



North Country Ag Advisor

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Cornell Cooperative Extension
North Country Regional Ag Team

CCE North Country Regional Ag Team

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"The North Country Regional Ag Team is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in Jefferson, Lewis, St. Lawrence, Franklin, Clinton, and Essex counties."

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Our Mission

"The North Country Regional Ag Team aims to improve the productivity and viability of agricultural industries, people and communities in Jefferson, Lewis, St. Lawrence, Franklin, Clinton, and Essex Counties by promoting productive, safe, economically, and environmentally sustainable management practices, and by providing assistance to industry, government, and other agencies in evaluating the impact of public policies affecting the industry."

Field Crops and Soils

Evaluating Aerial Data Access for All Corn Growers: NNYADP Research Update

NNYADP Press Release

Northern New York; April 12, 2021.

Dairy and cash grain producers in northern New York State are participating in research to evaluate if aerial imagery from drones and satellites may enable all farmers, not just those with a yield monitor, to build a corn yield database for their individual farm fields. The farmer-driven Northern New York Agricultural Development Program (NNYADP) is funding the research; Cornell University nutrient management researcher Quirine Ketterings, Ph.D., is the project leader.

A large regional database has been established as a result of the comparison of yield monitor data provided by regional producers and Champlain Valley Agronomics with drone and satellite imagery data. The project's latest report is posted at <https://www.nnyagdev.org/index.php/2020-nnyadp-projects>.

"The estimated yield maps developed in 2020 on northern New York farms using aerial imagery data from unmanned drones and satellite systems showed promising results, demonstrating the potential to use imagery for mapping yield without the use of yield monitors," Dr. Ketterings said.

The desired outcome of this research is to develop a standalone tool that uses aerial imagery data to automatically generate corn grain and corn silage yield potentials and yield zone maps for individual farm fields. These maps will help farmers to more precisely allocate manure, fertilizer, and seed resources, and to enhance cost-effective agricultural environmental stewardship. "Not all farms can afford yield-monitoring equipment. If images obtained with unmanned aerial systems can consistently be used to accurately estimate corn grain and silage yields, we can design an approach to give all corn growers access to reliable yield data without the use of that equipment for developing farm-specific yield stability zone management," Ketterings noted.



Cleaned yield monitor data (left) visualized after processing and cleaning and the estimated yield map (right) from satellite imagery and digital elevation model from a grain field evaluated in NNYADP research field trials. Images courtesy of Q. Ketterings.



Funding for the Northern New York Agricultural Development Program is supported by the New York State Legislature and administered by the New York State Department of Agriculture and Markets.

Filed Under: [News & Press Releases](#)

Improve Pastures and Hay Fields by Overseeding Perennial Forage Grasses and Legumes with a No-till Drill

By Kitty O'Neil

Spring is here and it is time to seed, or overseed, perennial grass and legume stands for hay and pasture production. Across the North Country, our fields are mostly dry enough for soil preparation and seeding of these cool season species. We generally recommend a May 1st to 15th window for this operation, but earlier is okay too in a spring like this one, when fields are dry and no torrential precipitation events are expected. We have always worked toward preparing a fine and firm seedbed for successful forage seedings, but more farms are making no-tillage seeding successful too – whether to improve an existing living stand, or a new seeding planted into a killed sod. Spring forage seedings typically find more soil moisture than late summer seedings and also yield better in the seeding year.

Many farms continue the traditional forage seeding method of dropping or drilling seed at a shallow depth into a well-prepared, fine, and firm seedbed. These shallow seedings are typically rolled afterward to maximize seed-soil contact for optimal and uniform germination and establishment. No-till drills permit forage grass and legume seed placement into existing pastures and hay fields, or establishment of a completely new seeding following harvest of a row crop, with less soil disturbance and less fuel consumption than conventional planting methods. The no-till approach eliminates the need for plowing or disking, minimizes soil loss from erosion, and protects soil structure and health. No-till seeding also conserves soil moisture and limits surface water run-off, and requires fewer field operations. Because of these advantages, no-till seeding has become a popular method for seeding forage grasses and legumes in some different situations. All seeding methods result in better establishment if soil fertility and pH is addressed first.

1. Improve existing, living hay field or pasture by drilling in supplemental legume and/or grass seed.

Pastures and hay fields can become low-yielding over time as soil fertility declines and weeds and less productive grasses increase in number. More desirable species may be overseeded with a no-till drill to improve the stand. Some clover species can be established with frost-seeding in late winter or early spring, but we are past that window now. Alfalfa and most grass species establish better with drilling. For good establishment, competition from the existing stand must first be reduced by mowing or grazing closely. Alfalfa may not establish as well as other species with this method. Species and yield improvements are typically less dramatic



with this approach, as compared with a complete termination and reseeding. An overseeding approach does not limit seeding year yield as severely, however.

