



# Dakota **AG**

THE BROOKINGS REGISTER | WEDNESDAY, JANUARY 31, 2024





# Can dental plaque strengthen soil?

**BROOKINGS** — In South Dakota, problematic soils — soils whose physical properties have the potential to expand, collapse or erode — negatively affect the fertility of the land, agricultural production and crop health. Under certain climatic conditions, these soils can also cause infrastructure, like roads and bridges, to crumble. With an ever-changing climate, soil erosion is expected to increase, worsening the problem.

A new project from South Dakota State University is looking to address this issue by using a rather unusual substance: dental plaque.

Aritra Banerjee is an assistant civil engineering professor at SDSU. Since earning his doctorate from the University of Texas at Arlington in 2017, he has been studying problematic soils and believes dental plaque could offer a sustainable solution.

“The inspiration for the proposed project stems from the observation that dental plaque needs specialized tools to be dislodged from teeth after hard-

ening,” Banerjee said. “If the process can be replicated to bind soil particles together, it will result in stronger soils that are resistant to erosion and may mitigate scouring.”

Through a \$299,797 National Science Foundation-backed project, Banerjee and his research team will explore the feasibility of using biofilms, such as dental plaque and sulfate-reducing bacteria, to stabilize problematic soils and prevent soil erosion.

### Research process

First, the research team will determine what strain of bacteria will grow best in the soil. Each strain of bacteria found in the dental plaque will be cultured and tested. The strain that grows and binds best in the soil will be utilized.

“We are using strains of bacteria that are commonly found in dental plaque as the biofilms,” Banerjee said. “The bacteria present in the biofilms will be utilized to regenerate the plaque in the soil so that it binds together.”

See **PLAQUE**, page 10



Photo courtesy U.S. Department of Agriculture Press

In South Dakota, expansive and sulfate-rich soils can cause serious problems for civil infrastructure, like roads and bridges, and agriculture production. In certain climatic conditions, these expansive — or “problematic” — soils will crack and swell, as pictured above. The Pierre Shale, a geological formation that encompasses most of South Dakota, is rich in sulfate-bearing materials and is the primary cause of the state’s soil challenges.

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# Turning switchgrass into bioplastics

SDSU researchers search for a way to help solve the global plastics crisis.

BROOKINGS — Plastic, made in the traditional petroleum-based method, has served its purpose. The near-perfect packaging material has been instrumental in transforming the world's food supply and can be found in nearly every sector of daily life.

But as humans have become increasingly reliant on plastic, serious environmental issues, like the Great Pacific Garbage Patch, have emerged. A natural, plastic-like alternative is sorely needed and, according to South Dakota State University researcher Srinivas Janaswamy, a sustainable remedy is within reach.

Bioplastics — plastic-like films that have the same qualities as petroleum-based plastic but are made from natural materials — are our best chance at chipping away at the ongoing plastic waste crisis, said Janaswamy, associate professor in SDSU's Department of Dairy and Food Science.

"Plastics are used for convenience in every household, but many are not appropriately recycled and are dumped everywhere around the globe," Janaswamy said. "Plastics take over 700 years to degrade and form an everlasting threat to our biosphere and ecosystem."

Janaswamy's research is on the leading edge of bioplastic development. Over the past few years, he has demonstrated how biodegradable films can be successfully created from a variety of agriculture byproducts,



including avocado peels and spent coffee grounds.

A new study from Janaswamy's lab has demonstrated how a transpar-

ent and strong biodegradable film can be derived from switchgrass (*Panicum virgatum*), a perennial prairie tallgrass native to North America.

In the United States, switchgrass grows abundantly and in a variety of different climates, making it a valuable

See **GRASS**, page 10



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# Researchers study response to fertilizer prices

BROOKINGS — In 2022, fertilizer prices reached record high levels due to the Russia-Ukraine war and supply chain disruptions from the COVID-19 pandemic. This has created a financial strain on farmers as nitrogen, phosphorus and potassium — elements found in most synthetic fertilizers — are essential for crop growth and make up a significant portion of a farm's operating cost.

The high prices have incentivized farmers to adjust their practices. In a new study, South Dakota State University researchers explored what strategies are being deployed by farmers in South Dakota, Minnesota, Nebraska and North Dakota to combat these costs.

