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Officials Learn About Flooding, Excessive Rain Plaguing Vermont's Farmers

On August 14th, members of CVFC had the honor of meeting with state and federal officials to discuss the impact of excessive rainfall and flooding on Vermont's farms. We were joined by Under Secretary for Farm Production & Conservation at USDA Robert Bonnie, as well as Senator Bernie Sanders, Senator Peter Welch, and Vermont Secretary of Agriculture Anson Tebbetts.

Our meeting, which took place at Conant's Riverside Farm in Richmond, was part of a two-day statewide tour for the delegation. A number of local media outlets were present for our meeting, as well as the press conference and farm tour that were part of the visit.

During our meeting, there were three main messages we conveyed:

- There's a significant need for short-term assistance-emergency funding where it's needed the most-to aid farmers in recovering from both catastrophic flooding and the effects of excessive rainfall this summer.
- There's also a significant need for long-term solutions to ensure agriculture's resilience in the face of a changing climate and other economic pressures.
- Excessive rainfall has had a negative impact on farms, as well, including crop yield and quality, livestock health, general operations, and finances.

Nearly a dozen of our members were in attendance and many of them shared their first-hand accounts of dealing with catastrophic flooding and excessive rainfall. **(cont.)**

Flooding (cont.)

Some of the common challenges they shared include:

- Losing a large percentage of their corn crop to flooding. Corn that survived may or may not be safe for livestock to consume due to mycotoxins; testing is needed to make this determination.
- Crops, including corn, are not growing well in general due to excessive rainfall. Too much water has led to poor nutrient uptake, root diseases, and molding. Farmers are anticipating that corn starch levels will be low this year.
- Not being able to cut hay for livestock feed because the ground is oversaturated. It is not possible to drive heavy farm equipment on fields in this condition.
- Because of significant crop losses, many farmers are wondering how they will feed their livestock this winter. They will likely need to purchase feed at substantial cost.
- Needing to bring heifers and cows into the barn from their pastures to protect their health. On farms that were flooded, the grass is unsafe for livestock to consume due to mycotoxins. On farms dealing with oversaturated soils, the livestock are experiencing “hoof rot,” an infection due to continuous exposure to wet conditions. And because livestock are in their barns, farmers are already using feed they had intended for the winter.
- Experiencing higher than normal levels of stress and low morale. This summer, farmers are constantly problem-solving, making difficult decisions, and feeling frustrated when they cannot work due to ground conditions. They are feeling anxious about the coming winter.

Overall, we are grateful for the opportunity to help educate state and federal officials about what Vermont farmers are facing this year. We hope we gave them a comprehensive picture showing how farmers have been negatively

impacted by both catastrophic flooding and excessive rainfall. We look forward to continuing the dialogue in the weeks and months ahead, influencing the development of short- and long-term solutions.

Featured Farmer: Cameron Clark

Riverhill Farms, Williston



Cameron and her partner Dan boil sap (courtesy)

Cameron Clark is the co-owner of Riverhill Farms in Williston, Vermont. Riverhill is primarily a certified organic dairy farm, but also includes certified organic maple sugaring, equine boarding, and trail riding. She farms with co-owner/mother Patrice, partner Dan O'Shaunnessy, and employee Wendy Manchester.

When we first asked Cameron Clark if we could include her in this Featured Farmer series, it was the dead of winter.

She enthusiastically accepted our invitation under one condition: That we save our visit for summertime. She envisioned showing us her farm when the Vermont landscape was lush and green, her herd of organic dairy cows dotting the hillsides.

We set the date for July 12. Mother Nature, we would later learn, had other plans for this day.

When Cameron awoke on July 11, she was shocked to find 75% of her pastures and fields covered in five feet of water. Around 6-8 inches of rain had fallen the day prior. The Winooski River, which traces the east side of her farm, had overrun its banks, cresting to a high of 27 feet.

Under normal circumstances, Cameron would tell you the benefits of farming near a river.

