdles is the time it takes to grow out an almond tree, on whichever rootstock, and see how it does under different natural conditions. Researchers can do that to a certain extent, in relatively low-risk environments, but ultimately, he said, farmers have to be willing to plant a few new trees and see how they do over five or 10 or 15 years.

“You’re not necessarily looking for a winner,” he said. “You’re looking to make sure it’s not a loser.” A tree that fails gets dropped, but trees that are successful will prompt farmers to gradually plant more of that type. With limited water increasing the price of doing business for farmers, Gradziel said “almonds is one of the few crops that’s actually valuable enough” to justify using that water. Still, growers need to find a profitable balance between input costs and yields.

“It’s an evolving solution,” he said, adding that he’s confident the almond industry is capable of changing as conditions require. He also said the collaboration of government and university researchers, industry and the growers themselves is critical to getting the science out of the lab and into the field. Getting feedback from the growers back to the scientists is equally important. In an area as big as California, he said testing needs to happen almost simultaneously in various regions with different soils and climates. Even though bringing a new almond variety to market can be a long-term investment, Gradziel wants to make sure the research is never too myopic to meet the different demands of the many farmers.

“I want to make sure that the breeding, selection options, that the growers have are diverse enough that whatever their particular need is, there will be something that satisfies it,” he said. In other words, it’s not one cultivar fits all.

News Briefs:

NRCS unveils new AI program to forecast and support better water management practices. The Department of Agriculture’s Natural Resources Conservation Service has unveiled a new computer application that harnesses the power of artificial intelligence to better forecast water supply in the arid West. The primary goal of the new technology is to help producers in the American West use increasingly tight water resources more effectively while protecting the shared natural environment. The program, known as the multi-model machine learning metasystem, or M⁴, [would be the largest migration of artificial intelligence into real-world river prediction programs, according to Sean Fleming, the applied R&D technical lead, water and climate services team at the NRCS National Water and Climate Center in Portland, Oregon.](#) As farmers, ranchers, foresters, and water managers in the West face extreme and debilitating drought conditions, accurate water forecasts have become critical to their operations by helping guide choices like crop selection, water rights rentals, and whether or not to leave land fallow. Since the Dust Bowl of the 1930s, NRCS has helped producers plan for their operations through the Snow Survey and Water Supply Forecast program. But as margins between water supply and water demand narrow, improved accuracy in these programs is needed to reflect tighter margins due to climate change and population growth. The value of water managed using these forecasts is in the billions of dollars. But with the use of artificial intelligence in the M⁴ program, changes in accuracy of these programs can help create over \$100 million a year in public benefit for just one river basin.

Beef, pork exports sustain record pace. American cattle and hog producers are sending meat overseas at a record rate in 2021 after strong third-quarter returns charted by the U.S. Meat Export Federation. [According to USDA data analyzed by USMEF,](#) beef export value in

September was nearly 60% higher month-over-month than in 2020; the figure represents one of the strongest months on record. Pork export value also increased, albeit by a slimmer 8%, as export volume was slightly below September 2020 figures. “Facing significant logistical headwinds and higher costs, these outstanding results are really a testament to the loyalty and strong demand from our international customers and to the innovation and determination of the U.S. industry,” said USMEF President and CEO Dan Halstrom. Japan continues to be a strong market for U.S. beef and has taken about 5% more product from January-September this year — about 246,380 metric tons — and paid 17% more for it — \$1.72 billion. According to USMEF, Japan, South Korea, and the combined China and Hong Kong markets are all on track to top \$2 billion in 2021. For pork, Mexico is set to take a record amount of volume and value; through September, exports are up 27% and have taken in \$1.24 billion, an increase of 57%. Other Central American countries are also upping their purchases, which have nearly doubled — up 97% to \$30.9 billion. USMEF did note a significant decline in pork exports to China/Hong Kong and called the drop “anticipated.” The country is currently in recovery from a massive outbreak of African Swine Fever which resulted in the loss of a good deal of its domestic hog herd.