"To assess farmers' adaptation strategies to high fertilizer prices and the effectiveness of different strategies in reducing the use of synthetic fertilizer, we conducted a survey," said Tong Wang, associate professor in SDSU's Ness School of Management and Economics and the primary investigator in the study. "The results of our work fill in the gaps on producers' short- and medium-term responses to increased synthetic fertilizer prices."

The research team — which included Wang; Matthew Elliott, associate professor in the Ness School; Heidi Sieverding, research scientist at the South Dakota School of Mines; and Stephen Cheye, graduate research assistant with the Ness School — found that 78% of producers had taken on some form of adaption strategy due to the costs. The most common adaption was the use of variable-rate fertilizer application, a tool that aims to enhance fertilizer use efficiency, followed by manure/compost. A smaller percentage of farmers chose to adopt cover crops, and some decided to change their crop rotation.

"We also asked producers to rate their likelihood of using these practices in the next three years if the current prices or supply shortage continue," Wang said. "Farmers are more likely to make medium- and long-term adaption plans than short-term adaption decisions if high fertilizer prices continue."

The use of biofertilizers — also known as microbes — was a new type of technology and had the lowest adoption rate of all the listed strategies.



Courtesy photo

In a new study, South Dakota State University researchers explored what strategies are being deployed by farmers in South Dakota, Minnesota, Nebraska and North Dakota to combat fertilizer costs.

However, a comparison between farmers' short- and medium-term responses shows biofertilizers will likely have the highest growth rate of all the strategies.

"Our findings revealed that farmers are highly interested in investing in new technologies, such as biofertilizers and variable-rate fertilizer," Wang said. "This calls for more research and development efforts to advance the use of biofertilizers and address its performance inconsistency challenges."

In comparison to the interest surrounding biofertilizers, there was less interest — depending on where the farmer was located — in utilizing cover crops and diversified crop rotations to combat the high costs of synthetic fertilizers. The research team notes this could be due to the relatively long period for their benefits, such as reduced

requirement for fertilizer inputs, to manifest. Farmers' adaptation strategies also depend on regional weather patterns and other related factors. For example, farmers in South Dakota were more likely to utilize cover crops than the other three states.

"The nonuniform increase in cover crop adoption rates could be attributed to recent flooding events, which likely introduced farmers in the severely affected regions to using cover crops," Wang explained. "Similarly, the fertilizer price spike will likely shift farmers toward alternative resources."

Overall, fertilizer was ranked as the issue having the greatest influence on farming operations during the survey implementation period (summer 2022), followed (distantly) by extreme weather and fuel prices.

"Policy assistance during extreme events such as natural disasters or fertilizer price spikes, if designed properly, could incentivize producers to adopt individual conservation practices or combinations that are ideal for their region," Wang said. "In the long term, social benefits will accrue as more farmers become accustomed to using conservation practices as adaption strategies to such events or as a norm in their agricultural production."

The study, titled "Impact of High Fertilizer Prices and Farmers' Adaptation Strategies in the U.S. Midwest," was published in Choices Magazine, a publication of the Agricultural and Applied Economics Association.

— SDSU Marketing & Communications



# SDSU, NDSU extensions talk beef feeding

BROOKINGS — South Dakota State University Extension is partnering with North Dakota State University Extension to host informational programs for beef cattle producers.

The Dakota Alternative Beef Cow Systems Symposium is designed to help farmers and ranchers navigate the rising costs of the pastures and forages used to feed beef cattle. There will be two in-person events — one in each host state — and one virtual event via Zoom.

As feed costs rise, it puts additional cost pressures on cattle producers. Experts from SDSU Extension, NDSU Extension and the University of Illinois Urbana-Champaign will provide up-to-date research, information and strategies to producers.

There will be presentations on strategies to replace forages, creep-feeding calves in confinement systems, grazing strategies that increase adaptability, and comparing the tradeoffs of alternative cow-calf systems with pasture-based systems.

“It is no secret that pasture and for-



age costs have increased substantially in recent years,” said Warren Rusche, assistant professor and SDSU Extension feed-

lot specialist. “The Dakota Alternative Beef Cow Systems Symposium is part of a multi-state research and outreach

effort to help beef producers make more informed decisions regarding management options to provide feed resources to their cowherd.”