“It’s a blessing most years,” she says. “We have really good river bottom soil. It grows really good grass. It retains moisture well when we have it.”

She pauses before adding,

“Then you get the one freak event. A typical spring flood is no big deal, but this is exceptional. Very exceptional.”

CAMERON CLARK, RIVERHILL FARMS

And if anyone is an expert on what is exceptional for the area, it’s Cameron. She is the eighth generation of farmers in her family to have stewarded this land since 1835. They purchased it from Thomas Chittenden, the first governor of Vermont. It has always been a dairy farm, and for a long time, it was conventionally operated. Her family stopped milking cows in 2007 while she went back to school. Cameron decided that if she were ever to resume milking cows, her farm would become organic.

She did just that in 2012. She started with 20 cows and grew her herd internally to 50 mature cows today. All along, she has been shipping the cows’ milk to Organic Valley. In 2019, she added “grass-fed” to her label.

That is one of the reasons why her flooded pastures and fields are so heartbreaking for us to behold. To her credit, Cameron let us keep our July 12 appointment. As we wound our way up



Silt clings thick and gray to pasture vegetation

Governor Chittenden Road toward her 560-acre farm, the floodwaters had already receded quite a bit. But the evidence of their recent presence still remained. Silt clung thick and gray to all the vegetation, rendering it unsafe for Cameron’s cows to eat.

When we reached the top of the hill where the farm’s buildings are located out of harm’s way, we found the cows tucked safely in the barn. They were happily munching on hay, but Cameron, who loves her cows dearly, could tell they were missing life in the pasture.

“We need to figure out when it will be safe for them to get back into the fields,” Cameron explains. “We’re considering clipping everything, allowing the rain to wash the silt back into the ground, and letting it grow back.”

As with most things in farming, that’s easier said than done.

“The same thing happened during Hurricane Irene and I had to keep my cows in the barn for a month,” she recalls.

Cameron will also need to apply for a **(cont.)**

Cameron Clark (cont.)

variance for the grazing requirements for her organic certification. Her cows must get 60% of their dry matter from pasture during the grazing season. In typical years, this is a requirement she meets quite easily.

Other items on her flood recovery task list include fixing her formerly submerged fences, repairing her cows' underpass beneath the train tracks, and cleaning up debris.

This is a far cry from what Cameron would be doing were it not for the biblical rains. During this time of year, she would usually be creating new paddocks for cows to graze, cutting hay, spreading manure on cut fields, and maintaining fence lines with weed whacking and brush hogging.

While the months ahead are uncertain for Cameron and other Vermont farmers like her, recovery efforts will go hand-in-hand with their ongoing practices to protect water quality, support soil health, and address climate issues. For Cameron, being an organic farmer is a core part of how she tackles these goals.

The most significant thing she has done to date has been to progressively convert 100 acres of perpetual corn to perennial forage for her cows to graze.

"That's a lot of soil that has been protected," she explains. "Especially with a flood event like this, that soil didn't go anywhere."

In addition, Cameron rotationally grazes her cows. As part of this, she has changed over a lot of barbed wire to high tensile perimeter fence. On a daily basis, she divides large pieces of pasture into smaller paddocks, usually 1-2 acres in size.

"I vary the sizes depending on what the grass is doing and how much the cows are eating,"

Cameron explains.

"As I cut hay fields and need more pasture throughout the year, I'll add in acres from hay fields after second or third cut," she shares. The farm has 50 acres of permanent pasture, but by the end of the season, the cows are grazing an additional 60 acres.

The benefits of rotational grazing are numerous for livestock and the environment, alike.

"My cows are happier, healthier," Cameron observes. "They do a better job of eating what's there. The grass regrowth is good. If they're only there for a day, I try to start with the grass 8-12 inches and only let them chew it down to 4-6 inches. That way, you get a faster regrowth and it protects the soil."

CAMERON CLARK, RIVERHILL FARMS

"It also keeps more moisture in the soil—if it's a dry year," Cameron says wryly.