Report: John Deere considering more overseas production as U.S. strike lingers.

A John Deere executive says the company is looking to shift some of its necessary production to overseas facilities as a standoff with more than 10,000 union employees continues in search of a new contract. [In an interview with the Des Moines Register](#), Cory Reed, president of John Deere’s agriculture and turf efforts, said the company will be able to accomplish some necessary production steps with its foreign plants. The company is also using nonunion, salaried employees — engineers, supervisors and financial services managers — to run U.S. facilities as the strike continues. The [strike began Oct. 14](#) after John Deere workers rejected a six-year contract offer from the company. John Deere and representatives from the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW) [reached another deal weeks later](#), but [union members voted that deal down](#). According to information from the company, the strike covers more than 10,000 employees of production and maintenance facilities in Illinois, Iowa and Kansas. Workers at parts facilities in Denver and Atlanta voted in favor of a separate agreement during the process.

Farm Hands on the Potomac...



Liam Condon

[Bayer Crop Science President Liam Condon plans to leave the company at the end of the year “to pursue career opportunities outside of Bayer,” the company announced Tuesday.](#) **Rodrigo Santos** has been selected to succeed Condon as the new president. Condon has headed Bayer’s crop science portfolio since the beginning of 2016 and has been with Bayer since 2006 when his former employer, Schering, was acquired by the company. Santos, himself a Bayer and Monsanto veteran, is currently the company’s chief operating officer. After the acquisition of Monsanto in 2018, he led the Crop

Science business in Latin America. A Brazilian national, Santos has spent 23 years with the company in sales, marketing, strategy, and business development roles located in Brazil, the United States and Eastern Europe.

Dennis Rodenbaugh has been tapped to lead Dairy Farmers of America as the new president and chief executive officer, effective at the end of 2022. Rodenbaugh will succeed **Richard Smith**, who plans to retire after leading the organization for the past 16 years. Rodenbaugh currently serves as executive vice president and president of council operations and ingredients solutions for DFA.

Farmers Mutual Hail Insurance Company of Iowa has announced **Shannon Rutledge** will be promoted to the position of president and CEO at the end of the year. Rutledge previously served as FMH's executive vice president and chief operating officer. He succeeds **Ronald Rutledge**, who will be retiring Dec. 30.

John Raines is joining TELUS Agriculture as the organization's new president, effective Nov. 29. Raines currently serves as the chief customer officer for The Climate Corporation. Before that, he was vice president of global integrated farming systems and precision planting for the Monsanto Company.

The Department of Agriculture has announced four new individuals to fill staff positions at headquarters in D.C. **Joaquin Altoro** was appointed administrator of the Rural Housing Service within Rural Development. Altoro most recently served as CEO and executive director for the Wisconsin Housing and Economic Development Authority. **Allen Rodriguez** is the new deputy press secretary in the Office of Communications. Rodriguez previously served as deputy press secretary to Sen. **Jeanne Shaheen**, D-N.H.

Riya Mehta will serve as a policy adviser to the Farm Service Agency, focusing on policy work within the Farm Program and Farm Loan Program. Mehta previously served as a policy adviser to Rep. **Jimmy Panetta**, D-Calif. **Conisha Hackett** was also appointed as a policy adviser to the Farm Service Agency, focusing on organizational policy work. Hackett previously served as a research analyst with the Policy Research Center at Alcorn State University.

USDA has announced the appointments of two Farm Service Agency state executive directors and two Rural Development state directors. **Thaddeus Fairley Sr.** has been appointed FSA state executive director for Mississippi. He most recently served as a field representative for Rep. **Bennie G. Thompson**, D-Miss., current chair of the Committee on Homeland Security. **Eugene Schriefer** has been appointed FSA state executive director for Wisconsin. Most recently, Schriefer served as a senior outreach specialist with the University of Wisconsin-Madison Extension Division. He has worked as an agriculture educator in Iowa County since 2009. **Julie Lassa** has been appointed RD state director for Wisconsin. Lassa most recently worked for a Wisconsin-based property and casualty insurance company. She also represented a district in central Wisconsin in the state legislature for 18 years, both in the Assembly and Senate. **Charlene Fernandez** has been tapped as the RD state director for Arizona. Fernandez was elected to the Arizona House of Representatives in 2014 and was later elected House Minority Leader in 2019.