South Dakota’s in-person event is from 10 a.m. to 3 p.m. on Feb. 6, 2024, at the Huron Event Center in Huron. North Dakota’s is from 10 a.m. to 3 p.m. on Feb. 7 at the Jamestown Civic Center in Jamestown, North Dakota. The virtual option will also be from 10 a.m. to 3 p.m. on Feb. 7 via Zoom.

Registration is required by Feb. 5 and is \$25 per person. Participants will also receive a link to a recording of the symposium. To register, visit [extension.sdstate.edu/events](http://extension.sdstate.edu/events) and search “symposium.”

For more information, contact Warren Rusche, assistant professor and SDSU Extension feedlot specialist, at 605-688-5452 or [Warren.Rusche@sdstate.edu](mailto:Warren.Rusche@sdstate.edu); or Zac Carlson, assistant professor and NDSU Extension beef cattle specialist, at 701-219-4094 or [Zachary.E.Carlson@ndsu.edu](mailto:Zachary.E.Carlson@ndsu.edu).



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# Don't ignore cold stress dangers

Cold temperatures, high winds, and wet conditions are commonplace on the farm in winter. While working outside is often inescapable, understanding how these conditions affect our bodies and our health are key to working safely.

Begin by dressing appropriately for weather conditions. According to the Occupational Safety and Health Administration, dressing properly is essential to preventing cold stress. These guidelines can help ensure clothing helps protect from cold temperatures:

- Wear at least three layers of loose-fitting clothing as layering provides better insulation. Tight clothing reduces blood circulation, which is necessary for extremities.

- An inner layer of wool, silk, or synthetic (polypropylene) helps keep moisture away from the body. Thermal wear, wool, silk, or polypropylene, inner layers of clothing hold more body heat than cotton.

- A middle layer of wool or synthetic provides insulation even when wet.

- An outer wind and rain protection layer allows some ventilation to prevent overheating.

- A knit mask can be used to cover the face and mouth when necessary.

- A hat that covers the ears will help keep the whole body warmer as they reduce the amount of heat that escapes from the head.

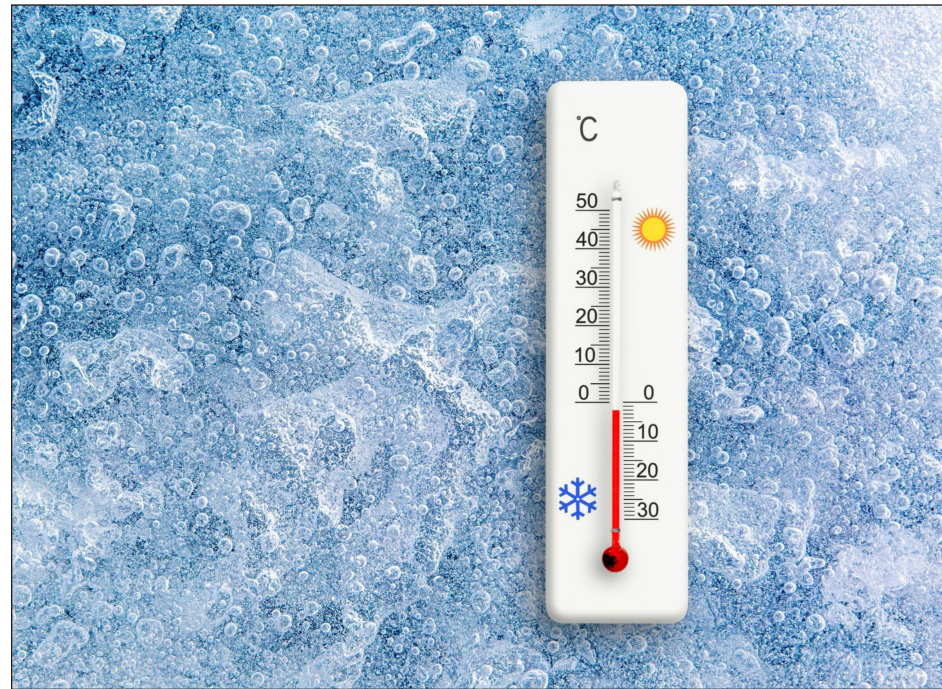
- When necessary, insulated gloves (water resistant if necessary) protect hands.

- Insulated and waterproof boots protect the feet.

Among the consequences of cold stress in winter temperatures are hypothermia, chilblains, frostbite, trench foot, and immersion hypothermia.