II. Kill an existing sod and reseed without tilling.

As an alternative to overseeding a living hay or pasture stand, the field may be completely killed and reseeded. In this case, the existing sod is normally killed with a broad-spectrum herbicide such as glyphosate or a mixture to address specific weed pressures. This approach works best in late summer/early fall and in late winter/early spring to avoid peak weed competitiveness. August is a good time to seed forage grasses and legumes in a killed sod if soil moisture is sufficient. This leaves ample time for seedling development before first frost. A small grain nurse crop can be used along with a late summer/early fall planted forage, also.

III. Plant a new forage seeding following a row crop.

In this situation, a grass-alfalfa or grass-clover stand is planted into a corn, small grain, or soybean stubble during the same spring or late summer forage seeding windows. A no-till drill is a very effective way to plant grasses and/or legumes without soil disturbance in the early spring, or to plant cover crops or forages in the fall. Be aware of residual herbicides used in the preceding crop. Spring applications of various triazine-type chemicals can injure legume seedings in the following fall, or even in the following spring.

Across these three scenarios, following a few rules will help the success of a forage seeding.

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1. Soil testing prior to seeding is always a good idea. It can be difficult or impossible to establish or improve stands when soil pH or fertility are not within acceptable range to support seedling establishment and productive plant growth. Sample soils after crop removal in the fall or before planting in the spring. Apply lime and fertilizers according to soil analysis recommendations. Ideally, lime needs to be applied 6-12 months before seeding to allow adequate time for pH effect, but there is no time like the present if it's needed.
2. Minimize competition from existing sod or crop. Prevent weeds or existing forage plants from competing with new seedlings. Seedlings will not compete as well if they are well-shaded. Drill new seed just after mowing, grazing, or herbicide application to reduce competition. Mowing or grazing combined with herbicide application can be the most effective way to eliminate all competition from existing plants and weeds. Allow the old stand to 'green up' slightly after mowing or grazing and before herbicide application for good results. After seeding into an existing pasture or hay field, periodically graze lightly or mow to favor the growth of new seedlings.
3. Seed at the proper time. No-till seeding can succeed in late winter, spring, or in late summer and fall, depending on objectives. Plan and prepare to ensure planting within an optimal window of time to match your objectives. Avoid seeding perennial forages during late May, June, and July to give them the best chance of establishment while minimizing weed pressures.
4. Properly adjust, calibrate, and monitor your no-till drill. The no-till drill is designed to plant seeds in an unprepared, uneven, residue-covered soil, or in sod. Despite the imperfect seedbed, the drill is equipped to open a furrow, place seed ¼" to ¾" deep, and cover and firm the soil over the seed without causing compaction. For good establishment, the drill must be equipped and adjusted properly, especially for small-seeded legumes and grasses. No-till drills are heavy, and are usually equipped with heavy frames and with fluted coulters and openers in the front to move residues away, cut into the sod, and leave a furrow for seed placement. Downward pressure on the coulters is adjustable, to provide adequate force to cut through cornstalks or sod, and also to trip and reset when rocks or other obstructions are encountered. Avoid allowing residue or debris to collect or bunch up in front of the coulters – residue can get pinched down into the furrow which will impede soil-seed contact.

with row-crop planters, so begin planting, but stop occasionally to check seed placement and make adjustments if needed. Measure the depth of the firmed soil over the seed behind the closing wheels. Most forage species have relatively small seeds and do not emerge well when planted deeper than about ½". Placing seed too deeply is a common reason for emergence and establishment failure. Another cause of poor establishment is poor seed-soil contact in the furrow, if furrows are not closed well.

Ideally, drill calibration should be performed for every different lot of seed. Seed from different lots and species vary in size and shape and will flow through the drill at different rates. Follow the drill manufacturer's procedure for calibration. Seeding rate charts printed on the drill or in the manual are just a starting point for settings. Most drills are equipped with 2 sets of seed boxes and both should be calibrated separately. Some drills are equipped with a special crank to allow calibration in-place. Other drills must be calibrated by 'planting' a short distance in the driveway and weighing or counting seeds dropped on the ground or into cups. Before calibrating, know what the target seeding rate is for your forage species and situation. The seeding rate is simply the amount of seed planted per acre. You will need some equipment – a small balance or scale, some cups or bags to catch seed from the drop tubes, and a measuring tape. Here are some necessary equations:

$$\text{Seeding Rate} = \frac{\text{Amount of seed}}{\text{Area planted}}$$

$$\text{Area planted (acres)} = \frac{\text{Seeder width (feet)} \times \text{travel distance (feet)}}{43560 \text{ square feet per acre}}$$

Seeder width is the measurement across the drill and travel distance is the distance the seeder traveled on the driveway or field to drop seed into cups. See <http://www.ricetec.com/Toolbox/grain-drill-calibration> for a good video illustrating one way to calibrate grain drill. This fact sheet describes another method: http://www.uaex.edu/Other_Areas/publications/PDF/FSA-3111.pdf.