Rotational grazing is a significant part of Cameron's farming philosophy.

"I only want to have as many cows as my land can support," she explains. "I'm not trying to get bigger. I'm only trying to make enough feed for this size herd."

While herd health and environmental impacts are primary drivers behind Cameron's decision-making, she also factors in the human quotient.

For example, back in 2018, she made a somewhat radical move: She switched the cows to once-a-day milking, a practice she has continued to this day.

She had her own quality of life and time **(cont.)**

Cameron Clark (cont.)

constraints to consider. For the most part, she had been farming alone for many years. She found it difficult to milk her cows twice per day, complete other tasks and projects, and have a life off the farm.

She started reading up on the practice, and decided to give it a try.

"I made a plan based on where my cows would be in their lactation in winter. I wanted to start in February," she explains. "But then we had a 20-below weekend in January and I just said, 'Today's the day.'" Sometimes necessity is truly the mother of invention!



Cameron with her favorite cow (courtesy)

How'd it go?

"I only had about five cows that were upset about it," she shares. "They got over it in a few days."

Over time, Cameron has observed that her cows are happier and their body condition has improved. Initially, she lost 15-20% in production and experienced a spike in somatic cells,

but production has since returned to normal levels and her average somatic cell count is 150,000—lower than when she was milking twice per day. And, of course, the benefits for her are abundant: She has less stress and more time to get other things done.

As Cameron looks to the future of sustainability on her farm, her biggest goal is to improve manure management.

"We don't have a manure pit because we don't have just liquid manure," Cameron explains.

There is manure from both horses and cows, along with sand bedding, sawdust bedding, and hay waste. All of that gets mixed together into a semi-solid, which would not be conducive to a manure pit.

"We just purchased a side-slinger spreader that will do a better job of spreading," she says. "We don't make enough manure to cover all of our fields, so one of our neighbors comes over to spread some of theirs. We're well within our nutrient needs and loads."

For Cameron, being a good steward of the environment is about maintaining her family legacy of caring for this land.

"If you could go down there and it were not covered in water and silt? It's just beautiful," Cameron tells us. "I want it to stay that way. I want it to be productive and provide for my animals because I love my cows."

Update: Since we visited with Cameron and wrote our story, she shared some good news with us! She and her team mowed and brushhogged the areas that had been flooded. Cameron reports the fields are growing back beautifully. She hopes to get another cut of hay and use some of the pasture again early this month.



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Farmers Find Savings in the Grass with Manure Injection

Injecting manure into a hayfield or other perennial crop is a terrifying prospect for many farmers.

“Farmers work so hard to create grass ground to be smooth, level, and minimally compacted,” Ryan Carabeau of Conant’s Riverside Farm in Richmond said. “To even consider going in with a tool that is lifting, cutting, and moving stuff around...it would make the people who follow that system with the mowers just shake in their boots thinking, ‘What rocks am I going to hit? What issues am I going to have?’

For years farmers have been increasingly using manure injection equipment solely on their annual corn fields to reap the benefits of increased nutrient retention for cost savings and better yields. There are benefits to the environment, like reduced risk of odor and runoff into waterways.

“We injected ten days ago, and we got three inches of rain since, and I feel a whole lot better that I injected that manure rather than surface applied it,” Allan Brisson of Allandra Farm in Ferrisburgh shared at a recent Champlain Valley Farmer Coalition Farmers Connect meeting in Ferrisburgh.

The injector makes slots in the soil where manure is then inserted several inches below the **(cont.)**

Manure Injection (cont.)

soil surface. If rocks are turned up in the process, it's not a problem at harvest time on a cornfield because the chopper is at least a foot off the ground. But, with a perennial crop, it's a different story. Grasses can be clipped off as close as four inches.

"When you're cutting grass, you're vacuuming the field, whereas, with corn, we can carry over those obstacles," said Jed Quesnel of Richville Farms in Shoreham. "We absolutely want to implement it, but we really have to get the tools in place to do it properly...The real cost of a rock could be upward of \$30,000, and you could experience a week and a half of downtime, which might take tons of feed and make it garbage."