Hypothermia occurs when prolonged exposure to cold causes the body to lose heat faster than it can be replaced. Low body temperatures will affect a person's ability to think clearly or move well. Early symptoms of hypothermia include shivering, fatigue, loss of coordination, confusion, and disorientation. As the condition progresses, shivering will stop, skin will become blue, pupils will dilate, pulse and breathing will slow and the person will lose consciousness.

Chilblains are caused by damage to skin blood vessels from repeated exposure to cold temperatures. The damage



can be permanent, evidenced by redness and itching of the skin when exposure to cold temperature recurs. Redness and itching can occur on cheeks, ears, fingers, and toes accompanied by possible blistering and inflammation.

Frostbite occurs when skin and tissues freeze while exposed to cold temperatures and low-wind chill factors. Permanent frostbite damage to body tissues and severe frostbite cases can lead to amputation. Frostbite symptoms include reduced blood flow to hands and feet as fingers or toes can freeze. Numbness, tingling, or stinging are accompanied by aching and bluish or pale, waxy skin.

Trench foot is caused by damage of tissues in the feet due to cold and wetness. These conditions can lead to damaged skin on the feet, loss of circulation to the feet, and toxin buildup. Trench foot symptoms include reddening of the skin, numbness, tingling, or swelling. These are accompanied by leg cramps, blisters or bleeding under the skin, and gangrene.

Immersion hypothermia is the result of prolonged exposure to chilling from rain, sweat, or cold water. These conditions cause the body to lose heat faster than it can be replaced. This condition may occur at cooler temperatures (above 40 degrees Fahrenheit). Low body tem-

peratures affect a person's ability to think clearly or move well. Early symptoms of immersion hypothermia include shivering, fatigue, loss of coordination and confusion and disorientation. As symptoms progress, the person will stop shivering, their skin will become blue, pupils will dilate, and pulse and breathing will slow. Eventually, they lose consciousness.

Anyone who works outdoors in frigid temperatures should have the ability to recognize conditions that can lead to these types of cold stress. Understanding cold stress symptoms, how to prevent cold stress, and what to do to help when someone is affected by cold stress should be part of training and/or education programs. Outdoor workers should have good understanding of proper clothing necessary for working in cold, wet, and windy conditions.

Anyone who shows signs of cold stress should receive prompt medical attention. Cold-weather survival equipment should include:

- Emergency communications (satellite phone, cell phone, and personal locator beacon)
- Medical and environmental thermometer, hot packs, first-aid kit
- Areas to warm up and a place to change wet clothing
- Appropriate cold-weather gear

such as hats, gloves, and boots for work in cold environments

- Warm water

Agricultural worker employers should

- Create a plan for acting on sudden weather changes, such as dropping temperatures or increasing wind speed

- Schedule normal maintenance and repairs during warmer months when possible

- Schedule frequent short breaks in warm, dry areas

- Minimize work requiring manual dexterity in cold rooms

- Provide glove alternatives for workers inside cold rooms (glove liners or fingerless gloves to wear under plastic gloves)

- Monitor workers' physical and cold conditions

Part of preparing for cold stress conditions includes knowing winter weather terms.

**Blizzard warning:** Issued for sustained or gusty winds of 35 mph or more, and falling or blowing snow creating visibilities at or below ¼ mile, these conditions should persist for at least 3 hours.

**Wind Chill Advisory:** Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.

**Winter Storm Warning:** Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.

**Winter Storm Watch:** Alerts the public to the possibility of a blizzard, heavy snow, heavy freezing rain, or heavy sleet. Winter Storm watches are usually issued 12 to 48 hours before the beginning of a winter storm.

**Winter Weather Advisories:** Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet which will cause significant inconveniences and, if caution is not exercised, could lead to life threatening situations.

Learn more about cold stress at <https://www.unmc.edu/publichealth/cscash/resources/index.html>

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# Be aware of carbon monoxide poisoning

It's colorless, odorless, tasteless, and potentially deadly.

CO is a common hazard resulting from the incomplete burning of carbon-containing material, such as natural gas, gasoline, kerosene, oil, propane, coal, or wood. To avoid breathing in toxic levels of carbon monoxide, be aware of how this gas is generated and take steps to prevent it.

On the farm, common sources of CO include internal combustion engines such as portable generators, vehicles, lawnmowers, and power washers.