5. Use high quality, well adapted seed. Choose forage species and varieties that are well-suited to the Northern New York climate, to your specific soil types, and to your specific needs. Check the seed tag and be sure to choose seed with a high germination percentage and purity and low percentage of other undesired seeds and inert material. Adjust your seeding rate to compensate for the

Depth control is often not as precise with a no-till drill as

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percentage pure live seed listed on the tag. The lower the germination rate, the more seeds you will need to plant.

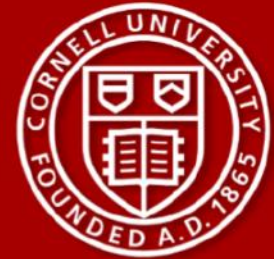
The Soil and Water Conservation District offices across the North Country have no-till drills to rent, or they can often help to pay a custom operator to drill forages for you. Contact CCE or your local SWCD office to inquire about their support services for no-till planting.

Additional Resources:

- Cornell Field Crops website. <https://fieldcrops.cals.cornell.edu/forages/planting-perennial-legumes-and-grasses/>
- Cornell Forages.org website. (Species selector tool is non-functional.) <http://www.forages.org/>
- Schuster, B., Q. Ketterings, K. Czymmek J. Cherney, J. Degni, K. Ganoe, and J. Lawrence. 2019. "Restoring Perennial Hayfields", Factsheet #109. Cornell University Nutrient Management Spear Program. <http://nmssp.cals.cornell.edu/publications/factsheets/factsheet109.pdf>
- Hunter, M. and J. Lawrence. 2020. "Weed Control in Grass Hayfields". https://nydairyadmin.cce.cornell.edu/uploads/doc_872.pdf
- Cornell Guide for Integrated Field Crop Management. 2021. J. Thomas-Murphy, ed. <https://www.cornellstore.com/product/188581?location=&quantity=1&size=83>



Calf Barn Ventilation Program



Join us for a free on-farm demonstration (including fogging the barn) and discussion about the importance of adequate calf barn ventilation and the impacts ventilation has on calf health and performance. This program is applicable to any sized dairy farm, and any type of calf barn ventilation system.

Presenters Include:

- Tim Terry, Cornell PRO-DAIRY
- Lindsay Ferlito, CCE NCRAT
- Casey Havekes, CCE NCRAT

*** Everybody in attendance must wear a mask and socially distance ***



Registration: FREE and limited to 20 people each day

https://ncrat.cce.cornell.edu/event_preregistration_new.php?id=1597

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Cornell Cooperative Extension is an employer and educator recognized for valuing AA/EEO, Protected Veterans, and Individuals with Disabilities and provides equal program and employment opportunities.

July 27, 2021
12:30pm - 2:30pm
Stauffer Calf Barn
Ferris Road
North Lawrence, NY
(just around the corner from
main farm on Co Rd 54)

July 28, 2021
12:30pm - 2:30pm
Beller Calf Barn
State Route 126
Carthage, NY
(3 miles NW up the road from
the main farm)

COVID-19 Disclaimer:

This program will adhere to all NYS and Cornell University COVID-19 safety guidelines including social distancing, mask wearing, and hand sanitizing. If guidelines change and limit in-person gatherings, this program will be postponed until it is safe.

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607-592-0290

Utility Scale Solar – What You Should Know

By Tim Terry, Cornell PRO-DAIRY

In March of 2020, Gov. Cuomo announced in his State of the State address an ambitious goal of 70% of the state's electricity needs would be generated via renewable means by 2030. Under this Green New Deal, the mandate increases to 100% by 2040. As a result, coal-fired plants will be idled while more wind and solar projects will be initiated. For you, as a holder of large tracts of open land, that may mean that you will be visited by landmen seeking to lease all or a portion of that land to use for constructing a solar array. Understand, this is not a couple dozen panels up on the barn roof generating a few kilowatts, but acres of panels on the ground generating several megawatts of electricity. This is not necessarily a bad thing as it reduces carbon emissions and may provide a secondary income stream for you, especially if it is placed on marginal land or land not currently in productive use. That said, in order for this to be a benefit and not a detriment you need to go into it with your head up and your eyes open.

Therefore, Basic Information

Understand that this is an industry in its infancy, and lease documents are not battle tested so don't sign any landman's forms as is. There is potential for many unrealistic provisions and expectations, and almost everything is fair game for negotiation with few, if any, "deal breakers". You will need professional legal counsel. You may be able to educate yourself on understanding the broad strokes of a commercial lease, but here the devil is in the details and is why you need an attorney.

This transaction is a commercial lease, but it's a lease on steroids and may be 50-70 pages long. It is at a higher level of sophistication than any ag tenant lease, utility easement, or right of way (ROW). There will be permanent structures built that do not become fixtures owned by you the landlord. Part and parcel of the lease is a solar easement on the surrounding acreage which means you can't do anything that might interrupt the flow of sunlight. So that means no tower silos, large grain bins, tree plantings, etc. upstream of the incoming sunlight. Unlike the gas lease there are no royalties or subsurface rights.