Allan Brisson of Allandra Farm (left) with his son Michael

But for Brisson, it's more concerning to spread manure on perennial crops like it's always been done - by broadcasting it from a tanker truck with a spreader bar from one center point across a span of 40 feet through the air onto the field below.

Brisson has been injecting manure on corn and grassland for several years and now exclusively injects nearly all the manure from his 1,000-cow dairy.

"When I see that picture of a tractor with a spreader bar, it's disturbing to me. I was talking to my brother, and I said, 'Why do we think it's okay to spread 8,000 or 9,000 gallons of manure per acre on top of the ground?' And he thought about it, and he goes, 'It's what we've been doing.'"

Brisson paused as he looked around the room at the 30 farmers and agriculture professionals who came to hear him and other industry experts speak at the Farmers Connect event.

"But there's a better way."

Benefits Backed by Science.

In recent years, UVM Extension has increased its research on manure injection on hayfields. As a result, farmers like Brisson have successfully been experimenting to make it work.

A big driver is reducing phosphorus runoff. Historically, hayfields have been considered low-risk for phosphorus runoff from erosion, a significant contributor to water pollution, because the soil stays mostly in place. Yet, erosion isn't the only reason for phosphorus loss on hay fields, and in Vermont, where there are more hay fields than annual crops, runoff can't be ruled out.

"Phosphorus doesn't move into the soil profile readily when surface applied. It will hang out on the surface, and when you have runoff, it will dissolve the phosphorus and carry dissolved phosphorus with it," Abby Augarten, UVM Extension Agronomy Outreach Specialist, shared in her presentation at the Farmers Connect meeting. "That is one mode we see phosphorus leaving the field even if there isn't any soil moving off that field."

One way Vermont regulators and

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Manure Injection (cont.)

researchers measure the risk of phosphorus losses on fields is with the phosphorus index or P index. Agronomists calculate it in any field where nutrients are applied. It provides a numerical value that sums up the risk of phosphorus leaving a field in three ways: soil erosion, dissolved runoff, or sub-surface flow, such as via a tile drainage system. When the P index is zero to 50, it's low-risk, but 51-80 is moderate-risk, 81-100 is high-risk, and more than 100 is very high. When it's over 100, farmers aren't allowed to apply any manure or fertilizer.

Augarten shared a recent modeling scenario in which UVM Extension compared what the P index would likely be after surface application of dairy manure versus manure injection. The scenario depicted a fall manure application on bare soil in between corn crops. In the example scenario, 8,000 gallons per acre of liquid dairy manure (5 to 10 percent dry matter) was applied, using book values estimated at 71 pounds per acre of P₂O₅. The surface application in the model showed a very high-risk P index.

"It's a red flag. We're going to have to make some switches to reduce that P index, so we're in compliance with regulations," Augarten said. In contrast, the P index with manure injection was low risk.

"What the low phosphorus index tells us is that when we inject manure in the soil, we're decreasing the risk that we're going to have phosphorus moving with sediment, in dissolved form, or sub-surface flows," Augarten said. "Manure injection is one way to build flexibility into your nutrient management plan and phosphorus index. While there are other tools, like increasing buffer strips or reducing the manure rate, injection is the management practice that takes it to the next level."

Augarten says manure injection may reduce the P index on hayfields, but the impact is smaller

than on corn fields, and more research is needed.

"We are still trying to capture actual, and not modeled, water quality impacts from grassland injection through rainfall simulators, but that has been less straightforward," Augarten said.

Beyond environmental benefits and nutrient management flexibility, the benefit that convinces farmers to figure out manure injection on hayfields is the savings on commercial fertilizer.

Extension research shows that 95 percent of the ammonia nitrogen from liquid dairy manure (5 to 10 percent dry matter) is available to the crop when farmers inject it in the spring or summer. When manure is applied to the surface level only, it drops to 40 percent because the ammonia volatilizes.

