Bringing Profitable Conservation Practices to Dairy

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Meadowbrook Dairy Inc.

-5th generation
-Dairy, beef, row crop
-100% no till with cover crops
-Manure, nutrient, irrigation management
-Custom no till planting, cover crop seeding, and manure hauling
-Direct beef sales to consumers

Wind erosion

Conventional farming

No till with cover crops

Water erosion

Conventional farming

No till with cover crops

New form of erosion

Equity erosion

Why we decided to change…economics

-Burning through good equity
-We were running out of cash flow money
-Yields were on decline
-Livestock health was degrading
-Bought out a bad business partner
-My dad wants to retire
-Labor issues
-Our current system was not working

Tighten your belt…grampa had a welder

Driven by determination to save the farm

Winter 2016
-I attended a farmer workshop and at lunch I met and visited with a farmer who has been strip till since 1985. He converted a 6 row Deere planter and put strip till coulters on and used dry fertilizer boxes for nutrient banding. He was going to sell it to me for $1,500 to start small scale

-Told the great news to dad and he told me “not a chance”

-Spent the remaining time of year researching strip till and no till. I needed more proof and data to get permission to buy the cheap strip till to experiment

Spring 2017

-January/February we talked as a family and agreed to have 400 acres custom no till drilled to try and see what happens!

-Conventional planted 100 acres of beans ourselves

-Harvest time saw no yield difference between conventional planted and no till planted beans

Spring 2018

-We spent $22 an acre custom seeding total $8,800

-We invested $4,000 into our planter to be able to no till soybeans

-Purchased spiked closing wheels and cast gauge wheels for row cleaners. Pulled pin out and made floating row cleaners

-This allowed us to start no tilling our soybeans acres

-Reduced tillage on corn acres. No fall tillage, only light disc pass in spring

-No till soybeans from 2017 and reduced tillage on corn from 2018 to 2021

Moral of the story

-Start doing something. You need to take action yourself and try.

-We started with $4,000

-We spent zero additional money to implement reduced tillage on corn. We parked chisel plow, field cultivator, and 4WDs. We saved thousands.

-Our yields were consistent with previous full width tillage practices

-Focus on changing management practices and implementing soil health principles.

-Once you adapt all soil health principles everything snowballs

2019 Manure management…no more commercial P&K

-Traded both our two 9200 4WDs

-Traded 3 smaller horizontal beater spreaders

-Bought back 245 and 305 magnums and two Meyers 750 vertical beater spreaders

-Started surface applying pen pack on soybean acres

-Started renting liquid manure equipment

-Started going off U of M fertilizer recommendations for P & K

-Started to cover more acres away from farm at lower rates

Soil Test P (Mehlich-3 or Bray) Fertilizer Phosphorus-P Needed?

15 ppm	Low	Yes, likely response
15–25 ppm	Medium	Possibly needed
25–40 ppm	Optimum	Maintenance only
40–50 ppm	High/Very High	No P needed

Soil Test K (ppm) Fertilizer Potash-K Needed?

120 ppm	Low	Yes
120–170 ppm	Medium	Maybe
170–200 ppm	Optimum	Maintenance only
200–220 ppm	High/Very High	No K needed

Liquid manure

GPM x 485 / GPA x Width

7,300/4.5=1622 x 485 = 786,777

3,500 x 35 = 122,500

786,777/122,500=6.42 MPH

Solid manure

Lay out 1 sq ft board. Collect wight and multiply by 43,560

1 sq ft weighs .59 pounds
.59 x 43,560= 25,700

25,700/2000=12.85 tons per acre

Where we apply manure

-Apply after residue removal. Straw, corn silage, corn stalks

-In summer or fall plant cover crop after manure application

-In spring will apply on cover crops or seed cash crop right after

-Liquid manure usually goes to corn ground

-Solid manure goes to soybean ground

-Solid manure goes to light soil to build organic matter

Over application of commercial fertilizer or manure is harmful to the soil.

Both sources bring higher levels of salt and nitrogen which can be harmful to the biology living in the soil.

Lower application rates and apply more times per year.


MEYER'S VB750

Prevent fertilizer, manure, and nutrient loss

Commercial Fertilizer

-P&K are safe to surface apply and typically don't leach or run away

-Band nitrogen up front with planter

-Side dress remaining nitrogen like you always would. Dry spread. Y drop. Coulter.