The tenant (solar company) has some unique needs to understand. The structures have greater requirements for access, maintenance, and transmission than other utility operations. The income stream from the structures is used as



Photo credit: T. Terry

collateral to obtain financing, and the tenant's ability to continue operations on your land cannot be interfered with by anyone holding a superior interest in the land (i.e. - mortgage). You may need to subordinate superior liens. All lease documents will be recorded with your deed.

Go into this with the understanding that this is a long-term (>40 years) business relationship. The structures mentioned above may be sold multiple times. The tenant has the ability to assign (transfer) the lease without your approval, and this is non-negotiable. Given this, there is likely to be several tenant changes over the life of the lease (likewise, there could be landowner changes, too). The presence of a solar array may also affect the marketability of your property which could impact your heirs.

The property tax liability should be a shared responsibility with the tenant paying for the increase in the assessment. You will need to make sure the tenant maintains liability insurance and names you as a co-insured. This is for your protection. They should also furnish you with a Certificate of Insurance (COI) each year, as well as indemnify you for any costs, losses, liabilities, etc. that arise from their activities. This must be all encompassing. At some point in time the agreement and the array will reach its end of life. The structures age, are superseded by a new technology, you or your heirs do not wish to renew, whatever. The decommissioning, or removal and restoration, of the site is important and must be negotiated and established in detail upfront even though it may not occur for decades. You may not even be dealing with the same people that originally signed the lease. A Decommissioning or Performance Bond is one way of making sure there is funding available to get the

Continued on Page 9...

job done to the satisfaction of the specifications originally negotiated. The exact nature of the bond is hard to determine, but this is where it makes sense to consult an attorney.

The Agreement

The agreement comes in two parts: the Option Agreement and the Lease agreement, but even before that you may be presented with a Preliminary Letter of Intent. This one-page document is basically a non-disclosure agreement or confidentiality clause so that future terms, especially the financial compensation, are not disclosed to others. Sometimes these letters omit that disclosure is allowed to attorneys, accountants, financial advisors, family etc. -- so make sure that is in there.

The Option Agreement (10-12 pages) locks in the land for a due diligence period of 1-5 years while the solar company decides if they want to develop the site. You will receive some payments during the period to secure their development rights, access to the site, and your confidentiality. This gives them time to do a more thorough feasibility study including a title search, legal survey, distance to grid connection, and neighboring land availability. They are trying to determine the viability of development - financial and otherwise. No ground will be broken at this time, except for some soil borings, and they will bear all the costs. You may still farm the land during this period, but no development. In other words, no new home site, heifer barn, satellite manure storage, etc. on the optioned property. The Lease Agreement - a.k.a. Ground Lease (50-70 pages), shows up when the solar company decides to develop the site. You will be sent a copy of the agreement to sign within a specified period. You have no chance to renegotiate at this time so don't sign the option agreement without also negotiating the entire lease agreement.

Negotiating

Some of us are good at animal husbandry, others are good at crop production, and still others excel at ag engineering. It's a rarity, however, that any have successfully negotiated a commercial agreement as intricate as a solar lease. This is why you need to secure professional legal help. Start with your own attorney. If they're not comfortable with it ask them who'd they least like to go up against in court. Look for someone experienced with real estate contracts, land acquisition, or better yet, oil and gas leases. Even though your attorney may do all the talking there are some things you need to know or at least consider:

1. Understand your bargaining position - They have to have the land, and until you sign an agreement you have all the

leverage. Unfortunately, you have little or none after signing so get it up front. It's best to think about this in the long term - not just the immediate benefit.

The lease will often be presented with a sense of urgency, perhaps even as a crisis. This is nothing more than a marketing technique. Landmen / leasing agents want to make the sale. The first offer is not their best offer (Negotiation 101 - Never begin a negotiation from a point you can't immediately abandon). Ask yourself, "Is this the only offer I will get?", "If one developer is interested will there be others?", "Can I walk away?", "Which terms are flexible, which are not?". Offers may range from X to 10X and is likely due to the number of middlemen the lease may have to go through. Proximity to existing infrastructure - high voltage power, lines, substations, facilities to be built - may also be a factor. Cost to construct a substation is considerable, so if you're located less than two miles from one your site may garner a premium.

You may be thinking, "Why don't I just develop this myself?" According to the Pennsylvania Dept. of Environmental Protection, a solar array requires an average investment of \$1.13M per megawatt for utility scale solar. Think about that for a minute.

There is a deadline and offers do get retracted, so be deliberate but don't dawdle.

2. Determine what you want and/or what you want to prevent. Do this before seeing your attorney as it will help them help you. Think: What will this look like when it's operational and over the next 40 years? What's important to me? Thought through the finances? What will and won't you allow? Do you want to protect natural structures - pond, lakes, creeks, etc.? Are there places you don't want solar panels and/or ROW's? Do you want to grow or do something under or between the rows of panels? Every property is unique. Describe specifically what you want to go into the option.