"That's why our nose curls up in the middle of the summer because we smell ammonia going out in the atmosphere, so if you keep it in the ground, you don't smell it, and you know you've captured it," Tom Eaton of Agricultural Consulting Services shared.

Eaton works with farmers like Brisson to create nutrient management plans to optimize crop yields and reduce environmental impacts. At Brisson's farm, he's calculated massive yearly savings in commercial fertilizer thanks to manure injection.

"Before manure injection, he was losing ammonia nitrogen, and he had to replace that," Eaton said, who calculated the annual value of Allandra Farm's manure at \$205,978 or \$21.10 per 1,000 gallons.

"If I'm losing 50 percent of that, or more, in the air, it's over \$100,000 I'm letting go," Brisson said. "This is something that we all have had in our pocket, but by the way we were doing it, we were letting it get away, at least a portion of it, and there's a way to do it and save it."

Augarten shared a UVM Extension

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Manure Injection (cont.)

modeling scenario that backed up Brisson's experience. The scenario looked at a field that requires 150 pounds of nitrogen per acre for optimal growth. The model showed manure injection of 8,000 gallons per acre in the spring/summer would provide a manure N-credit of approximately 100 pounds per acre from combined ammonium and organic nitrogen. Surface-applied manure would only provide approximately 50 pounds, leaving the farmer on the hook to fill a 100-pound gap per acre with commercial fertilizer compared to only 50 pounds with manure injection.

In addition to purchasing less commercial fertilizer, injection has increased Brisson's profitability through the farm's crop yields. He says he consistently harvests higher-quality crops from his hay and corn fields, making his dairy herd more productive and allowing him to sell excess crops.

"We went from a farm that was borderline on having enough feed to selling feed. All because of cover crops, no-till, and manure injection," Brisson said.

What About the Rocks?

It was the make-or-break question for most farmers at the discussion.

Brisson solves the problem at his farm by pulling a 41-foot, 12.5-ton roller across the 1,500 acres of perennial grass he injects manure into.

"You give it a day or two to firm up before you roll it," Brisson said. "It'll squish it right back out again if you do it too early. When it hits a stone, it will put it down, and there might be a few it won't put down, and you need to pick them up," Brisson said to the group as they chuckled about the chore of picking up rocks. "Even if you have a field where you went out when it was a little too wet, you can make that field right again without

having to reseed the whole field."

Brisson shared pictures of injected grass he had pulled up by hand. It showed a thick layer of manure under it with white roots reaching through it. Above the surface, he says the grass has a clear color difference.

"The grass is almost blue because it's getting nitrogen from manure injected in November. To me, it's an indication of protein," Brisson said.

Brisson's set-up for manure injection includes several satellite pits away from his main farm. Employees watch over manure as it's piped to remote fields instead of having to truck it. At the field, hoses connect to the manure injector equipped with 14 Dietrich shanks spaced two feet apart, pulled behind a tractor with a three-point hitch. Manure is injected at a depth of 3.5 inches. "We typically put down 16,000 gallons per acre, and it's neat and clean," Brisson said.

The Dietrich shank injector system differs from the disk injector system, often called a pizza cutter, that's commonly used in Vermont. The shank spreads manure out horizontally underground in addition to making vertical cuts.

"It's about distribution - don't expect much if you're trying to shove manure into a small crack in the ground without any horizontal distribution; that's where the Dietrich shank is starting to make more sense," Eaton said.

There are also fewer hoses to contend with in the Dietrich shank system.

"The disk grassland injector, from the mechanics of it, it's got a million hoses on it, and 14 hoses are enough to keep flowing, say nothing about a million," Brisson said.

Brisson admits his set-up isn't cheap - he's invested hundreds of thousands of dollars between the roller, the injector, draglines, and satellite pits.

A group of problem-solvers, many

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Manure Injection (cont.)

farmers attending the meeting chimed in with ways they've introduced manure injection on hay fields at their farms.