According to the United States Consumer Product Safety Commission, approximately 170 people die yearly from CO produced by non-automotive consumer products. These products include malfunctioning fuel-burning appliances such as furnaces, ranges, water heaters, and portable heaters. Fireplaces and charcoal burned in homes and other enclosed areas can also produce CO. In 2005, CPSC staff documented at least 94 generator-related CO poisoning deaths. Among them, 47 were known to have occurred during power

outages due to severe weather.

Other CO deaths can occur because of vehicles left running in an attached garage. The US Centers for Disease Control and Prevention estimates that several thousand people visit hospital emergency rooms every year seeking treatment for CO poisoning.

Symptoms of CO poisoning include:

- Headache
- Fatigue
- Shortness of breath
- Nausea
- Dizziness

When CO levels in a person's body are high, the person may experience:

- Mental confusion
- Vomiting
- Loss of muscular coordination
- Loss of consciousness
- Ultimately death

According to the Occupational Safety and Health Administration, carbon monoxide, when breathed in, displaces oxygen in the blood and deprives the heart, brain, and other vital organs of oxygen. Large amounts of CO can overcome a person in minutes, resulting in loss of

consciousness and suffocation.

Initial symptoms may cause chest pain in individuals with angina. During prolonged exposure, symptoms may progress to vomiting and muscle weakness. Symptoms can vary widely from person to person. They may occur sooner in young children, the elderly, people with lung or heart disease, people at high altitudes, or those who already have elevated CO blood levels, such as smokers. CO poisoning also poses a particular risk to fetuses.

The impact of CO inhalation depends on the length of the exposure and an individual's health condition. CO concentration is measured in parts-per-million (ppm). CO levels of approximately 1 to 70 ppm may not result in any symptoms for most people. However, heart patients may experience an increase in chest pain. As CO levels increase and remain above 70 ppm, symptoms may become more noticeable.

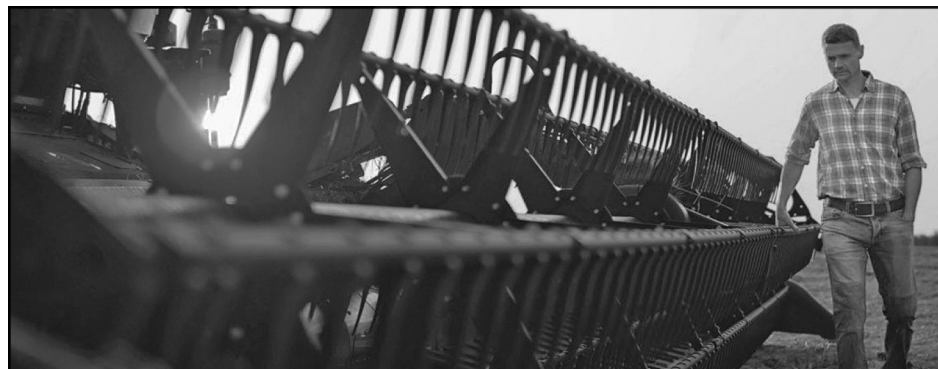
When discovered in time, CO poisoning can be reversed. However, in acute poisoning cases, permanent damage may occur to parts of the body that

require a lot of oxygen, such as the heart and brain.

Whenever CO poisoning symptoms are experienced, getting to fresh air is critical. If the symptoms occur inside the home, get outside and call 911. Remaining inside a house or other enclosed areas with high levels of CO could result in death.

It's also crucial to consult a physician for proper diagnosis and medical attention. If CO poisoning is confirmed, ensure any appliances that were a CO source are repaired or replaced. If the incident occurred inside an improperly vented enclosure, update the venting.

CO alarms are designed to sound before potentially life-threatening CO levels are reached. Safety standards for these alarms have continually improved, and current alarms are more reliable than those used in the past. Install an alarm according to the manufacturer's instructions, and never ignore a CO alarm. While an alarm provides some added protection, there is no substitute for proper use and upkeep of appliances that can produce CO.