Many leases don't specifically state 40-50 years, instead they are written for 10 or 20 years plus a series of 5 year options. Option period payments tend to be small because it's a period of highest risk for the developer. Can you get more money? Try bargaining for more money or less time to develop - real money is when it's operational.

Critical in any long term leasing agreement is to build in an escalator - dollars have to keep pace with inflation. What

Continued on Page 10...

initially looked like the gravy train could, over time, only buy you a cup of coffee. Use the government inflation statistics as the escalator. This is typical of commercial rental agreements so you shouldn't get any push-back from the developer.

3. Don't assume you can do things that are not written in the lease agreement. Include in the initial negotiation or via addendum. The guy who sits down on the back deck and tells you all the nice money you're going to make and what a wonderful person you are and how this is going to be a great thing -- once you sign the lease you'll never see him again. Instead, you'll be dealing with someone who has the company's best interest in mind and, quite possibly, an attitude, too. It doesn't matter if it wasn't written down. It is a bitter pill to swallow, but realize that while you still own the land you won't be able to use the land. The chain link fence and barbed wire sends the message that no one, not even the landowner, is welcome in there. Grazing cattle, growing crops, setbacks, even placement of panels and control units need to be delineated up front. You will need to specify continued access to the back 40, pastures, water sources, or the secret fishing hole.

4. Understand the duration of the lease. Basic math here: Option + Construction + Operations + Renewals = Duration of the Lease. The option period may be as long as 4-5 years with very little money coming in. There is usually little or no breakdown of the various categories in the lease except maybe renewals. Options periods range from 30 - 60 months, and it may be in your best interest to push for lower - the sooner they start paying you the real money the better. A Memorandum of Lease document will be recorded on your deed in courthouse.

5. The option agreement is their option not your option. They can pull out at any time so don't spend the lease money before you have it. However, don't think you're going to get out of it if you change your mind. Depending on how it's written, by signing the option agreement you are also signing the lease agreement - this is where your attorney earns his/her keep. You may not have your land developed after you sign a lease. You can't get out of it or amend it after you sign. They may option all of your land, but only use a portion of it. You may be able to push this with the solar company, i.e. - they have to use a minimum percentage or release the remaining acreage.

6. Know how to modify your lease. Step 1 - find an attorney (see #1). Legal contracts require legal help. Answer the long term questions upfront. Get what you want in writing before signing the lease as changes are not possible afterward. Shorten the option period and/or increase the

option money. You may unknowingly be agreeing to a Warranty of Title thereby indemnifying the solar company. As landowner you are guaranteeing that you have perfect, blemish free ownership of the property, but that is not usually the case as there may be other leases, originated generations ago, that are still in effect today, such as utility ROW's, conservation easements, FSA/NRCS administered programs, subsurface rights (oil, gas), etc. There may be some long hidden environmental hazards that come to light during installation. If you indemnify the solar company, you are essentially giving them a blank check. Curtail this as much as possible. Lease offers usually have some flexibility.

7. Be clear on when, where, and how you will be paid. After you've done your due diligence and have settled on an offer be clear that you are not giving them anything for free. Even water used for cleaning and maintaining the panels. Get paid for any access they will be restricting. Getting paid for ALL acres used including access and ROW's not just the solar field itself. Be sure that they will maintain any ROW's - keeping brush and noxious weeds trimmed. You'll want the payment terms to be clear and concise. There are many different arrangements on the options. Sometimes payment is upfront, sometimes there is a modest upfront plus annual payments. You need to specify defined dates, i.e. - "Need to have a check for this amount on this date or solar company is in default." Define what happens if payment(s) are missed - are you free and clear from the lease, how will back payments be recouped?

8. Things that are written count, things that are spoken don't. Once you sign the option you will never see the landman that originated the lease option again. You will likely be dealing with an entirely different person and/or entity, or even their attorneys. Avoid falling for "that doesn't need to be in there", or "everybody knows that's ok" statements. Get all the promises in writing. If it's important to you it has to be in the agreement. Even down to minute details - such as herbicide use especially on an organic operation. These leases are so new there is no track record and procedures have not been standardized. Define who, when, and how the site will be maintained. What happens if a water line or drain tile is cut during construction - who pays? How will it be repaired? There may be shared farm lanes, but who will maintain them? Get it in writing!

9. Things your neighbors may not like. Fences limit hunting. Arrays may detract from their views. Local zoning may exercise some limitations. You may have already leased out part of that land for another ag enterprise; this should be

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recorded on the lease. What will happen to these things following construction? For instance, will the array interfere with maple sap harvesting? Will part of the sugarbush be removed to accommodate the array? Will there be light intrusions from security lights? How will the grounds around the facility be maintained vis-à-vis weeds, grass, litter caught in the security fence, etc? What visual screening will be provided around the site? The last thing you need is to be regarded as a slum-lord and/or someone who sold out the charm of the community for a few bucks.