-Purchase more stable sources of nitrogen such as ESN, AMS, or treat with inhibitors. Try to get away from using straight urea

-Watch the weather and try to apply with rain in forecast.

Manure

-Reduce your total tons and gallons per acre applied

-Our typical application is 3,500 GPA or 7-13 ton of solid

-The nitrogen in our manure will help break down crop residue and be released again

Plant cover crops

-Apply manure on cover crops or plant cover crop after manure application

-Cover crops capture, store nutrients and prevent leaching

-Cover crops will stop nutrient stratification

-Cover crops improve water infiltration rates to get nutrients in root zone

-Cover crops create organic matter.

-Every 1% OM holds 20-22k gallons of water

-Creates more pounds of nitrogen through mineralization

-Feeds microbes and forms aggerates and nutrient cycling

Cover crops incorporate 5 soil health principles on our dairy farm

Keeps the soil covered-Protecting soil from wind and water erosion and harmful temperatures.

Minimizes soil disturbance-Roots not iron performs our tillage. Biology not commercial fertilizer for nutrients and less herbicides, and insecticides.

Plant Diversity-New species, root systems, increase nutrient cycling

Maintain living roots-Cover crops allows for more green growing days for photosynthesis to feed the micros and biology, improve soil structure and water infiltration

Livestock integration-Cover crops make great alternate forages, and our cattle manure is bringing in fungi and rich nutrients. Cover crops improve our manure efficiency

Cover crops help control moisture in the soil profile

Letting cover crops grow in heavy soils pulls excess moisture away

It allows for earlier field operations and better harvest conditions. This fall we were seeding and hauling manure in rain

Cover crops suppresses weeds, reducing herbicide application

We plant rye, oats, radish, turnips, clover, and hairy vetch

Cover crops stealing moisture and nutrients

- Its true if managed incorrectly

Cover crops need to be managed by weather, moisture in profile, and C:N ratios

- Termination dates need to be evaluated and executed based on criteria
- Late fall seeded cover crops need moisture and heat to germinate

Cover crops are cool, but not cool when they don’t work

Japanese millet larva hatched in plant shoot

Soybeans ate by insects or unknown pest

Soybeans ate by turkeys, geese, and deer

Fall 2024. Late seeded with winter weather. Manure application. Rented ground after rye. 400 acres.

Weedy dirty fields

Fall and spring tillage wiped out annual weeds

Need to spray earlier with residuals

After small grains spray in fall or plant cover crops

Our soybean acres were weedy first 2 years until we changed management and broke the weed cycle. Pennycress and St. John’s Wort

Years 2020 and 2021…economics and soil health started to show

-Fuel savings! No more 4WD running doing fall or spring tillage

-No tillage points, shovels, and filters.

-No more rock picking

-Time and labor saved

-Machinery depreciation reduced

-Fertilizer expenses dramatically reduced

-Soil healing and changing

-Worm population growing

-Money was staying in the checkbook

-Happier times farming

We felt stuck…we wanted to no till corn and plant cover crops

Setting ourselves up for no till

-We re enrolled into a 5-year CSP plan. We chose no till, cover crops, nutrient management, and irrigation management enhancements.

-Crop adjustor helped us to determine yield on no till plot. Conventional ran 50 bpa better

-We saw the of lack of proper equipment, fertilizer placement, and soil health for decreased yield

Equipment purchases

-Purchased a Case 2150 12row 30” precision planter built to no till corn and beans

-Purchased a 25ft Case 500T no till air drill

-Purchased our own liquid manure equipment

-All equipment was financed through AGBMP loans to make P&I payments affordable.

-Having a reenrolled in CSP allowed our farm to offset our financial burden to make payments on equipment and to offset any potential revenue lost per acre

Reached out to the MN soil health coalition for technical support to fine tune our operation.

It is a farmer led organization promoting and educating all things soil health to farmers, consumers, food processors, and legislation members.

Farmer to farmer mentor networking.

Finding a mentor to share ideas, success, and failures accelerated our adaption rate.

No matter where you are in your journey from beginning to advanced there is someone to network to help you.

Annually host over 75 field days or educational webinars/podcasts across Minnesota.