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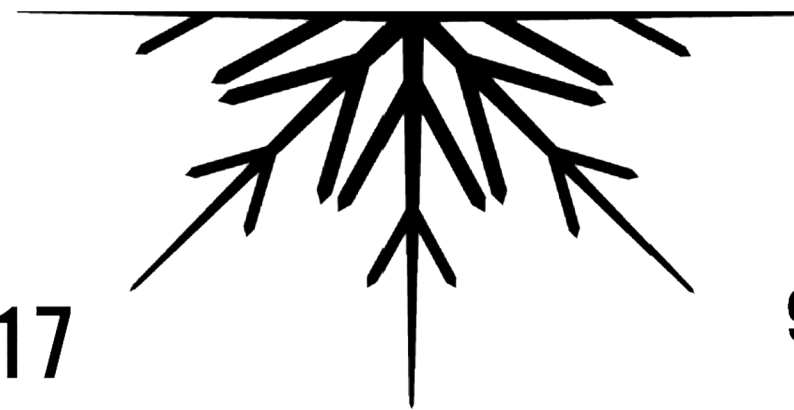


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# GRASS: Plastic takes 700 years to degrade

Continued from page 3

resource for soil conservation, ornamental grass, heat production and bio-fuels. Switchgrass is also composed of roughly 58% lignocellulosic material, making it an ideal material for the development of plastic-replacing products.

To make the films, Janaswamy and his research team — which includes Sajal Bhattarai, an SDSU grad and a graduate research assistant at Purdue University — first extracted lignocellulosic material, the most abundant renewable biomass on Earth, from milled switchgrass. Lignocellulosic material, or plant dry matter, is composed of cellulose, hemicellulose and lignin.

After the material was extracted, a filtration, bleaching, washing and drying process resulted in a white residue that was then used to create the films.

Once fully dried, the team assessed the film's qualities.

Results showed the films to be transparent, high in tensile strength and completely biodegradable within 40 days at 30% soil moisture. The last characteristic — biodegradation — is crucial in the development of bioplastics as the primary challenge with petroleum-based plastics is their inability to degrade.

For example, a plastic bottle will take more than 700 years to naturally degrade in soil. Bioplastics, ideally, would biodegrade in a fraction of that time, greatly reducing the amount of plastic waste in the environment.

"This research successfully demonstrates biodegradable, biocompatible, strong and transparent films can be made from the lignocellulosic residue of switchgrass," Janaswamy said. "The film possesses high tensile strength,

low water vapor permeability and good biodegradability."

The one downside of the films is relatively low elongation, especially in comparison to synthetic films. Janaswamy attributes this to the structural nature of the rigid lignocellulose network structure.

Plasticizers, liquids added to plastics to soften them, generally improve film flexibility and elongation.

However, plasticizers were not tested in this particular study. Janaswamy notes this will be an area of interest for future research.

Outside of eliminating plastic waste and subsequently helping the environment, this work could help farmers in the region generate extra income, as the materials utilized for bioplastics are often either underused or not used at all.

"Our planet needs sustainable, eco-

nomical and environmentally friendly solutions to address the repercussions of plastics," Janaswamy said.

"The strong and biodegradable switchgrass residue-based films open up a new window of opportunities to design and develop reusable, recyclable and compostable films from underutilized, inexpensive and abundant agricultural biomass, contributing to the circular rural economy in a friendly and sustainable manner."

Financial support for this work was provided by the U.S. Department of Agriculture's National Institute of Food and Agriculture. The full study, which was published in the academic journal Resources, Conservation and Recycling under the title "Biodegradable films from the lignocellulosic residue of switchgrass," can be found at

<https://doi.org/10.1016/j.resconrec.2023.107322>.

# PLAQUE: Could replace traditional cement or lime

Continued from page 2

Traditionally, weak soils have been stabilized with cement or lime. However, these techniques are not environmentally friendly and, for certain soils, may not even be suitable. For example, when lime or concrete is added to sulfate-rich soils, a mineral called ettringite slowly forms in the presence of water. Eventually, ettringite will lead to the concrete or pavement expanding and cracking — a phenomenon otherwise known as "sulfate-induced heave." This causes civil infrastructure, like bridges and roads, to crumble well before their expected lifespan.

"Addressing the issues of sulfate-induced heave and the effect of changing climatic conditions will result in fewer maintenance activities during the life of the pavement," Banerjee said.

One of the ways to mitigate this issue is to remove sulfate from the soil prior to stabilization. The research team will look to use sulfate-reducing bacteria to eliminate sulfate before the application of lime.

"This will prevent sulfate-induced heave in bio-treated soils and mitigate erosion," Banerjee added.