10. Not all info on the internet is good info. Some is very good, some is conspiratorial, most is somewhere in between.

Parting Thoughts

Site plans may/may not be required. These are usually not a condition of the option but may be required for the lease. Decommissioning and land recovery - bargain for the maximum amount of clean-up and removal, and remedies if they don't. This is often addressed by a performance bond secured at, or prior to, signing of the agreement.

Determine the remedies and disposition of the lease if the solar company is liquidated. You don't want or need the responsibility of remediating the site. Sure, much of the galvanized steel structure may look pretty appealing, but the panels may be considered hazardous waste requiring special disposal and a hefty tipping fee. Plus it needs to be properly disconnected from the grid.

This may affect Land Trust easements and or any "clean and green" status. Often if 50% or more of the power generated is used internally it is not a problem, however, this is not likely for an industrial sized project. Any roll back taxes should fall to developer.

As stated earlier, securing legal services is a must not an option. Figure on 10-12 billable hours, or more, depending on how complex the lease may be.

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Dystocia and Difficult Calvings: A Perspective from Dam and Calf (Part 1)

By Casey Havekes, and Betsy Hicks (Dairy Specialist, South Central NY Dairy & Field Crops Team)

Dystocia is defined as an abnormal or difficult time during birth, at any stage of labor. A 2007 National Animal Health Monitoring System (NAHMS) study of calf loss in North America showed that 15.9% of calves died before weaning, and 8.1% of these deaths were from problems during calving and in the first 48 hours of life. We know that difficult calvings are hard on the dam, but from this we can infer that difficult calvings also negatively impact the calf. Calf vitality can be defined as the capacity to live and grow with physical and mental energy and strength, and we know that the physiology and behavior of a newborn calf is impacted by low vitality. It is estimated that dystocia has a cost of \$400 million to the dairy and beef industries in the US annually, with the costs including losing the dam and/or calf, dams being culled earlier, producing less milk and rebreeding back more slowly, as well as calves being more susceptible to disease and growing more slowly.

In this 2-part series, we will discuss dystocia from the dam's perspective in Part 1, and from the calf's perspective in Part 2. The information shared below was originally shared as part of Cornell Cooperative Extension's Critical Calf Care series. You can find links to the recordings by clicking [here](#), and supplemental materials by clicking [here](#).

Dystocia can occur as a failure in any one or more of the three main components of calving – expulsive forces, birth canal adequacy, or fetal size and positioning. Causes for dystocia can be broken up into three main categories – proximal causes (things that present themselves at calving), intermediate causes (things leading up to calving), and ultimate causes (the main reason for dystocia) (Mee 2008). Attributes of a difficult calving might present as a uterine

torsion, abnormal position of the calf, or a disproportion of the calf to the birth canal. Intermediate causes can be diagnosed as longer gestation length, nutritional causes such as hypocalcemia or stress around calving. Ultimate causes can be attributed to gender of the fetus, multiple fetuses, or fetal abnormality, as well as parity, breed of sire or dam, season, nutrition of dam, region, disease presence, history, and interactions between all causes. The most common type of dystocia seen is fetal size and positioning, with the most important risk factor for dystocia being calf birthweight. Birthweight can be influenced by many of the ultimate causes formerly mentioned.

To help identify when the dam may be in need of help and may be experiencing dystocia, it is important to know the three stages of parturition. Stage 1 involves changes that may or may not be visual cues to an observer. The cervix starts to dilate 4-24 hours before birth, and pelvic muscles around the tailhead start to loosen. The cow may have increased activity, and mucus may be present. Stage 2 is what people normally think of the calving process – first the water bag and amniotic sac appear, then the calf's two front feet and a nose should appear. The dam should be making visible progress every 15-20 minutes, and 1-2 hours after the start of Stage 2, the calf should be born. Stage 3 includes the expulsion of the placenta, which involves contractions and should occur 4-24 hours after the birth of the calf. Identifying which stage the cow is in may give cues as to what issue a cow may be facing during labor. Each farm should have specific protocols for timeframes to check for problems with calving, and how to give assistance to the dam, if needed.

If assistance is needed, there are a few things to keep in mind. First, the person assisting the birth should assess the problem.

- Is the calf positioned correctly?
- Is the cervix adequately stretched?
- Is the uterus twisted or normal?
- Is the calf appropriately sized to fit through the birth canal?

Assuming these questions are answered, likely the birth can be assisted with minimal issue. If they aren't, or the answers aren't clear, a call to the veterinarian is never a bad idea. If assistance is given, remembering some key things will ensure the best outcome for both the calf and dam.

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Photo credit: L. Ferlito

Cleanliness, proper chain placement on the calf's legs, lubrication, proper force without using too much force, and pulling during contractions are all important factors to keep in mind when assisting a birth. Figure 1 shows the proper chain placement on a calf's legs to ensure minimal stress to the calf when being pulled.