CASE IH
CASE IH

Spring 2022

-Fertilizer placement
In row furrow starter
28% 2X0

-Row cleaners

-Sharp Disc openers

-Down force

-Closing system

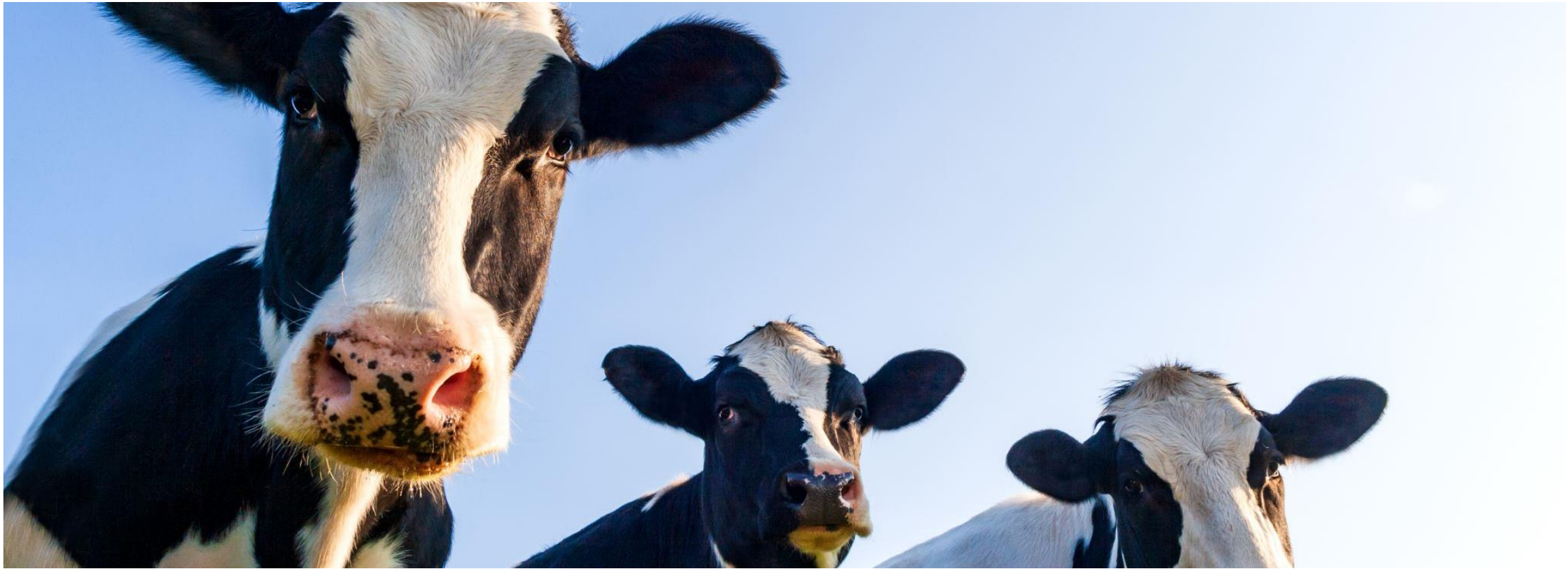
We apply nitrogen 8 to 10 times on our irrigated field

Weather station with soil moisture probe and rain bucket

Bringing dairy and livestock in.

People told me we would never be able to implement no till, have good yields and quality forages

Manure management would be impossible



Cattle are the solution. Adopting regenerative practices is easier with cattle!

Full circle system. We grow a crop. Harvest. Feed to cattle. Produce milk and beef. Manure. Cover crop. Repeat. No other industry can do that.

Best source of nutrients. Cattle manure and urine bring in fungi diversity, biology, and rich nutrients into our fields.

Added rotations. Small grains. Alfalfa. Cover crops. Forages, Japanese millet, rye, sorghum, grass.

Earlier harvested crops. Opportunities for multi species legume mixes to grow nitrogen and increase biology.

Harvesting corn silage, baling small grains and corn stover. Pulls excess residue occasionally.