Removing sulfate before the application of lime is needed for better crop

health. South Dakota, Texas, Colorado, Wyoming and the southwestern United States are home to the expansive, problematic soils outlined above.

"The successful integration of sulfate-reducing bacteria in sulfate-rich soils will also allow the use of lime in such soils without facing issues of sulfate-induced heave, which causes cracks in soils and results in erosion during flooding and windstorms," Banerjee said.

"Since the state of South Dakota has a significant presence of sulfate-rich expansive soils and is a major agricultural producer, such innovative measures of bio-stabilization have immense potential for adaption in agriculture and civil infrastructure development, rehabilitation and repair."

Banerjee points out that the potential, proposed solutions could enhance the health of crops and plants in drought-prone areas as biofilms have high water retention capabilities.

The project will be in collaboration with faculty members from Arizona State University and the Center for Biomediated and Bio-inspired Geotechnics, ASU's NSF-funded research center.

The work is expected to last approximately two years.



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# Borrowers flock to fixed-deposit programs

JEFFERSON CITY, Mo. (AP) — On the first business day of the new year, Missouri Treasurer Vivek Malek began accepting applications for about \$120 million of state-subsidized, low-interest loans to small businesses, farmers and affordable housing developers.

Within six hours, Malek had so many requests for the money that he had to cut off applications.

“The demand is huge, and it is real,” Malek said.

Missouri’s situation, though extreme, is not entirely unique. From New York to Illinois to Montana, states have seen surging public interest in little-known programs that use state funds to spur private investment with bargain-priced loans. The programs have taken off after a series of key interest rate hikes by the Federal Reserve made virtually all loans more expensive, whether for farmers purchasing seed or businesses wanting to expand.

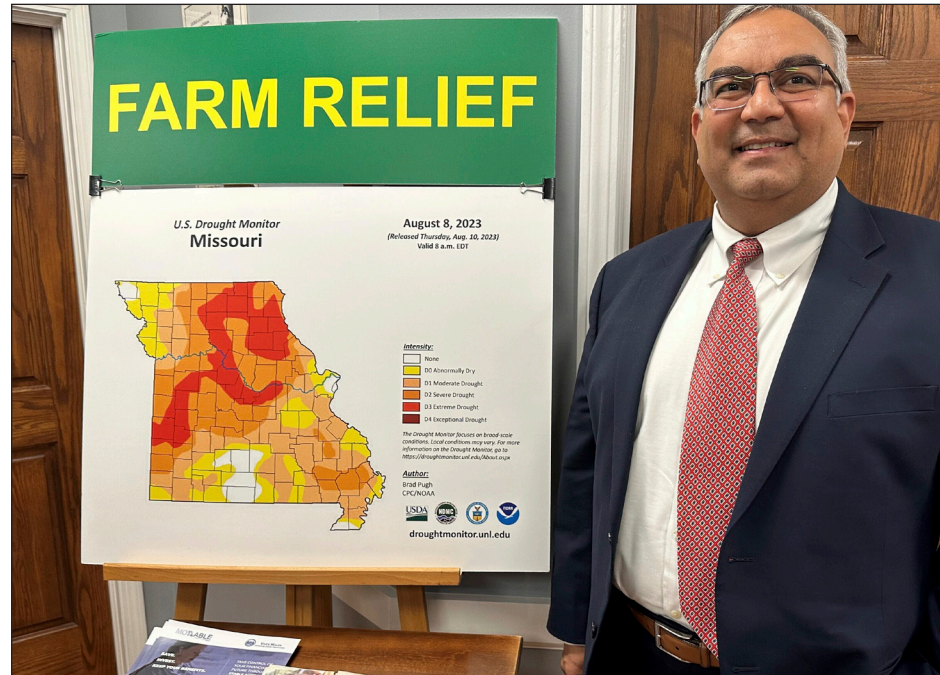
To combat inflation in consumer prices, the Fed raised its benchmark interest rate 11 times from March 2022 to last July, setting it at a two-decade high.

Under so-called linked-deposit programs, states deposit money in banks at below-market interest rates. Banks then leverage those funds to provide short-term, low-interest loans to particular borrowers, often in agriculture or small business. The programs can save thousands of dollars for borrowers by reducing their interest rates by an average 2-3 percentage points.

States typically cap the amount of money available for such discounted rates at either a flat dollar amount or a percentage of their total fund balances, because the programs result in less earnings for the state. Many states have built large surpluses from pandemic-era revenues, meaning they have more money available to deposit in banks.