Retaining records on all births is recommended, but especially so for dystocia births. These records can be used to give prioritized care to both dam and calf after the birth. Things to note in records include: cow ID, person assisting, date, calving ease score, calf ID, results, and notes on dam and calf. For more information on record keeping, please refer to Episode 3 of Critical Calf Care (click [here](#) to access the recording).

According to 2007 NAHMS data, severe dystocia impacts 6.8% of heifers and 3.5% of cows, and mild dystocia impacts 11.8% of heifers and 7.3% of cows. With that in mind, we know dystocia and difficult calvings are inevitable; however, understanding the stages of parturition and being prepared for recognizing signs of distress during calving are critical components of helping both the dam and calf through a difficult birth.

Part 2 will discuss the impact of dystocia on the newborn calf and strategies for the producer to use to give the best quality of care to dystocia calves. If you have dystocia problems on your farm, please reach out to one of us (Betsy Hicks: bjh246@cornell.edu; 607-391-2673/Casey Havekes: cdh238@cornell.edu; 315-955-2059) and we can help you troubleshoot this challenging area.

FIGURE 1 Place a loop above and a half-hitch below the fetlock joint, with the connecting chain on the top of the leg

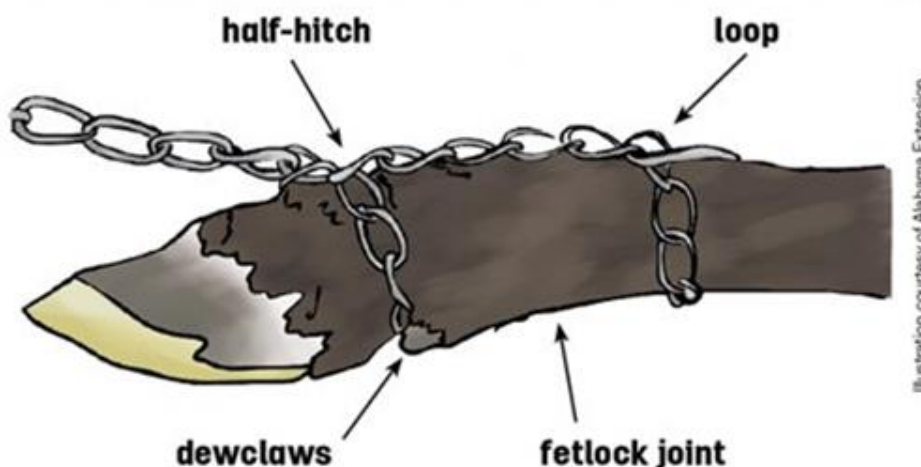


Figure 1. Proper chain placement on a calf's legs (courtesy of Alabama Extension).



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Disease Prevention to Reduce Antibiotic Usage: On-Farm Perspectives from CNY Dairy Producers (Series Part 2)

By Christine Georgakakos, Cornell University Department of Biological and Environmental Engineering, and Betsy Hicks, CCE South Central NY Dairy and Field Crops Program

This article is part of a series, written from a peer-reviewed article entitled “Farmer perceptions of dairy farm antibiotic use and transport pathways as determinants of contaminant loads to the environment” published in the *Journal of Environmental Management* (<https://doi.org/10.1016/j.jenvman.2020.111880>). The work focused on twenty-seven interviews of dairy farmers in Central NY March through October of 2019, completed and summarized by the authors. Eight of the farms included managed their farms according to USDA Certified Organic standards, and the remaining nineteen farms managed their farms conventionally. Farm size ranged from under 50 mature cows to over 1000 mature cows. This series talks about the nuances between farm size and management, specific to findings interesting to the dairy farmer. This article highlights farmer perspectives of antibiotic usage on-farm as well methods farmers use as a means for disease prevention.

Disease Prevention

Many dairy farmers know the truth in the saying, “an ounce of prevention is worth a pound of cure”, and manage their herds in such a way as to keep their cows healthy rather than having to treat sick cows. Not only does disease prevention keep herds healthy, it also minimizes antibiotic usage. Farmers we interviewed discussed three main ways of keeping their herds healthy as related to reduction in antibiotic usage: vaccination and immunity, cow comfort and facility conditions, and attention to nutrition at every stage of life. Our interviews with dairy producers highlighted similarities in terms of disease prevention, no matter farm size or management system.

Vaccinations and Immunity

Farmers in every management system we interviewed discussed vaccination as a powerful tool for disease prevention. One organic producer stated, “we try to find, do everything possibly under the sun, to prevent ... that’s the key, how to prevent all these issues”. Similarly, a large conventional farmer noted that intensive, farm-specific vaccination protocols were key to using less antibiotics, stating, “When we were 100 cow farm, we would probably treat more cows with [antibiotics] than we ever do now. It was, in years past, it was a more reactive thing. Cows are sick,

now the bigger your farm gets, you tend to be more ... proactive ... so you tend to worry about your vaccines, and making sure they’re all in line”.