Cattles health with regenerative practices

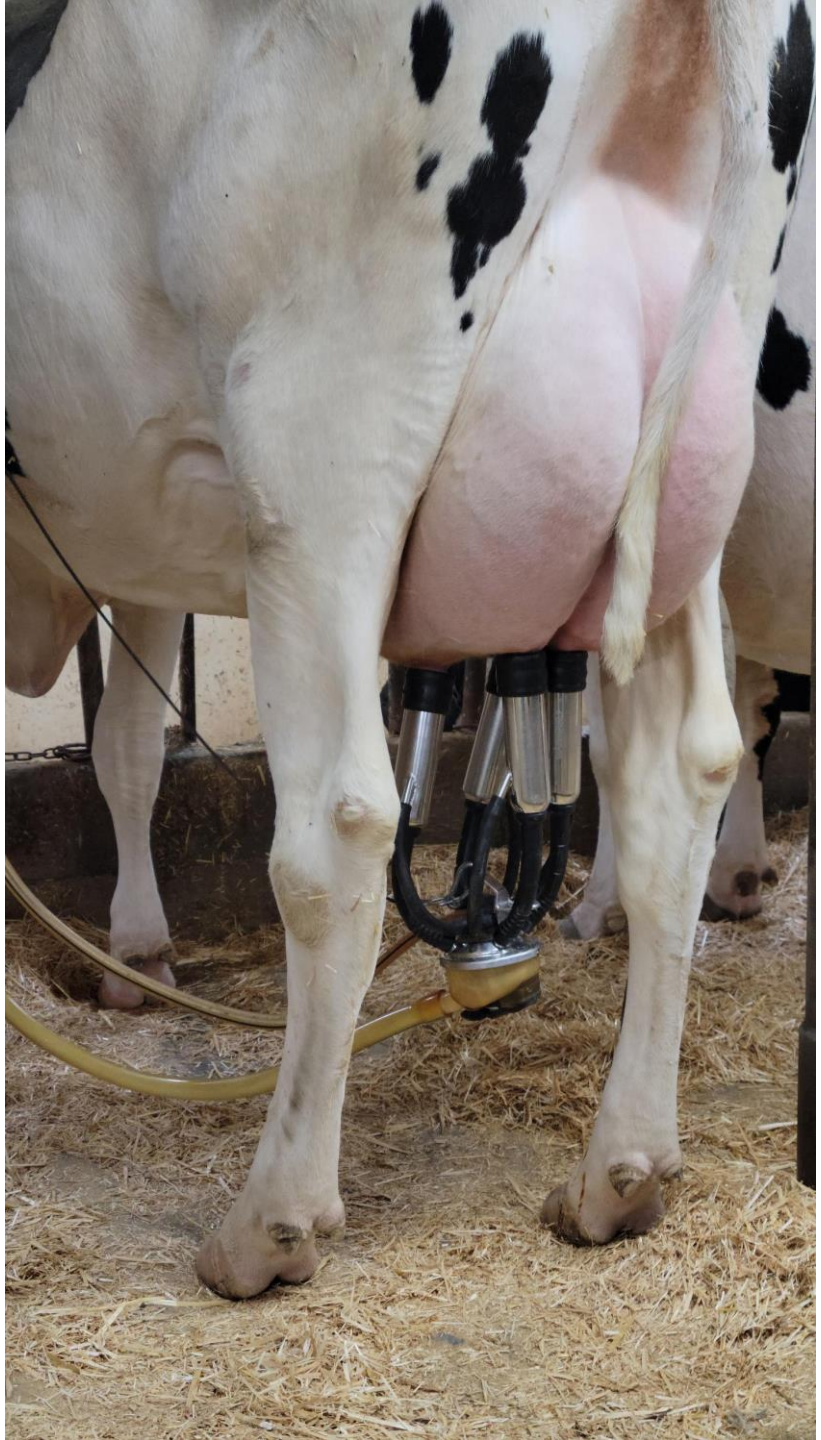
All things start from the soil; high functioning soil produces healthier crops.

Healthier forages fed to cattle are more energic and healthier.

Veterinary expenses and cattle treatments have gone down tremendously. Decreased respiratory illnesses, mastitis, milk fever, and cattle death loss under 1%

It's like it all went away once we started working with nature.

Consumers are looking for regenerative raised produce, milk, and protein.