Thaddeus Fairley Sr, FSA



Anne DeCesaro

Claire Hutchins now serves as a cross-commodity economist for USDA’s Economic Research Service located in Kansas City. She was previously with the U.S. Wheat Associates as a market analyst.

Anne DeCesaro now serves as policy director for Rep. **Bryan Steil**, R-Wis., on the House Select Committee on Economic Disparity and Fairness in Growth. She most recently served as director of policy and regulatory coordination for food, nutrition and consumer services at USDA.

Madelyn Derks has been promoted to legislative assistant in the office of Rep. Vicky Hartzler, R-Mo. She will handle the portfolio for agriculture and food, animal welfare, energy, environmental protection, foreign trade, public lands and natural resources. Derks previously served as Hartzler’s staff assistant.

Ryan Altman has taken over the agriculture portfolio for Rep. **Tom Emmer**, R-Minn. Altman also covers the portfolio for armed forces, international affairs, emergency management, labor and employment.

Dawn Caldwell now serves as the executive director of Renewable Fuels Nebraska. Caldwell previously served as the head of government affairs for the Aurora Cooperative Elevator Company in Nebraska.

Elizabeth Escobar now serves as the manager of strategic planning and business development for Nichino America. Escobar comes to Nichino America from ISK Biosciences where she most recently served as project manager for new business development.

The National Waterways Foundation (NWF) has elected **Matt Woodruff** as chairman, with his term expiring in 2023. He succeeds Rick Calhoun, who served as chairman for 2020-2021. Woodruff serves as vice president of public and government affairs at the Kirby Corporation. NWF has also elected new officers for the upcoming year: **Tracy Zea**, Waterways Council Inc., will serve as president; **Robert McCoy**, Amherst Madison, as vice chairman; **Karl Jefferson**, LIUNA, as treasurer; and **Deb Calhoun**, Waterways Council Inc., as secretary. **Anne Thompson**, with the National Corn Growers Association, was elected as a trustee for a three-year term expiring in 2024.



Shannon Rutledge

Barry Rosenbaum, president of Nassau Candy Distributors, is the new chairman of the National Confectioners Association board of trustees. **Tony Jacobs**, president of Bazooka Candy Brands, was selected to serve as the new vice chair. Rosenbaum succeeds **Paul Chibe**, who had to step down from the board as he transitioned from his role as CEO of Ferrero North America to global president of sugar confectionery and gums, based in Europe.

Neil Harl, professor emeritus of agricultural law at Iowa State University, passed away Nov. 4 in Ames, Iowa. He was 88. An Army Veteran, Harl worked for Wallaces Farmer magazine until his acceptance at the University of Iowa College of Law in 1958. After graduating in the top three of his law school class in 1961, he continued his education at Iowa State University, pursuing a Ph.D. in Economics. Harl later joined the faculty at Iowa State as an associate professor in economics, advancing to full professor in 1967. In 1976, he was named a Charles F. Curtiss Distinguished Professor, one of the youngest to be so recognized. Harl served as founding president of the American Agricultural Law Association and president of the American Agricultural Economics Association. A visitation will be held from 5 p.m. until 7 p.m. on Friday, Nov. 12, at Adams Funeral Home, 502 Douglas Ave., Ames. A funeral service will be held at noon Saturday, Nov. 13, at the First United Methodist Church, 516 Kellogg Ave., Ames. Burial will be in the Iowa State University Cemetery in Ames.

Best Regards,

Sara Wyant
Editor

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