Though most states don’t currently offer such programs, some that shelved them when interest rates were low are now considering whether to revive them to aid financially-strapped businesses and residents.

“I can say in talks with other state treasurers that there is a definite increased interest in treasury money, whether that is through a linked-deposit program or a different vehicle,” said Illinois Treasurer Michael Frerichs, who is president of the National Association



Associated Press photo

Missouri Treasurer Vivek Malek stands near a poster promoting drought conditions and state aid programs. Agricultural entities are among several categories of businesses that can receive low-interest loans backed by deposits of state funds made by the treasurer’s office. Participation in such programs has grown in various states.

of State Treasurers.

Illinois has nearly \$950 million of deposits linked to low-interest loans for farmers, businesses and individuals. That’s up substantially from past years. In 2015, Frerichs said, the state’s agricultural investment program had just two low-interest loans. By 2022, that had grown to \$51 million of loans. Last year, Illinois made \$667 million of low-rate deposits for agricultural loans.

With rising demand, Frerichs recently raised the program’s overall cap from \$1 billion to \$1.5 billion.

Though smaller in scope, New York’s program also has seen an explosion of applicants.

In 2022, New York had 42 applications for state deposits in financial institutions linked to \$20 million in low-interest loans. Last year, that rose to 317 applications linked to more than \$220 million of loans, said Rafael Salaberrios, a senior vice president who manages capital access programs at Empire State Development, New York’s economic development agency.

“As the banks see the benefit, they are inundating us with applications — and that’s a good thing,” Salaberrios

said. He added: “The linked deposit has allowed for the growth of small businesses to continue even during these high (interest) rate environments.”

Because of rising demand, Missouri’s linked-deposit loan program neared its statutory cap of \$800 million last May. After some existing loans expired, the treasurer’s office was able to reopen applications at 10 a.m. on Jan. 2. By 4 p.m. that day, it had approached the cap again — receiving 142 applications totaling over \$119 million — and closed the application window.

About half the applications came on behalf of customers of just two financial institutions — OakStar Bank and FCS Financial, a leading agricultural lender. FCS Financial had over 100 additional applications in line to submit when applications were cut off, said Brian Zimmerschied, vice president for its commercial crop lending team.

BTC Bank in rural Bethany, Missouri, had planned to turn in about dozen applications on behalf of its customers. But it missed out entirely because of the quick cutoff, bank CEO Doug Fish said.

Among those left disappointed was Jason Bernard, a farmer near Bethany

who had hoped for a low-interest loan to help purchase this year’s supply of seed, fertilizer and chemical spray.

With higher interest rates, “it’s a lot harder to make it, just because your payments,” Bernard said.

The Missouri treasurer’s office is backing legislation to raise the program’s cap from \$800 million to \$1.2 billion, which would mark a 50% increase in capacity. The expansion could cost the state \$12 million of potential earnings, though that could be partly offset by the economic activity generated from those loans, according to a legislative fiscal analysis.

In Montana, lawmakers last year authorized a new program to address a shortage of affordable housing. The Montana Board of Investments launched a linked-deposit loan initiative in October that received \$77 million of applications within two months, reaching a self-imposed cap and forcing it to close applications sooner than expected.

Republican state Rep. Mike Hopkins, who sponsored the housing incentive legislation, was thrilled with the response.

“We’re in a bit of a jam in the state of Montana” for affordable housing, Hopkins said, and “we were able to get money out the door as quickly as possible.”

Officials in Iowa, Kansas and Ohio also told the AP they had increased demand for programs that deposit state money in banks to provide low-interest loans. The number of such loan recipients in Kansas tripled from 2022 to 2023. In Ohio, the amount of money provided for those loans rose by two-thirds during that time, to more than \$600 million.

Oklahoma’s linked-deposit program has been dormant since 2010 amid low interest rates, but at least two banks recently contacted the treasurer’s office about the possibility of restarting it, said Deputy Treasurer Jordan Harvey.

Texas Agriculture Commissioner Sid Miller said he hadn’t approved any linked deposits for low-interest loans since taking office in 2015 — until last year, when he approved his first two.

“There wasn’t much need because interest rates were cheap,” Miller said.

“But now that the rates are up,” Miller added, “it could be a viable program, and we could help some people.”



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