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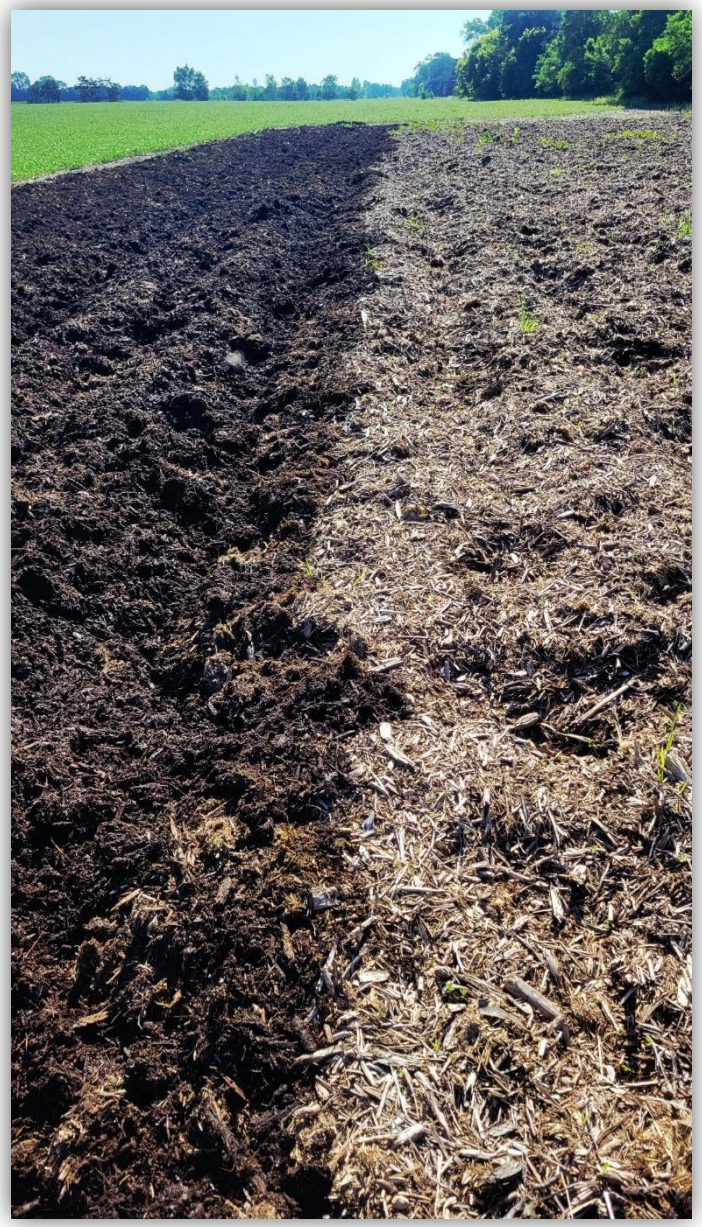

Dollar saved, dollar earned

- CONVENTIONAL
- Harvest
- Stalk chop-$15
- Haul manure(400 acres)
- Chisel-$25
- SPRING
- Disc-$20
- Pick Rock-$20
- Spread commercial P&K-$55
- Cultivate-$20
- Plant-$25
- Roll-$12
- TOTAL-$332

- REGENERATIVE
- Harvest
- Haul manure(700 acres)
- Plant cover-$55
- SPRING
- Plant-$40
- TOTAL-$235

$97 an acre input reductions

Key points to take away

- -EDUCATE yourself on how soil food web and biology works
- -Understand all 5 soil health principles and how to implement each one. The more you can do the faster and better results you will get
- -Have a purpose, or something you want to fix, and write down goals for each year and do them
- -Have proper equipment capable of performing in no till conditions. Row cleaners, down force, closing system, and nutrient banding are essential!
- -Have a nutrient/manure/herbicide plan. Reduce manure rates and cover more acres

Parking tillage equipment cost you nothing, it saves you money

We started with a dream and $4,000 investment

- -Get your coop and landlord involved right away. Tell them your plans and don't leave them in the shadows. You may have to educate them about soil health and your goals and change the way you spray and fertilize.
- -Sign up for CSP, EQIP, or any other funding available to cost share buying equipment, plant cover crops to take away financial risk away
- -Attend as many field days as possible and conferences to learn and network with other farmers.
- -Sign up to become a member for the MN soil health coalition and reach out to a mentor for support

Reasons why we made the switch

-Freedom from corporate ag

-Freedom from the bank

-Freedom from stress

-Freedom of working against nature. Much easier to work with nature

-Freedom of human and livestock health. The soil is alive

-Freedom to be home to spend time with family and be happy

Thank you!

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