Ryan Carabeau of Conant's Riverside Farm in Richmond described how their farm took a first cutting from a hayfield, injected manure into the field, and then converted it to a corn field using no-till planting, so they didn't have to worry about the roughness and rocks.

"We'd have to modify our system and dial it in before we even considered doing this into a hay crop and continuing to leave it as a hay crop," Carabeau said.

Lorenzo Whitcomb of North Williston Cattle Company in Williston has been pulling a manure tanker that feeds into a Dietrich shank injector. Though it's harder on the tractor and the field when compared to feeding the injector with a drag hose, it's made manure injection more accessible.

Brendan Rowley of Rowley Brothers Farm in Milton, Vermont, agrees. He operates a custom manure application business in addition to working at his family's dairy farm.

"I like that it's a little bit lower pressure than the dragline system. If I get into it, it'll be small-scale. A lot of what I do is for smaller farms, and the smaller guys still need service," Rowley said.

Grants Make Accessing Tech Easier

As more Vermont farmers consider how to modify their cropping systems to reap the benefits of manure injection, several programs are available from the Vermont Agency of Agriculture to support the purchase of equipment.

- The [Capital Equipment Assistance \(CEAP\) Program](#) covers up to \$60K or 90% of the cost of injection toolbars like the Dietrich shank. The deadline to apply is Nov. 1.

- The [Farm Agronomic Practices \(FAP\) Program](#) provides \$10,000 of non-competitive funding per year to cover soil-based agronomic practices. The deadline to apply for fall practices is Aug. 1.
- The [Natural Resource Conservation Service \(NRCS\)](#) also provides funding for manure injection.

Sonia Howlett, Agricultural Water Quality Program Coordinator for the Vermont Agency of Agriculture, Food and Markets, says farmers that apply for larger grants together often do well.

"We've seen farms that are very small that have said, we are all going to cover crop and do no-till, and we've had trouble getting access to the UVM no-till drill; let's all pitch in for this one piece of equipment," Howlett said.

As with most things, manure injection on grass and other perennial crops will look different at every farm, but there's one thing these farmers all have in common: their desire to get better at what they do.

"Eventually, it's probably going to be the golden standard, and if that's the direction we're heading, it's good to learn about it now to get ahead of the game," Rowley said.

Listen: What's Happening on Farms this Summer?

CVFC's Executive Director Vijay Nazareth recently visited the 92.1 WVTM studios to talk about what's happening on Vermont farms this time of year. Vijay discussed the recent flooding, climate smart farming, and workforce development, including what the Farmer Coalition is doing to help address these issues.

Scan the QR code with your smartphone or device to hear the full discussion.



Welcome Our New Staff Member!

Brooke Small comes to the Farmer Coalition with an eye for soil-based nutrition. She completed her Bachelor's of Science in Dietetics and Food Science from the University of Vermont, but didn't see this as the avenue for change until she connected human health with soil health through her work on New England farms.



Brooke has worked in every sector of the food system from seed to slaughter to USDA policy. She is excited about connecting students and community members to the impactful work that is happening on Vermont farms and looks forward to promoting the limitless opportunities that agriculture provides.

Join Our Monthly Board Meetings

Our Board of Directors meets the first Wednesday of each month at 9:30 a.m., with options to attend in person at UVM Extension in Middlebury or on Zoom. All CVFC members are invited to attend; members of the public may join at 10:00. If you would like to attend these meetings, email info@cvfc-vt.com and we'll send you the link.

Fall Happenings!

This fall is full of agricultural events and workshops!

Stay up-to-date with the most current calendar of events by visiting <https://cvfc-vt.com/events/> or simply scan the QR code with your smart device for event details and registration information.



Annual Calendar of Funding Opportunities

Stay on top of all the latest funding opportunities for agriculture! The Vermont Agency of Agriculture, Food & Markets has a calendar available on their website so you can see all of the programs in the year to come. Scan the QR code with your smart device or view and bookmark the calendar by visiting:



<https://agriculture.vermont.gov/grants/calendar>

Thank You!