Newborn calf immunity was also seen as a major avenue to prevent disease and minimize antibiotic usage. Colostrum feeding to newborns was discussed among all farm categories. One conventional farmer explained: “A baby is going to get her first couple months of immunity from that colostrum. If you collect it right and you give it to them in a timely fashion, and you give them enough ... they’re going to get their immunities from there because you can’t really vaccinate a calf and have their immune system ready to respond to that vaccine until three/four months of age.”

Cow Comfort and Facility Conditions

Another unifying theme we found among farmers was the belief and practice of using cow comfort to maintain good animal health – whether it be through barn design, flooring material, or minimizing stress. One farmer in our study said: “Give them the best you can give them to eat and keep them comfortable with good air”. Baby Boomers especially commented on minimizing stress as an important factor, and one farmer commented that, “you know, it’s kind of like people. You hear about people getting sick and their doctor says, ‘You need to quit your job. There’s too much stress.’ And then they just start feeling better. Well I think it’s the same with cows. When you’re not pushing them for production”. One Gen X farmer talked about minimizing stress: “we just like them to be cows. I hate doing anything to them that I don’t have to do”.

Analyzing and improving facility conditions in terms of cow comfort was mentioned among all categories of farmers. Some farmers stated, “if we have a lot of mastitis issues ... is everything clean? Is there an issue in the equipment? And then in the barn where the cows lay in the stalls, liming the stalls, keeping everything nice and clean and dry”. Ventilation and keeping the cows’ environment clean were a main focus for many of our conversations around disease prevention.

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Nutrition

Fresh cow nutrition and care was frequently referenced by farmers to help prevent disease on their dairies. Across categories, farmers noted that this stage required more attention, with an increased need for treatments (both antibiotic and non-antibiotic) as compared to the rest of lactation.

Treatments referenced across management scales included calcium bolus, drenching and giving vitamin supplementation. Conventional farmers were more likely to mention these practices as an alternative to antibiotics than organic farmers. Probiotics were also widely referenced as being a supplement for fresh cows across management.

Calf care also appeared to be a top priority for farmers across all farm categories. *"The calf stuff has been a really big deal in terms of preventative stuff, and in terms of treatment"* was a common perception we heard. Improving calf immunity through colostrum, vaccination, and probiotics was often discussed. One farmer stated, *"Every calf gets colostrum. If it's born at 11 o'clock at night, I stay up with that damn calf, and it gets colostrum,"* highlighting the importance farmers put on making sure calves get the care they need.

The Dairy Industry Unified

Ways to achieve herd health may differ among farms, but there are many common themes across the industry on how farmers view disease prevention. Noting these commonalities is a way to share to the public that the industry is working towards healthier herds and less antibiotic usage every day. These disease prevention actions and others ultimately lead to reduced antibiotic usage on farms and reduced risk of antibiotic residues and resistant bacteria in the environment.

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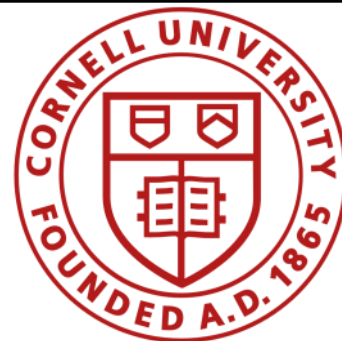
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The Pesticide Management Education Program (PMEP) at Cornell University is pleased to announce the availability of the *2021 Cornell Guide for Integrated Field Crop Management*.

Written by Cornell University specialists, this publication is designed to offer producers, seed and chemical dealers, and crop consultants practical information on growing and managing field corn, forages, small grains, and soybeans. Topics covered include nutrient management, soil health, variety selection, and common field crop pest concerns. A preview of the Field Crops Guide can be seen online at <https://cropandpestguides.cce.cornell.edu>. Highlighted changes in the *2021 Cornell Field Crops Guide* include:

- Revised pesticide options for economically important field crop pests.
- Updated corn, forage, and small grain variety trial and research data.
- New information on barley disease control.
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Cornell Crop and Pest Management Guidelines are available as a print copy, online-only access, or a package combining print and online access. The print edition of the *2021 Field Crops Guide* costs \$32 plus shipping. Online-only access is \$32. A combination of print and online access costs \$45 plus shipping costs for the printed book.



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Cornell Guidelines can be obtained through your local Cornell Cooperative Extension office or from the Cornell Store at Cornell University. To order from the Cornell Store, call (844) 688-7620 or order online at <https://www.cornellstore.com/books/cornell-cooperative-ext-pmep-guidelines>.

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What's Happening in the Ag Community

*Due to COVID-19, there are some restrictions for in-person work and programming.
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Calf Ventilation Program, see page 7 for more information.

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